

# EVALUATION OF POTABLE, NON- POTABLE AND RECYCLED WATER DEMANDS

## **Grapevine Project**

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## **1.0 SUMMARY OF GRAPEVINE PROJECT DEMANDS**

This engineering report summarizes the estimated potable, non-potable, and recycled water demands for the Grapevine Project in Kern County, California (the project). The demands were estimated for all project elements using well-established methodologies and land use assumptions that are consistent with the Grapevine Specific and Special Plans. The project is also designed to be very water-efficient; specifically, the project's water efficiency standards meet or are more stringent than current regulations and tertiary-treated recycled water is planned to be widely used in order to reduce potable water demands.

### **1.1 Grapevine Project Description**

The 8,010-acre Grapevine Project site is located entirely within unincorporated Kern County, just south of the junction of highways Interstate 5 and State Route 99. The project site is situated within the 15,644-acre Grapevine Planning Area identified in the Tejon Ranch Land Use and Conservation Agreement that will permanently preserve over 90% of Tejon Ranch as open space and limit development to designated areas near existing infrastructure such as Interstate 5.

The Grapevine Project, which would include 12,000 residential units and 5.1 million square feet of commercial and light industrial land uses<sup>1</sup>, is designed as a series of conveniently located village centers, each composed of a mix of housing, neighborhood-serving retail and office uses, schools, parks, and community services. Outside these village cores, the project incorporates a mix of residential uses, office, research and development, regional commercial, and light industrial/warehouse uses. Accordingly, the demands for the project were developed for each of these major land use elements.

### **1.2 Methodology Used to Estimate Water Use Factors**

As described below, the project's average annual water demand was estimated based on: (1) the application of well-established methodologies for estimating indoor and outdoor water use factors on a "per acre" or "per unit" basis, and (2) assumptions regarding water efficiency and the use of recycled water for certain end uses. These project-specific water use factors were then applied to each land use element anticipated by the Grapevine Specific and Special Plans. Additionally, the

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<sup>1</sup> The project could include up to 2,000 additional residential units, for a maximum of 14,000 units, through a reduction the commercial and light industrial land uses based on vehicle trip equivalency ratios.

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water demand estimates were conservatively increased to account for treatment and distribution system losses and various contingencies.

## **1.2.1 Residential Indoor Water Use Factors**

The residential indoor water use factors were developed using a predictive model of residential water use developed for the United States Environmental Protection Agency (U.S. EPA) and several large water utilities (DeOreo, 2011b). Based on assumptions regarding fixture efficiency, household size, and other key factors, indoor water use factors were estimated for the different housing product types described in the Grapevine Specific and Special Plan. These product types include “Standard Residential” units, which are detached single-family homes, and “Village Center Residential” units, which include higher density and multi-family units.

## **1.2.2 Commercial, Institutional, and Industrial (CII) Indoor Water Use Factors**

The CII indoor water use factors were developed using the data and methodology included in the Pacific Institute’s *Waste Not, Want Not: The Potential for Urban Water Conservation in California* (2003), also called the “Pacific Institute study”. This study correlated indoor water use in a wide range of CII facilities to the number of employees in that facility based on statewide averages of measured data. Per the study, the resultant “employee water use factors” were then updated to reflect water efficiency standards implemented since the study was completed. The CII indoor water use factors for the project were estimated for the assumed mix of specific CII land uses that are contemplated in the Grapevine Specific and Special Plans.

## **1.2.3 Outdoor Water Use Factors**

The outdoor water use factors were estimated using the landscape irrigation demand model described in the recently-updated Model Water Efficient Landscape Ordinance (MWELo; DWR, 2015). The MWELo requires that the annual estimated total water use (ETWU) for landscape irrigation not exceed a Maximum Applied Water Allowance (MAWA). The MAWA is calculated based on the regional reference evapotranspiration rate, an evaporation adjustment factor, the total landscaped area, and the area of “special landscaped area”.<sup>2</sup> For each major land use element within the project (e.g., residential, CII, and community landscaping), a landscape ETWU was estimated based on a combination of four key landscape palettes (e.g., high or low water use

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<sup>2</sup> Special Landscaped Area includes areas of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

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plantings) and assumptions of recycled or potable water use. In all instances, the ETWU for landscaped areas within the project meet or exceed the efficiency standards of the MWELo.

## 1.3 Water Demand by Major Sector and End Use

Based on assumptions regarding project land use at build out as described in the Grapevine Specific and Special Plan, and the application of the water demand methodologies described above, the total water demand of the project by major sector and end use was estimated. As described below and shown in Table 1, the total demand of the project development (including contingencies) would be 8,261 acre feet per year (AFY) at full build out. A summary of the water use by sector and the contingencies is provided below.

| Land Use Category                           | Estimated Total Water Use (AFY) | Estimated Indoor Water Use (AFY) | Estimated Outdoor Water Use (AFY) |
|---------------------------------------------|---------------------------------|----------------------------------|-----------------------------------|
| Residential                                 | 3,637                           | 1,920                            | 1,717                             |
| Commercial, Institutional and Industrial    | 1,180                           | 588                              | 592                               |
| Community Landscaping                       | 2,415                           | -                                | 2,415                             |
| Treatment system losses                     | 268                             | -                                | -                                 |
| Distribution system losses                  | 362                             | 125                              | 236                               |
| <i>Subtotal Average Annual Water Demand</i> | <i>7,861</i>                    | <i>2,634</i>                     | <i>4,960</i>                      |
| Contingency                                 | 400                             | -                                | -                                 |
| <i>Project Annual Average Water Demand</i>  | <i>8,261</i>                    | <i>-</i>                         | <i>-</i>                          |

*Excerpt from Table 1: Estimated Grapevine Project Annual Water Demand*

### 1.3.1 Residential Water Use

Residential water use is comprised of “indoor water use factors” which include water used to shower, wash clothes, and flush toilets, and “outdoor water use factors” which primarily account for landscape irrigation within a residential lot. The project’s residential water use was calculated by multiplying the unique water use factors for each housing type by the planned number of units of that type.

Based on application of the U.S. EPA methodology, the average indoor water use factor for the project’s residential dwelling units was 0.16 AFY, which multiplied by 12,000 units equated to a total residential indoor water use of approximately 1,920 AFY.

Based on MWELo and the assumed landscaped areas within each residential lot, the outdoor water use factors were estimated as 0.08 AFY/du for Village Center Residential units, and 0.17 AFY/du

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for Standard Residential units. Multiplied by the respective number of units, the total residential outdoor water use was estimated to be approximately 1,717 AFY.

Total residential water use, therefore, was estimated to be approximately 3,637 AFY (i.e., 1,920 AFY indoor use plus 1,717 AFY outdoor use). It was assumed that potable water would be used to meet all residential demands.

## **1.3.2 Commercial Industrial and Institutional Water Use**

Based on application of the Pacific Institute study methodology, it was estimated that the project's CII indoor water use per employee would range from 53 gallons per day (gpd) for village center offices to 847 gpd for restaurants in the project's high-traffic, highway-serving areas. Based on the assumed distribution and areas of the different CII land uses, it was estimated that total CII indoor use would be approximately 588 AFY. Based on MWELo and the assumed landscaped areas, it was estimated that outdoor water use in the CII portion of the project would be approximately 592 AFY, bringing the total CII water use to approximately 1,180 AFY. It was assumed that recycled or non-potable water would be used for CII landscape irrigation, with the exception of at schools, where potable water would be applied for landscape irrigation.

## **1.3.3 Community Landscaping Water Use**

The project includes significant acreage dedicated to "community landscaping" that includes landscaped areas in parks, roadways, and other community areas. Based on MWELo and the assumed landscaped areas, total community landscaping water use for the project was estimated to be approximately 2,415 AFY. It was assumed that recycled or non-potable water would be used for community landscaping irrigation, with the exception of residential common areas, where potable water would be applied for landscape irrigation.

## **1.3.4 Treatment and Distribution System Losses**

All water treatment and distribution systems experience system losses from drinking water treatment, system maintenance, and leaks. Water treatment and distribution system losses are assumed to be 10% of the total project potable water use and 5% of recycled water use, for a total

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of 629 AFY. These assumptions are consistent with operation of a new, well-designed and maintained treatment<sup>3</sup> and distribution system<sup>4</sup>.

## 1.3.5 Water Demand Contingency

A water demand contingency of 400 AFY was conservatively added to the overall project water demand to account for unforeseen water uses. Potential uses allowed by the Grapevine Specific include additional housing up to 14,000 total units, urban agriculture, or certain water-intensive industrial land uses.

## 1.4 Water Demand and Supply By Source

As described below and shown in Table 2, the project's demands will be met by a combination of potable and non-potable water supply sources that will be treated onsite at water and wastewater treatment plants operated by the Tejon-Castac Water District (TCWD) (EKI, 2015a; 2015b).

| Water Source                               | Water Use Category             | Estimated Total Water Demand (AFY) |
|--------------------------------------------|--------------------------------|------------------------------------|
| California Aqueduct (Nickel Water)         | Potable Water                  | 5,620                              |
|                                            | Supplemental Non-Potable Water | 258                                |
|                                            | Contingency                    | 400                                |
| <i>California Aqueduct Subtotal</i>        |                                | 6,278                              |
| Recycled Water                             | Recycled Non-Potable Water     | 1,983                              |
| <b>Project Average Annual Water Demand</b> |                                | <b>8,261</b>                       |

*Excerpt from Table 2: Estimated Grapevine Annual Water Demand by Source*

### 1.4.1 Potable Demand and Supply

A total of 5,620 AFY of treated, potable water would be used to meet all indoor demand and residential and school landscaping outdoor demand<sup>5</sup>. The source of this potable supply would be

<sup>3</sup> <http://www.pall.com/main/water-treatment/direct-coagulated-water-47223.page>

<sup>4</sup> The California standard is 10% allowable water loss in existing water systems (EPA, 2010. *Control and Mitigation of Drinking Water Losses in Distribution Systems*, November 2010). Based on professional experience, we have assumed that the new project water distributions systems will have 5% water loss.

<sup>5</sup> Per the Grapevine Specific and Special Plans recycled water may be used for landscape irrigation throughout the project. However, for purposes of this report we have conservatively assumed that potable water will be used to irrigate residential landscaping.

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Nickel Water<sup>6</sup> that is conveyed through the California Aqueduct and treated at the project's potable water treatment plant(s) (EKI, 2015b).

## 1.4.2 Non-Potable Demand and Supply

A total of 2,241 AFY of non-potable water would be used to meet non-residential, roadway, and selected common area landscape irrigation demand. Approximately 1,983 AFY of recycled water would be generated within the project in an average rainfall year (Attachment A). An additional 258 AFY of supplemental, non-potable water would be used in an average rainfall year to meet selected landscape irrigation demands that exceed the available recycled water supply. The source of this non-potable supply would be Nickel Water that is conveyed through the California Aqueduct, filtered, and delivered into the Grapevine Project's non-potable water distribution system.

## 1.4.3 Contingency

As discussed above, a water demand contingency of 400 AFY was conservatively added to the estimated project water demand. Depending on its final designated uses, the water demand contingency may be supplied with either fully-treated potable or filtered non-potable Nickel Water (EKI, 2015b). Further, to the extent that the water demand contingency is used to meet additional indoor demands, this would generate additional recycled water that could be used to meet selected non-potable demands within the project (EKI, 2015a).

One potential use of the contingency is to add additional housing up to 14,000 total units consistent with the Grapevine Specific and Special Plans. Water demand estimates for this scenario and the adjusted land use assumptions are included in Attachment B.

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<sup>6</sup> Tejon Ranchcorp, an affiliate of the Grapevine Project applicant, has the right to receive 6,693 AFY of water from the Kern County Water Agency (KCWA) through at least 2079 as the assignee of a Kern River water transfer agreement between KCWA and the Nickel Family LLC (the "Nickel Water"). The delivery of Nickel Water is 100 percent reliable on a year-to-year basis and is not subject to hydrological variability, regulatory requirements, or supply constraints that may affect other water sources.

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## **2.0 INTRODUCTION**

This engineering report summarizes the estimated potable, non-potable, and recycled water demands for the project based on the proposed housing product mix; commercial, institutional, and industrial (CII) land uses; and landscaping features and palette. This section provides an overview of the Grapevine Project.

### **2.1 Grapevine Project Description**

#### **2.1.1 Project Location**

The Grapevine Project is located in the west-central portion of Tejon Ranch (the Ranch). The approximately 270,000-acre Ranch is currently held in private ownership by Tejon Ranchcorp (TRC). The Ranch includes a large portion of the Tehachapi Mountains as well as smaller portions of the San Joaquin and Antelope Valleys. Generally, the Ranch extends from Interstate 5 (I-5) on the western side to State Route 58 (SR 58) on the northern side and SR 138 on the southern side (Figure 1).

The 8,010-acre Grapevine Project site is entirely within unincorporated Kern County, just south of the junction of I-5 and SR 99. Downtown Bakersfield is approximately 25 miles north of the project. The majority of the project is on the east side of I-5, but a smaller portion lies on the west side of I-5. The project site is bisected by the California Aqueduct (Figure 1 and Figure 2).

The Grapevine Project site lies mainly in the Grapevine and Pastoria Creek U.S. Geological Survey (USGS) 7.5-minute quadrangles. There is one parcel and a portion of two other parcels in the project site that lie entirely within the Mettler USGS 7.5-minute quadrangles. The latitude and longitude of the approximate center of the site is 34°57'9" N and 118°55'39" W. The Universal Transverse Mercator (UTM) coordinates for the approximate center are UTM Easting (meters) 323999 and UTM Northing (meters) 3869472 in Zone 11.

#### **2.1.2 Project Overview**

The 8,010-acre project site is within the 15,644-acre Grapevine Planning Area identified in the Tejon Ranch Land Use and Conservation Agreement, a landmark agreement reached in 2008 with leading environmental organizations (including the Sierra Club, Natural Resources Defense Council, California Audubon Society, Endangered Habitats League, and Planning and Conservation League) to permanently preserve over 90% of Tejon Ranch as open space and limit development to designated areas near existing infrastructure such as I-5.

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The Grapevine Project site includes approximately 8,010 acres, of which approximately 3,232 acres (or about 40%) would be designated for agriculture (with grazing and open space as the predominant land uses) and approximately 4,778 acres (about 60%) would be developed as a new residential community and employment center. The community would leverage and build upon the economic expansion and job growth that has occurred at Tejon Ranch Commerce Center (Figure 2), located immediately north of the project on I-5. The Grapevine Project would feature a series of compact neighborhoods linked by bicycle and pedestrian trails that provide convenient access to grocery and drugstores, professional services, schools, and parks. The project site is located along I-5, at the gateway to the Central Valley, and is immediately adjacent to the extensive open space that was conserved in the Tejon Ranch Land Use and Conservation Agreement.

The project, which would include 12,000 residential units and 5.1 million square feet of commercial and light industrial land uses<sup>7</sup>, is designed as a series of conveniently located village centers, each composed of a mix of housing, neighborhood-serving retail and office uses, schools, parks, and community services. Outside the village cores, the Grapevine Project includes a mix of residential uses, office, research and development, regional commercial, freeway-oriented commercial, and light industrial/warehouse uses. Other potential public facilities, including fire stations, a sheriff substation, transit facilities/park-and-rides, and water and wastewater treatment facilities, are proposed throughout the community.

Access to the first phases of the Grapevine community would be from Interstate 5 at the existing Grapevine Road and Laval Road interchanges. During later phases of development, the existing Grapevine Road/ Interstate 5 interchange may be expanded and relocated to the north. To allow for the relocation and replacement of the interchange, an existing Vehicle Enforcement Facility may be relocated to a TRC-owned parcel on the west side of the junction of I-5 and CA-99. The project would also improve an existing TRC agricultural road east of the project area to provide access for truck traffic currently using Edmonston Pumping Plant Road to travel to properties east of the project. The circulation network within the project is composed of primarily two- and four-lane arterials, collector streets, and local streets organized in a grid pattern. All roads within the project site would be public. Multipurpose trails are proposed along Grapevine Creek, Cattle Creek, the southern foothills, and the open space adjacent to the California Aqueduct and at other locations throughout the project site. Some of these trails would connect to on-street, Class 2 bike lanes. Water and sewer service would be provided by TCWD.

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<sup>7</sup> The project could include up to 2,000 additional residential units, for a maximum total of 14,000 units, through a reduction of commercial/industrial square footage based on vehicle trip equivalency ratios.

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## **2.1.3 Project Construction Scenario**

The project site is divided into six planning areas ranging in size from approximately 450 to 1,400 acres. Development would be phased over a period of 19+ years, starting with the development of Planning Area 6a and/or 3 and continuing with the balance of the planning areas nearest to the initial phase. Buildout of each phase is projected to take approximately 2 to 4 years (Phase 1: 2 years; Phase 2: 4 years; Phase 3: 3 years; Phase 4: 4 years; Phase 5: 4 years; Phase 6: 2 years), with the first phase commencing in 2016. The portions of the site that are proposed to remain in exclusive agriculture/open space are primarily located along the southern edge of the California Aqueduct, along the southern portion of the project site at the foothills of the Tehachapi Mountains, and along Grapevine and Cattle Creeks.

## **2.1.4 Project Operation Scenario**

The project operations are described in the Grapevine Specific and Special Plan, and land uses associated with operations are described in the Grapevine Special Planning District Plan.

## **2.2 Project Water Demand Estimation**

The project's average annual water demand was estimated based on: (1) the application of well-established methodologies for estimating indoor and outdoor water use factors on a "per acre" or "per unit" basis, and (2) assumptions regarding water efficiency and the use of recycled water for certain end uses. These project-specific water use factors were then applied to each land use element anticipated by the Grapevine Specific and Special Plans. Additionally, the water demand estimates were conservatively increased to account for treatment and distribution system losses and various contingencies.

The following sections describe how water the water demands were estimated for the project:

- Section 3.0 - Assumptions Regarding Project Water Efficiency
- Section 4.0 - Indoor Water Use Estimates
- Section 5.0 - Outdoor Water Use Estimates
- Section 6.0 - Projected Water Use By Sector
- Section 7.0 - Assumed Treatment and Distribution System Losses
- Section 8.0 - Additional Factors Impacting Total Water Demand

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The following sections then present the results and how water demands will be managed and /or mitigated in the future:

- Section 9.0 - Total Estimated Potable, Non-potable and Recycled Water Demands
- Section 10.0 - Water Conservation Education, Implementation and Enforcement Measures
- Section 11.0 - Offsite and Cumulative Impacts
- Section 12.0 - Mitigation Measures

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## 3.0 ASSUMPTIONS REGARDING PROJECT WATER EFFICIENCY

The project is designed to be water-efficient, and would utilize tertiary-treated recycled water to the maximum extent feasible to reduce potable water demands. The specific water efficiency requirements summarized in the table below and described in Sections 3.1 through 3.3 have been incorporated into the project and are the basis for the water demand estimates presented herein. In all cases the project's water efficiency standards meet or are more stringent than current regulations.

| Statute or Regulation                                                                     | Citation                                                                                   | Description                                                                                                                                                                                                             | Applicability to Project                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Executive Order (EO) B-29-15                                                              | EO B-29-15                                                                                 | <ul style="list-style-type: none"> <li>EO B-29-15 was issued on April 1, 2015 with the goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013.</li> </ul>            | <ul style="list-style-type: none"> <li>Certain EO directives are applicable to the project.</li> <li>Project meets or exceeds all applicable regulations, see Section 3.4.</li> </ul>                                                                                               |
| California Green Building Standards (CALGreen) Code                                       | CCR Title 24, Part 11<br><br>Chapter 17.10 of the Kern County Code of Building Regulations | <ul style="list-style-type: none"> <li>Cal Green Code (which Kern County adopts by reference) includes water efficiency requirements for new residential and CII structures.</li> </ul>                                 | <ul style="list-style-type: none"> <li>Applicable to the planning, design, construction, use, and occupancy of newly-constructed residential and CII buildings.</li> <li>Project meets or exceeds all applicable water efficiency regulations, see Sections 3.1 and 3.2.</li> </ul> |
| Model Water Efficient Landscape Ordinance (MWELO) July 9, 2015 Final.                     | CCR Title 23, Division 2, Chapter 2.7                                                      | <ul style="list-style-type: none"> <li>Establishes an outdoor water budget for new and renovated landscaped areas that are 500 square feet or larger.</li> </ul>                                                        | <ul style="list-style-type: none"> <li>Applicable to all landscaping within the project.</li> <li>Project meets or exceeds all applicable regulations, see Sections 3.2 and 3.4.</li> </ul>                                                                                         |
| CALGreen Code as Adopted by the Building Standards Commission                             | CCR Title 24, Part 11<br>Emergency Building Standard<br>DSA-SS EF-02/15                    | <ul style="list-style-type: none"> <li>The Building Standards Commission, which regulates the construction of public schools and community colleges in California, approved a modified version of the MWELO.</li> </ul> | <ul style="list-style-type: none"> <li>Applicable to public schools and community colleges within the project.</li> <li>Project meets or exceeds all applicable regulations, see Section 3.2.</li> </ul>                                                                            |
| Kern County Code of Ordinances – Landscaping Requirements and Water Efficient Landscaping | Title 19, Chapter 19.86, § 19.86.050 and §19.86.060                                        | <ul style="list-style-type: none"> <li>Requires that a minimum of five percent (5%) of the total developed lot area shall be landscaped.</li> </ul>                                                                     | <ul style="list-style-type: none"> <li>Applicable to landscaping for CII land uses within the project.</li> <li>Project meets or exceeds the standards in these regulations, see Section 3.2.</li> </ul>                                                                            |

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| Statue or Regulation                                                                      | Citation                            | Description                                                                                                                                                                                                                                                      | Applicability to Project                                                                                                                                                               |
|-------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kern County Code of Ordinances – Landscaping Requirements and Water Efficient Landscaping | Title 19, Chapter 19.86, § 065      | <ul style="list-style-type: none"> <li>The Kern County Code of Ordinances Water Efficient Landscaping section, is currently based on the 2009 version of the MWEL, but is required to be updated to the 2015 version of the MWEL by December 1, 2015.</li> </ul> | <ul style="list-style-type: none"> <li>Applicable to all landscaping within project.</li> <li>Project meets or exceeds the standards in these regulations, see Section 3.2.</li> </ul> |
| California Water Code                                                                     | Division 6, Part 2.10, §10910-10915 | <ul style="list-style-type: none"> <li>Requires the development of a project-specific Water Supply Assessment.</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>Applicable to the project.</li> <li>Project complies with this regulation, see Section 12.0.</li> </ul>                                         |

## 3.1 Indoor Water Use Efficiency

The California Green Building Standards Code, also called the “CALGreen Code,”<sup>8</sup> establishes building requirements for residential and non-residential structures, including water efficiency and conservation requirements. With limited exceptions, the CALGreen Code applies to the planning, design, construction, use, and occupancy of newly-constructed buildings and structures. Chapter 17.10 of the Kern County Code of Building Regulations adopts the CALGreen Code by reference.

For indoor water use, these building codes specify the maximum allowable flowrates for fittings and fixtures consistent with the California Health and Safety Code, California Plumbing Code, and the California Energy Commission’s proposed Appliance Efficiency Regulations, including the following standards, which have recently been updated in response to the Governor’s Executive Order No. B-29-15:

- Toilets - 1.28 gallons per flush,
- Showers - 2 gallons per minute (gpm) at 80 pounds per square inch (psi) of water pressure,
- Bathroom faucets - 1.2 gpm at 60 psi,
- Kitchen faucets - 1.8 gpm at 60 psi,
- Common area bathroom faucets - 0.5 gpm at 60 psi, and
- Urinals - 0.125 gallons per flush.

<sup>8</sup> California Code of Regulations (CCR) Title 24, Part 11.

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The project indoor water demands were estimated based on the following assumptions:

- **Residential Indoor Efficiency.** For residential indoor use, the project would comply with the CALGreen Code standards (CCR Title 24, Part 11) for residential development as implemented by Kern County<sup>9</sup>. Prior to issuance of residential building permits, the applicant shall provide written verification of compliance with these standards.
- **Non-Residential Indoor Efficiency.** For non-residential indoor use, the project would comply with the CALGreen Code standards (CCR Title 24, Part 11) for non-residential development as implemented by Kern County<sup>9</sup>. Prior to issuance of building permits for commercial or industrial development, the applicant shall provide written verification of compliance with these standards.

## 3.2 Outdoor Water Use Efficiency

The CALGreen Code requires an outdoor water budget that is consistent with the California Department of Water Resources (DWR) Model Water Efficient Landscape Ordinance (MWELO), and requires that automatic irrigation system controllers for landscaping be provided by the builder.

Kern County adopted its own landscaping standards in Chapter 19.86 of the Kern County Zoning Ordinance that guide landscape design criteria and that are largely consistent with the 2009 version of the DWR MWELO. In response to the Governor's Executive Order No. B-29-15, DWR has modified and adopted a revised version of the MWELO that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas. Local land use agencies (cities and counties) have until December 1, 2015 to adopt the DWR MWELO or adopt their own ordinance, which must be at least as effective in conserving water as the DWR MWELO. We have assumed that, as they did before, Kern County will adopt the 2015 DWR MWELO without revision.

As such, the project outdoor water demands were estimated based on the following assumptions:

- **Residential Landscaping Efficiency.** For residential landscaping, the project would require that a maximum of 40% of each residential lot, not including streets and sidewalks, would be planted and require irrigation. Further, a maximum of 25% of the landscape area (i.e., no more than 10% of the lot) can include high-water use plantings (HWUPs), with

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<sup>9</sup> Chapter 17.10 of the Kern County Code of Building Regulations.

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the difference consisting of low-water use plantings (LWUPs). This standard complies with the adopted MWELo. Prior to issuance of residential building permits that include landscaping, the applicant shall provide written verification of compliance with these standards.

- **Non-Residential Landscaping Efficiency.** For non-residential landscaping, the project would require that a maximum of 20% of the land use area, not including streets and sidewalks, would be planted and require irrigation. A maximum of 25% of this landscaped area would consist of HWUPs, with the difference consisting of LWUPs. This standard is more stringent than the requirements of the adopted MWELo. Prior to issuance of building permits for CII development that include landscaping, the applicant shall provide written verification of compliance with this standard.
- **School Landscape Efficiency.** For schools landscaping, the project would require that a maximum of 50% of the land use area, would be planted and require irrigation. A maximum of 50% of the landscaped area would consist of HWUPs, and the difference would consist of LWUPs. This standard is more stringent than the requirements of the adopted MWELo. Prior to issuance of building permits for school developments that include landscaping, the applicant shall provide written verification of compliance with this standard.
- **Parks Landscape Efficiency.** For parks landscaping, the project would limit HWUPs to no more than 45% of the total land use area and maximize the use of native and other low water use trees, shrubs, and groundcover to the extent consistent with the intended land use benefits. This standard is more stringent than the requirements of the adopted MWELo. Prior to issuance of building permits for park improvement plans, the applicant shall provide written verification of compliance with this standard.
- **Buffer Zone Landscaping Efficiency.** In buffer zones and other undeveloped open space within the project, irrigated landscaping plantings would be restricted to sparsely-clustered, moderate water use and native trees and shrubs. This standard is more stringent than the requirements of the adopted MWELo. Prior to approval of residential common area landscape improvement plans, the applicant shall provide written verification of compliance with these standards.
- **Residential Common Area Landscaping Efficiency.** For residential common area landscaping, the project would limit HWUPs to no more than 25% of the total land use area and maximize the use of native and other low water use trees, shrubs, and groundcover to the extent consistent with the intended land use benefits. This standard is more stringent than the requirements of the adopted MWELo. Prior to approval of residential common

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area landscape improvement plans, the applicant shall provide written verification of compliance with these standards.

- **Roadway Landscaping Efficiency.** Irrigated landscaping along project roadways would be limited to a combination of native and low water use trees, shrubs and groundcover and/or irrigated agricultural. Irrigated landscaping in project round-a-bouts would be limited to native and other low water use shrubs and groundcover. This standard is more stringent than the requirements of the adopted MWEL. Prior to approval of common area landscape improvement plans, the applicant shall provide written verification of compliance with these standards.
- **Golf Course Landscaping Efficiency.** Any golf course constructed as part of the project would be designed as a "links-style" course that would include no more than 40% irrigated turf or other high-water use plantings. This standard is more stringent than the requirements of the adopted MWEL. Prior to issuance of permits for golf-course development, the applicant shall provide written verification of compliance with these standards.
- **Urban Agriculture.** Urban agriculture that may be integrated into the project would be required to have average water uses of 5 AFY/acre or less in order to comply with the adopted MWEL. Prior to approval of urban agriculture improvement plans, the applicant shall provide written verification of compliance with these standards.

The demand estimates for the outdoor residential and non-residential portions of the project are consistent with implementation of the project's water efficiency design standards.

## 3.3 Recycled Water Use

All wastewater produced by indoor water use within the project would be collected and treated to California Title 22 unrestricted reuse standards (EKI, 2015a). The project would make full use of recycled water for appropriate irrigation and other purposes, consistent with the Grapevine Specific and Special Plans' criteria for recycled water use; this includes the ability to use recycled water for irrigation at residential parcels<sup>10</sup>.

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<sup>10</sup> Per the Grapevine Specific and Special Plans recycled water may be used for landscape irrigation throughout the project. However, for purposes of this report we have conservatively assumed that potable water will be used to irrigate residential landscaping.

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## 3.4 Compliance with Executive Order B-29-15

In response to the ongoing drought in California, Governor Brown issued Executive Order B-29-15 on April 1, 2015 with the goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the Executive Order currently extends through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The Executive Order includes specific directives which set strict limits on water usage in the State. The following directives are applicable, directly or indirectly, to the project:

- **Directive 2.** Directs the State Water Resources Control Board (SWRCB) to impose restrictions to reduce urban potable water use by 25%. While not directly applicable, all project design features address this directive by incorporating both indoor and outdoor water efficiency measures into the project design to reduce water demands.
- **Directive 5.** Directs the SWRCB to impose restrictions that commercial, industrial and institutional properties, such as campuses, golf courses, and cemeteries, immediately implement water efficiency measures to reduce potable water usage by 25%. While not directly applicable, the project's water efficiency design standards, described above, address this directive by incorporating both indoor and outdoor water efficiency measures to reduce non-residential water demands.
- **Directive 6.** Directs the SWRCB to prohibit use of potable water to irrigate ornamental turf in public street medians. The project's water efficiency design standards, described above, address this directive directly.
- **Directive 7.** Directs the SWRCB to prohibit use of potable water to irrigate at new homes and buildings that is not delivered by drip or microspray. This directive has been superseded by the revised MWELO (see Directive 11).
- **Directive 11.** Directs DWR to update the MWELO (DWR, 2015). The project's water efficiency design standards, described above, address this directive directly by ensuring that all landscaping meets the requirements that are described in the adopted MWELO.
- **Directive 16.** Directs the California Energy Commission to adopt new water efficiency standards for appliances. The project's water efficiency design standards described above address this directive directly by ensuring that the project complies with the CalGreen Code.

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## **4.0 INDOOR WATER USE ESTIMATES**

### **4.1 Residential Indoor Water Use**

Average residential unit water use factors were estimated for the different housing product types described in the Grapevine Specific and Special Plan. These product types include the following dwelling unit classifications: (1) “Standard Residential” units, which are detached single-family homes; and (2) “Village Center Residential” units, which include higher density or multi-family units. Table 3 summarizes the planned number of residential units, median housing density, and household size.

The residential water use factors are comprised of “indoor water use factors” which include water used to shower, wash clothes, and flush toilets, and “outdoor water use factors” which primarily account for landscape irrigation within a residential lot. Indoor water use factors were developed using a predictive model of residential water use developed for the U.S. EPA and several large water utilities (DeOreo, 2011b). The development of the residential outdoor water use factors are discussed in detail in Section 5.0.

#### **4.1.1 Residential Indoor Water Use Methodology**

The U.S. EPA and several water utilities funded a detailed study of residential water use in single family homes throughout the United States (DeOreo, 2011b). A predictive model was developed from a statistical analysis of the study data. This model is based on residential indoor water use data collected over the years 2006 through 2010 at 300 single family homes constructed since 2001 in nine American cities, including one city in California.

Because this model reflects actual water use patterns observed in recently-constructed and occupied homes, it represents a sound basis for predicting indoor water use in new developments, which would be required to meet even higher standards of efficiency such as the CALGreen Code. The results of this model also compare well with recent residential per capita data being published for communities throughout California by the SWRCB (2015) and residential water use factors developed by others based on studies conducted in Bakersfield, such as that done by Vaughn Water Company (Vaughn Water Company, 2009).

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The predictive model allows the projected total residential indoor use to be calculated from these demographic and water conservation inputs:

$$\text{INDOOR} = [71.2 \times \text{RESIDENTS}^{0.63} \times (1 + 0.91 \times \text{LEAK}) \times (1 - 0.23 \times \text{H.EFF.CW}) \times (1 + 0.12 \times \text{SOFTENER})] + 11.8$$

|        |             |                                                                                                     |
|--------|-------------|-----------------------------------------------------------------------------------------------------|
| where: | INDOOR =    | indoor water use in gallons per home per day                                                        |
|        | RESIDENTS = | number of residents in household                                                                    |
|        | LEAK =      | the fraction of homes with a significant leak greater than 50 gallons per day                       |
|        | H.EFF.CW =  | the fraction of homes with a high-efficiency clothes washer that uses less than 30 gallons per load |
|        | SOFTENER =  | the fraction of homes with a water softening system                                                 |

## 4.1.2 Residential Indoor Water Use Estimate

Residential indoor water use factors were developed to reflect the project's water efficiency design standards and the following assumptions:

- A total of 75% of clothes washers installed in residential units would use less than 30 gallons per load.<sup>11</sup>
- Leaks greater than 50 gallons per day would occur in at most 9% of the homes, which represents a conservative assumption (i.e., likely higher than would actually be encountered based on empirical data from existing residential developments, DeOreo, 2011b).
- Based on the most recently available Kern County demographic information, the average project household size is assumed to be 3.2 people.<sup>12</sup>

Based on these assumptions, indoor water use for each residential unit is estimated to be 0.16 acre-feet per year per dwelling unit (AFY/du) and the total residential indoor water use for the project is estimated to be 1,920 AFY (see Table 1 and Table 3).

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<sup>11</sup> For context, approximately 39% of existing homes in the United States have clothes washers that use less than 30 gallons per load (DeOreo, 2011b) and the majority of commercially-available home washing machines today use under 30 gallons per load.

<sup>12</sup> <http://www.dof.ca.gov/Research/demographic/reports/estimates/e-5/2011-20/view.php>

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## 4.2 Commercial, Industrial, and Institutional Indoor Water Use

The CII water use factors were estimated for the CII land uses described in the Grapevine Specific and Special Plans. The CII land uses within the Grapevine Project would encompass a range of facilities, including commercial (retail and restaurant), employment (office, warehouse, light industrial, and research and development), community facilities, schools, and utilities. Though the distribution of these specific CII land uses and facilities will be subject to refinement, the water use factors developed herein and described below are expected to be generally representative of project CII land uses.

The CII water use factors are comprised of “indoor water use factors” which include cooling, selected domestic uses, and industrial processes, and “outdoor water use factors” which primarily account for landscape irrigation within a CII lot. The CII indoor water use factors were primarily derived from the Pacific Institute’s *Waste Not, Want Not: The Potential for Urban Water Conservation in California* (2003). In one exception, indoor water use for solar farms was derived from information developed by the Bureau of Land Management (2012). The development of the CII outdoor water use factors are discussed in detail in Section 5.0.

### 4.2.1 CII Indoor Water Use Methodology

Indoor water use in the CII sector includes showering at gyms and hotels, food preparation, commercial dish washing, laundromats, industrial processes, water fountains, and commercial car washes. Several studies have correlated CII water use with factors such as building area and the number of employees in a facility (Dziegielewski, 1990; Idaho Department of Water Resources, 2001; Santa Monica, 2004; and Soquel Creek Water District, 2013). The primary reference used herein to estimate indoor project CII water use factors is the Pacific Institute’s *Waste Not, Want Not: The Potential for Urban Water Conservation in California* (2003), also called the “Pacific Institute study”. This study correlated CII water use to the number of employees in a facility based on statewide averages of measured CII water use data during the late 1990s and 2000.

Based on the Pacific Institute study, indoor water use factors were developed for each project CII land use category including commercial facilities such as retail and restaurants; employment-generating uses such as offices, high-tech flex buildings, warehouses, and light industrial uses; community facilities; and schools. Only the demands for the solar farm were calculated separately.

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The indoor water use factors developed for each of these CII land uses were generally based on the following parameters<sup>13</sup>:

- The number of employees per area of land use;
- Employee water use factors;
- Water savings from the planned water-efficient design of the CII project land uses; and
- The percentage of total demand allocated to indoor water uses.

Table 4 summarizes the CII land use parameters applied to estimate the CII indoor water use factors. Each of these parameters is discussed in the following sections.

## 4.2.1.1 Number of Employees

The number of employees for each type of CII land use as shown in Table 4 was estimated using two parameters: (1) the ratio between commercial or institutional floor area to developed land area as obtained from the project land planners; and (2) the average number of employees per floor area by CII category reported by the Federal Energy Information Administration in a 2006 study.<sup>14</sup>

## 4.2.1.2 Employee Indoor Water Use Factors

The employee water use factors discussed in the Pacific Institute study identified the average indoor water consumption per employee per working day for each type of CII land use and normalized for a 225-day work year. For example, if the applicable employee water use factor is 100 gallons per employee per work day, each employee within the applicable CII land use category would consume 225 multiplied by 100, or 22,500 gallons per year.

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<sup>13</sup> For the project's solar farms, an indoor water use factor of 0.0001 AFY/ac was derived using the following the factors from Bureau of Land Management (2012) for photovoltaic solar plants: (a) 80% productive use of the total proposed area, (b) nine acres per megawatt (MW) of power generation, (c) 0.02 full-time equivalents (FTE) employees per MW, and (d) 50 gallons per day per FTE.

<sup>14</sup> Energy Information Administration, 2006. 2003 Commercial Buildings Energy Consumption Survey: Building Characteristics Tables, revised June 2006. The Commercial Buildings Energy Consumption Survey is a comprehensive national survey that collects information on the stock of U.S. commercial buildings, including their energy-related building characteristics, energy usage data, and how many employees there are per square foot for different CII land uses.

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It should be noted that the employee water use factors were derived from the Pacific Institute study for comparable facilities based on water use data collected during or prior to the year 2000.<sup>15</sup> The water use efficiency for new CII construction has generally improved since this study was done. As a result, the employee water use factors developed as part of the Pacific Institute study provide a conservative estimate of CII water use for new buildings, a fact that was anticipated in the study and addressed through the development of conservation savings estimates, see Section 4.2.1.3.

For the high-traffic, highway-serving commercial areas along I-5 an escalation factor has been applied to the water use factors provided in the Pacific Institute study and no conservation savings have been assumed; see Section 4.2.1.3. These assumptions reflect the fact that the end uses in the highway-serving commercial areas along I-5 would likely be disproportionately affected by the large and temporary populations that travel the I-5 corridor, such as the fast-food restaurant patrons.

## 4.2.1.3 Conservation Savings

The Pacific Institute study was based on pre-2000 water use data that predate the adoption of the CALGreen Code and other current water efficiency standards that would be implemented by the project. Anticipating these then-impending improvements in water use efficiency, the Pacific Institute study presented logic to support the discounting of the CII water use factors to reflect evolving and ever-more-stringent water efficiency standards. The Pacific Institute study estimated that the implementation of CII water conservation measures, such as those that would be implemented by the project under the CALGreen Code and similar regulations, could reduce measured water demands by 26% to 42% compared with the levels developed in their study, depending on the type of land use. An allowance for this conservation potential has been incorporated into Table 4. The CII water conservation measures discussed in the Pacific Institute study and that would be implemented by the project include:

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<sup>15</sup> According to the Pacific Institute study (2003), CII employee water use factors were estimated from data gathered from CII water users around California in several surveys (DWR, 1995 and 2000; Davis et al., 1988; Dziegielewski et al., 1990; and Dziegielewski et al., 2000). To estimate statewide CII water use, these employee water use coefficients were then applied to statewide employment data to project the total water use for each sector. These estimated water usages were then compared with water-delivery data by sector, as reported by nearly 150 water districts across the state. The difference between CII water use estimates developed using these two methods was less than 10 percent.

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- Installation of ultra-low flush toilets and urinals, plus low-flow faucet aerators and showerheads<sup>16</sup>;
- Improvements to mechanical cooling systems by installation of conductivity controllers, addition of chemical treatments to improve the concentration ratio, and improved energy efficiency of other mechanical components; and
- Other technologies appropriate for kitchens, laundries, and industrial processes such as water-efficient dishwashers and washing machines and industrial water reuse.

Other additional water conservation measures that would be employed for non-residential land uses are discussed in the project's water efficiency design standards in Section 3.0.

As shown in Table 4, the "best potential" water use savings identified in the Pacific Institute study were incorporated into the project demand calculations for all CII categories except for that within high-traffic, highway-serving areas along I-5. As mentioned in Section 4.2.1.2, for these high-traffic areas it was assumed that any conservation savings would be largely negated because the end uses would be disproportionately affected by large and temporary populations. Therefore, no savings from the water use levels identified in the Pacific Institute study are assumed for the project's high-traffic, highway-serving commercial land uses.

## 4.2.2 CII Indoor Water Use Estimate

Based on the methodology described above, indoor water use factors were estimated for an assumed mix of specific CII land uses and facilities in Table 4. As shown in Table 4, CII indoor water use per employee ranges from 53 gpd for village center offices to 847 gpd for restaurants in the project's high-traffic, highway-serving areas.

The CII indoor water demand results were compared with measured indoor water use at similar CII land uses within the TRCC, a highway-serving commercial area located adjacent to the Grapevine Project.<sup>17</sup> Based on this comparison, a water demand escalation factor was added to the indoor demands calculated for the project's comparable freeway-oriented commercial areas to better match TRCC's indoor water demands. For example, indoor usage at restaurants in the TRCC ranged from 0.75 to 2.4 AFY/1000 square feet of floor area with a median usage of 1.0 AFY/1000

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<sup>16</sup> Effective January 2014, only high-efficiency toilets that use 1.28 gallons per flush will be available for purchase in California. The water savings estimates assumed in the Pacific Institute study only reflected installation of 1.6 gallon per flush toilets. Therefore, these CII conservation savings estimates may be conservative (i.e., underestimate the water savings potential).

<sup>17</sup> Monthly water use data per account at the TRCC for the period July 2012 through June 2013 was provided to EKI by the Tejon-Castac Water District in September 2013.

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square feet of floor area; the estimated restaurant water usage for the project's freeway-oriented areas would be approximately 1.2 AFY/1000 square feet of floor area with the escalation factor.

Based on these assumptions, the total CII indoor water use for the project is estimated to be 588 AFY.

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## **5.0 OUTDOOR WATER USE ESTIMATES**

Outdoor water use factors were estimated for residential units, CII landscaping, and community landscaping using a methodology consistent with the revised MWELO (DWR, 2015). For new development projects, the MWELO requirements apply to lots with landscape areas equal to or greater than 500 square feet. As such, we assume that all project landscaping will need to comply with the MWELO.

In one exception, to address water availability for potential solar farms on industrial zoned land in the project, outdoor use associated with washing the photovoltaic panels was estimated based on water use factors developed by the Bureau of Land Management (2012).

### **5.1 Landscape Water Use Methodology**

Landscaping water use factors were estimated using the landscape irrigation demand model described in the MWELO (DWR, 2015). The MWELO requires that the annual Estimated Total Water Use (ETWU) for landscape irrigation not exceed a calculated Maximum Applied Water Allowance (MAWA). The calculations used to estimate the project's landscaping water use factors (see Table 5) are consistent with the ETWU calculations, and the resulting landscaping water use factors are compared to (and are less than) the MAWAs for each landscaping area (see Table 6, Table 7, and Table 8).

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The ETWU is calculated for each planting type and area using the following equation:

$$\text{ETWU} = \text{ETo} \times \text{ETAF} \times \text{Area}$$

Where:

ETo = The regional reference evapotranspiration rate<sup>18</sup>

ETAF = Evapotranspiration Adjustment Factor

= For regular landscapes areas =

Plant Factor (PF)<sup>19</sup> ÷ Irrigation Efficiency (IE)

= For Special Landscape Areas (SLA)<sup>20</sup> = 1

Area = Landscape area of the particular planting type

The total site ETWU is the sum of the ETWUs for the area of each planting type.

The MAWA is calculated using the following equation:

$$\text{MAWA} = \text{ETo} \times [(\text{ETAF} \times \text{LA}) + (1 - \text{ETAF}) \times \text{SLA}]$$

Where:

ETo = The regional reference evapotranspiration rate

ETAF = Evapotranspiration Adjustment Factor

= For residential areas = 0.55

= For non-residential areas = 0.45

= For schools equals = 0.65 (based on amendments to CALGreen Code approved by the Building Standards Commission on July 21, 2015)

LA = Total landscape area (including SLA)

SLA = Special Landscape Area

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<sup>18</sup> Evapotranspiration is a measure of the total water evaporated from a plant and surrounding soil, plus the effect of biological processes within plants that result in water loss to the atmosphere.

<sup>19</sup> Plant factors are the ratio between the evapotranspiration of plants and the reference evapotranspiration, which when multiplied by the reference evapotranspiration estimated the amount of water needed by plants. Plant factors vary depending on the species of plantings, the density of plantings, and microclimatic conditions.

<sup>20</sup> The SLA includes areas of the landscape dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

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Each of the factors used in the ETWU and MAWA calculations listed above, as they relate to the project, are described below.

## 5.1.1 Reference Evapotranspiration

As shown above, location-specific reference evapotranspiration (ET<sub>o</sub>) data is required for calculating the ETWU and the MAWA. Reference evapotranspiration data were obtained from DWR's California Irrigation Management Information System (CIMIS) Station 125 located in Arvin about 17 miles northeast of the project center.<sup>21</sup> Monthly averages of evapotranspiration were calculated from this data and are shown in Table 5, with a total annual reference evapotranspiration of 60.78 inches.

## 5.1.2 Plant Factors

As shown in Table 5, the project's anticipated planting types include the following: (1) "high water use plantings," assumed to include turf grass and ornamental landscaping; (2) "low water use plantings," assumed to consist of shrubs and native and drought-tolerant vegetation; (3) "combination plantings," which reflects full canopy tree coverage underlain by low water use plantings; and (4) "buffer zone plantings," which represents a landscaping design of very low water use plants that are sparsely clustered.

Plant factors estimated in the MWELO range from 0.7 to 1.0 for high-water-use plantings; from 0.4 to 0.6 for moderate water use plantings; and from 0.1 to 0.3 for low water use plantings. For this report, plant factors for high and low water use plantings are assumed to be 0.8 and 0.3, respectively.

The plant factors for the anticipated project trees included in the combination plantings, such as oaks, elms, cherry, and pine, ranges from 0.4 to 0.6 (UCCE/DWR, 2014). Because the depth to groundwater is very deep, from about 500 to 1,000 feet below ground surface, it is assumed that trees would need to be irrigated, as their roots would not be able to reach the water table apart from localized perched groundwater that may exist in certain locations. Areas where trees are planted, such as along roadways, would also be planted with low water use plants; the effective plant factor for these "combination plantings" areas is assumed to be 0.7.

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<sup>21</sup> The Arvin CIMIS Station is the closest CIMIS station to the Grapevine Project that has a significant historical record of evapotranspiration data, in this case dating back to 1995. The average evapotranspiration measured there is 60.78 inches per year, greater than the Reference Evapotranspiration for Grapevine of 49.5 inches per year that is listed in the MWELO, Appendix A. To be conservative, the higher (CIMIS) data was used to develop the outdoor water use estimates.

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Buffer zone plantings would comprise the landscaping within designated, otherwise-undeveloped portions of the project such as along the I-5 corridor; they would generally not be used in residential applications. These areas would be sparsely landscaped with rocks, clusters of trees, and moderate water use plantings. The effective plant factor for “buffer zone plantings” is assumed to be 0.4.

## 5.1.3 Irrigation Efficiencies

"Irrigation efficiency" refers to the percentage of applied water that can be used by irrigated plants net of evaporation, conveyance, soil infiltration, and other losses. As shown in Table 5, irrigation efficiencies were assumed to be 75% for high water use plantings and 81% for all other planting types, which are the values presented in the MWELO for overhead spray irrigation systems and drip irrigation systems, respectively.

## 5.1.4 Evapotranspiration Adjustment Factor and Evapotranspiration Rate

The evapotranspiration adjustment factor (ETAF), the plant factor divided by the irrigation efficiency, is calculated for each planting type in Table 5.

The ETAF is multiplied by the reference evapotranspiration in Table 5 to calculate the evapotranspiration rate for each planting type. The evapotranspiration rate is the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants over a specific duration and is assumed to be equivalent to the applied irrigation need. The annual evapotranspiration rate per acre would be approximately 5.40 AFY/ac for high water use plantings; 1.88 AFY/ac for low water use plantings; 4.38 AFY/ac for combination plantings; and 2.50 AFY/ac for buffer zone plantings. The evapotranspiration rates are multiplied by landscape areas for each planting type and for each land use in Table 6, Table 7, and Table 8 to calculate the ETWU for each landscape/planting type.

## 5.1.5 Regular and Special Landscape Areas

“Regular landscape areas” include most landscape areas irrigated by potable water. “Special landscape areas” include landscaped areas dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water. With respect to compliance with the MWELO, the ETAF for special landscape areas is equal to 1, which in effect means that any planting type can be used in these areas and not exceed the MAWA. For the purposes of this report, land-use specific MAWAs were calculated assuming: (1) all regular landscape areas at individual residential lots based on the use of potable water for irrigation, (2) 33% regular landscape areas and 67% special landscape areas at schools based on the use of potable water for irrigation and an assumed percentage of landscaped area used for recreation, and

# Evaluation of Potable, Non-Potable and Recycled Water Demands Report

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(3) all special landscape areas for commercial and industrial land uses and community landscaping primarily based on the use of recycled water for irrigation.<sup>22</sup> For the purposes of estimating landscaping water demands, however, the ETWUs for all land use types were conservatively estimated using the equations and factors applicable to regular landscape areas (i.e., we have used ETAFs associated with the actual planting instead of the MAWA to better represent actual anticipated demands).

## 5.2 Residential Outdoor Water Use Estimate

Residential landscaping would include two planting categories, high water use plantings and low water use plantings. Residential ETWU factors for landscaping were calculated in Table 6 by multiplying the evapotranspiration rates for high and low water use plantings by the total planting area for each landscape category within a residential lot. Residential outdoor water use factors were developed to reflect the project's water efficiency design standards and the following conservative assumptions:

- A maximum of 40% of each residential lot, not including streets and sidewalks, would be planted and require irrigation;
- A maximum of 25% of the landscaped area would consist of high water use plantings, and the difference would consist of low water use plantings (see Table 6);
- In order to account for additional outdoor water use, such as car washing and other ancillary uses, 10% was added to the landscaping water use factor and used for calculating the total annual outdoor water use for residential units; and
- Treated potable water would be used for residential landscape irrigation, although the use of recycled water is not precluded.

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<sup>22</sup> Landscaping in residential common areas, a subset of the community landscaping, was assumed to be special landscape area, even though it will be irrigated with potable water, because it was considered a recreational area.

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Median residential lot sizes would be 2,810 square feet (sf) for Village Center Residential units and 6,050 sf for Standard Residential units. Applying the above assumptions, the area of landscaping for each residential type is listed in the table below.

| Residential Product Type   | Median Lot Size | Landscaping Area (LA)<br>(40% of Lot) | Area of HWUP<br>(25% of LA) | Area of LWUP<br>(75% of LA) |
|----------------------------|-----------------|---------------------------------------|-----------------------------|-----------------------------|
| Village Center Residential | 2,810 sf        | 1,124 sf                              | 281 sf                      | 843 sf                      |
| Standard Residential       | 6,050 sf        | 2,420 sf                              | 605 sf                      | 1,815 sf                    |

Based on this methodology and assumptions, and as shown in Table 6, the average residential outdoor water use factors would be 0.07 AFY/du for Village Center Residential lots, and 0.15 AFY/du for Standard Residential lots. The resultant MAWA<sup>23</sup> was calculated for each residential lot type using the ETAF of 0.55 for residential areas and assuming 100% regular landscaping area, based on use of potable water. The MAWA was then compared to each residential landscaping ETWU factor to ensure compliance with the MWELO.

Based on these assumptions, the total residential outdoor water use for the project is estimated to be 1,717 AFY.

### 5.3 CII Outdoor Water Use Estimate

CII landscaping would include two planting categories, high water use plantings and low water use plantings. CII outdoor water use was calculated in Table 7 by multiplying the evapotranspiration rates for high and low water use plantings by the total planting area for each landscape category within a CII land use. Outdoor CII water use was developed to reflect the project's water efficiency design standards and the following conservative assumptions:

- A maximum of 20% of commercial and industrial land use area, not including streets and sidewalks, would be planted and require irrigation;

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<sup>23</sup> The calculation for the MAWA is presented in the MWELO. Total outdoor landscaping water use for each lot must be less than or equal to the MAWA.

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- A maximum of 50% of school land use area, would be planted and require irrigation . At schools a maximum of 50% of the landscaped area would consist of high water use plantings, and the difference would consist of low water use plantings (see Table 7); and
- Recycled water would be used for CII landscape irrigation, with the exception of landscaping at schools, which would use treated potable water for landscape irrigation.

The ETWU for each CII land use was compared to the MAWA, which was calculated using the evapotranspiration adjustment factor of 0.45 for commercial areas and assuming 100% special landscape area based on the use of recycled water, to ensure compliance with the MWELo.

School landscaping is assumed to consist of 50% high water use plants and 50% low water use plants. On 21 July 2015, the California Building Commission approved amendments to the CALGreen Code that requires a less stringent ETAF of 0.65 for regular school landscaping when calculating the MAWA. The ETWU for schools was compared to the modified MAWA, which was calculated using the ETAF of 0.65 for schools assuming 33% regular landscape area and 67% special landscape area based on the use of treated potable water and an assumed portion of landscaped recreational areas, which is classified as special landscape area.

For project solar farms, an outdoor water use factor, associated with washing the photovoltaic panels, of 0.0044 AFY/ac was derived using the following the factors from Bureau of Land Management (2012) for photovoltaic solar plants: (1) 80% productive use of the total land area, (2) 9 acres per megawatt (MW) of power generation, and (3) a panel washing water use factor of 0.05 AFY/MW.

Based on these assumptions, the project's total CII outdoor water use is estimated to be 592 AFY.

## 5.4 Community Landscaping Outdoor Water Use Estimate

Community landscaping would include various landscaping types in parks, roadways, and other community areas within the project. Community landscaping outdoor water use was calculated in Table 8 by multiplying the evapotranspiration rates for each planting type by its planting area within a community landscaping category. No project irrigation is assumed for open space areas that are located outside of the project's development footprint, such as for open space areas or existing agriculture<sup>24</sup>, or for the undeveloped portions of Planning Areas 6b through 6e.

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<sup>24</sup> Existing agriculture will not be served by the project water systems.

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Community landscaping demands were developed to reflect the project's water efficiency design standards and the following assumptions:

- The parklands area would be developed as 45% high water use plantings and 45% low water use plantings. The remaining 10% would include trails, picnic tables, pavement, mulch, or other non-water using features. These estimates do not include assumptions regarding the use of artificial turf for play fields, but they may occur.
- A seven-foot-wide irrigated common area would border each side of all new project roads, along approximately 630,000 total linear feet counting both sides of roadways. In addition, one portion of the central east-west roadway, totaling about 13,450 linear feet, would be developed as a windrow, with up to about 35 feet of landscaping on each side of the road. The project would not include roadway medians, except for the centers of four roundabouts.
- A total of 25% of residential common areas would include high water use plantings and 50% would consist of combination plantings. The remaining 25% of the residential common areas would be hardscape that does not require irrigation.
- Urban agriculture that may be integrated into the project shall use plants with average water uses of 5 AFY/acre or less. Irrigation for the urban agriculture is accounted for in the potential uses for the contingency, as discussed further in Section 8.3.

Irrigation water use factors for landscape plantings are listed in Table 5, with estimated community area irrigation demand summarized in Table 8. It is assumed that recycled or non-potable water would be used for common area landscape irrigation, with the exception of within residential common areas and schools, where potable water would be applied. All landscaped residential common areas, however, would be considered recreational areas or meeting spaces and, as such, would be classified as special landscape areas under the MWELo.

The ETWU for each CII land use was compared to the MAWA, which was calculated assuming 100% Special Landscape Area, to ensure compliance with the MWELo.

As shown in Table 8, total project community area landscaping water use is approximately 2,415 AFY.

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## 6.0 PROJECTED WATER USE BY SECTOR

### 6.1 Residential Water Use

The total residential indoor water use was calculated by multiplying the indoor water use factor for each housing type by the planned number of units of that type. As discussed above in Section 4.1.2, the average indoor water use factor for all project residential dwelling units is 0.16 AFY which is equivalent to a total residential indoor water use of 1,920 AFY (see Table 3).

The total residential outdoor water was calculated by multiplying each Standard Residential unit by 0.17 AFY, and each Village Residential unit by 0.08 AFY (see Table 3). The total residential outdoor water use would be approximately 1,717 AFY.

Total residential water use would therefore be approximately 3,637 AFY (i.e., 1,920 AFY indoor use plus 1,717 AFY outdoor use). The corresponding average per capita residential water use would be approximately 45 gallons per capita day (gpcd) for indoor uses and 40 gpcd for outdoor uses, for a total of 85 gpcd for the assumed 3.2 persons per residential unit. This level of per capita demand is comparable with the current statewide average (SWRCB, 2015) and with measured water use for similar land uses in the same geographic area (Vaughn Water Company, 2009<sup>25</sup>).

### 6.2 CII Water Use

As shown in Table 4, total CII water use for the project would be approximately 1,180 AFY, including indoor use of 588 AFY and outdoor use of 592 AFY. It is assumed that recycled or non-potable water would be used for CII landscape irrigation, with the exception of schools, where potable water would be applied for landscape irrigation.

### 6.3 Community Landscaping Water Use

As shown in Table 8, total community landscaping water use for the project would be approximately 2,415 AFY. It is assumed that recycled or non-potable water would be used for community landscaping irrigation, with the exception of residential common areas, where potable water would be applied for landscape irrigation.

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<sup>25</sup> In a 2009 Water Supply Assessment prepared on behalf of the Vaughn Water Company, 2005 water use data was presented by lot size for residential homes in the Rosedale portion of Bakersfield. These data showed that water use decreased as lot size decreased, with a 6,010 sf lot using 0.36 AFY per dwelling unit. This demand is comparable with the water demand estimates for the project's Standard Residential units (0.33 AFY per dwelling unit), which are expected to have an median lot size of 6,050 sf and will meet even higher standard of efficiency that reflect the new CALGreen Code requirements, among other things.

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## 7.0 ASSUMED TREATMENT AND DISTRIBUTION SYSTEM LOSSES

All water treatment and distribution systems experience system losses from drinking water treatment, system maintenance, and leaks. Water treatment and distribution system losses are assumed to be 10% of the total project potable water use and 5% of recycled water use. These assumptions are consistent with operation of a new, well-designed and maintained treatment<sup>26</sup> and distribution system<sup>27</sup>.

The total estimate of project water losses does not include losses at the wastewater treatment plants or within the recycled water storage ponds. These losses are accounted for as a reduction in the recycled water supply and not as a recycled water use.

As shown in Table 9, water losses are projected to be about 629 AFY.

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<sup>26</sup> <http://www.pall.com/main/water-treatment/direct-coagulated-water-47223.page>

<sup>27</sup> The California standard is 10% allowable water loss in existing water systems (EPA, 2010. *Control and Mitigation of Drinking Water Losses in Distribution Systems*, November 2010). Based on professional experience, we have assumed that the new project water distributions systems will have 5% water loss.

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## **8.0 ADDITIONAL FACTORS IMPACTING TOTAL PROJECT WATER DEMAND**

### **8.1 Interim and Offsite Uses of Water**

#### **8.1.1 Construction Water**

During project construction, potable or non-potable Nickel Water would supply construction water for uses such as dust control and soil compaction. As shown in Table A-2 of Attachment A, total estimated construction water use is approximately 8,250 AF, which would be used over the 19+ year buildout period at an average rate of approximately 420 AFY. Prior to full project buildout, project water demands will be a fraction of the project's available Nickel Water supply, and the remaining supply will be available for construction water uses and other interim uses.

#### **8.1.2 Project Phasing**

As described in Section 2.1.3, project development would be phased over a period of 19+ years, starting with the development of Planning Area 6a and/or 2 and continuing with the balance of the planning areas (1, 3, 4, 5, and 6b-6e) in numerical order. Buildout of each phase is projected to take approximately 2 to 4 years (Phase 1: 2 years; Phase 2: 4 years; Phase 3: 3 years; Phase 4: 4 years; Phase 5: 4 years; Phase 6: 2 years), with the first phase commencing in 2016. Given this approximate phasing, water demands and the accompanying generation of recycled water will necessarily be incremental, at the approximate volumes shown in Table 10 and Table 11.

#### **8.1.3 California Highway Patrol Weigh Station**

A California Highway Patrol weigh station ("weigh station") is currently located south of the California Aqueduct. A new interchange servicing the project is planned for the location of the current weigh station. To accommodate the new interchange, a new weigh station will be constructed north of the TRCC, at the intersection of Interstate 5 and State Route 99. The water and wastewater service to the weigh station is discussed in a 25 November 2014 memorandum, included as Attachment C.

### **8.2 Recycled Water Availability**

A water balance was developed to estimate (1) required recycled water storage, and (2) the volume of recycled water available to meet non-potable irrigation demands during an average-rainfall year. Non-potable irrigation demands would include irrigation of most landscaped areas other than residential areas and schools. Table A-1 of Attachment A presents the preliminary average-year rainfall water balance at project buildout.

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The needed recycled water storage volume during an average rainfall year is about 436 acre-feet (AF). As shown in Table 11, it is anticipated that recycled water flows can supply most of the projected non-potable irrigation demand during an average rainfall-year, except for approximately 294 AF that would be made up by untreated<sup>28</sup> Nickel Water that is conveyed to the project site through the California Aqueduct. The needed amount of this supplemental water would vary depending on actual rainfall patterns.

## 8.3 Water Demand Contingency

As shown in Table 1, a contingency (400 AFY) has been added to all project demands to provide a conservative buffer for unforeseen water uses throughout the project as it is built out over time. This contingent demand is inclusive of all treatment and distribution losses.

The Grapevine Specific and Special Plans allow for building of additional housing, and the use of land for urban agriculture, or certain heavy industrial land uses. The contingency may be used to accommodate the possibility of these additional demands in the future. As an example, a scenario is presented in Attachment B in which a portion of the contingency is used for the construction of 2,000 additional housing units.<sup>29</sup> Attachment B includes water demand estimates and adjusted land use assumptions for this scenario.

The source to meet the complete 400 AFY water demand contingency is assumed to be either fully-treated potable or filtered, non-potable Nickel Water; see Table 2.

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<sup>28</sup> The Nickel Water used for non-potable irrigation will be filtered, but will not be fully treated at the water treatment plant. Instead, this supplemental non-potable supply will be co-mingled with the recycled water and served via the recycled water distribution system.

<sup>29</sup> To accommodate the additional 2,000 dwelling units, consistent with the Grapevine Specific and Special Plans, this alternative scenario assumes (1) an increase in parkland, (2) a reduction in retail square footage based on the vehicle trip equivalency ratios of 225 square feet per single-family dwelling unit and 155 square feet per multi-family dwelling unit, (3) and increases in landscape water efficiencies for select land use categories.

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## **9.0 TOTAL ESTIMATED POTABLE, NON-POTABLE AND RECYCLED WATER DEMANDS**

Table 1 and Table 2 summarize the Grapevine Project's potable, non-potable, and recycled water demands for residential, CII, and landscaping uses. Water demand calculations are summarized in Table 1. Water demand by source is presented in Table 2.

The total potable and non-potable demand of the Grapevine Project development including the contingency is estimated to be approximately 8,261 AFY at full build out.

The total project potable water demand would be 5,620 AFY.

A total of 1,983 AFY of recycled water would be generated in an average rainfall year and used to help meet non-residential, roadway, and selected common area landscape irrigation demand. An additional 258 AFY of supplemental, non-potable water would be used in an average rainfall year to meet commercial and industrial, roadway, and common area landscape irrigation demand that exceeds the available recycled water supply. The projected 1,983 AFY of recycled water plus the 258 AFY of supplemental, non-potable supply amounts to 2,241 AFY of non-potable supply.

The contingent water demand is assumed to be 400 AFY, which could be supplied with either fully-treated potable or filtered, non-potable Nickel Water that would be conveyed to the project through the California Aqueduct.

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## **10.0 WATER CONSERVATION EDUCATION, IMPLEMENTATION AND ENFORCEMENT MEASURES**

Water conservation education, implementation, and enforcement would be key to achieving and maintaining the anticipated project water demand efficiencies. To this end, specific measures would be carried out to educate and incentivize residents and employees regarding water conservation, backed up by enforcement actions where needed. For example, it is anticipated that water usage records would be regularly evaluated by TCWD staff to look for and address patterns of high usage that could indicate inefficiencies or leaks, and water budgets would be developed for all residential and CII customers and enforced through water rates or penalties.

Water conservation and design requirements would also be incorporated into all pre-construction and pre-sale and subsequent re-sale documents and agreements, including development agreements; recorded covenants, conditions, and restrictions that would run with the land; and building and landscaping permits. Drafting of these documents would be coordinated by the Master Developer to reflect the Specific and Community Plan and would incorporate input from the TCWD, Kern County, and other relevant parties. The documents would articulate the responsibilities and mechanisms for implementation and enforcement.

On 1 April 2015, the Governor of California issued Executive Order No. B-29-15, which sets strict limits on water usage in the State. The water demands estimated herein have taken into account the requirements of the executive order. Additionally, as shown in Section 3.0, all future designs and construction will comply with the requirements of the executive order and all other applicable land use and water efficiency regulations.

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## **11.0 OFFSITE AND CUMULATIVE IMPACTS**

This section describes the offsite and cumulative impacts of the project as they relate to water demand.

### **11.1 Offsite Impacts**

The offsite land uses that have been identified for this project include:

- Connector and Haul Roads
- California Highway Patrol Weigh Station (see Section 8.1.3)
- California Aqueduct Turnouts
- Expansion of the TRCC East or West Wastewater Treatment Plants
- Interchange (over I-5)

None of these offsite land uses have an accompanying Project water demand; therefore they do not impact the findings and conclusions of this report.

### **11.2 Cumulative Impacts**

The project would be supplied by Nickel Water, that would be conveyed to the project through the California Aqueduct and treated on-site at the project's water treatment plant(s), and by recycled water that is generated at the project's on-site wastewater treatment plants. Because the project water needs would be met by these sources that are not shared with any other entity, there are no cumulative impacts associated with the project water demands.

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## 12.0 MITIGATION MEASURES

Mitigation measures are steps taken to reduce an environmental impact caused by the project. As described in Section 3.0, the project includes many water efficient design standards with the goal to maximize water use efficiency and reduce potable water demand within the project, including the extensive use of recycled water and non-potable water. Implementation of the following mitigation measures would further ensure that individual development projects permitted within the project meet the criteria established in Section 3.0 and that there would be sufficient water supply to meet the demands of those projects in normal and dry years over at least a twenty-year time horizon.

- **Mitigation Measure #1:** Prior to issuance of any building permits or other development approvals, the applicant shall provide written verification of compliance with project-specific water efficiency design standards.
- **Mitigation Measure #2:** Pursuant to California Water Code §10910-10915, a Water Supply Assessment will be prepared by TCWD for any proposed development that meets the definition of “project” per the California Water Code §10910(a) and 10912(a).
- **Mitigation Measure #3:** A Water Supply Verification will be prepared by TCWD, as appropriate, at the tentative map stage per California Government Code §65867.5(a) and 66473.7(a), (b), (i).

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## 13.0 REFERENCES

- California Building Standards Commission. CAL Green Code, effective 2014 with supplements effective 2015: <http://www.bsc.ca.gov/Home/CALGreen.aspx>
- Bureau of Land Management. 2012. *Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States, Appendix M*. July 2012.
- DeOreo, William B., 2011a. California Single Family Water Use Efficiency Study. California Department of Water Resources, dated 20 April 2011.
- DeOreo, William B., 2011b. Water Efficiency Benchmarks for New Single-Family Homes - Final Report, Salt Lake City Corporation and the United States Environmental Protection Agency, dated 24 March 2011.
- DWR, 2015. Department of Water Resources Model Water Efficient Landscape Ordinance (California Code of Regulations, Title 23, Division 2, Chapter 2.7), dated July 9, 2015.
- Dziegielewski, B., D. Rodrigo, and E. Opitz, March 1990. *Commercial and Industrial Water Use in Southern California. Final Report*, prepared for the Metropolitan Water District of Southern California by Planning and Management Consultants, Ltd.
- Energy Information Administration, 2006. 2003 Commercial Buildings Energy Consumption Survey: Building Characteristics Tables, Revised June 2006.
- Erler & Kalinowski, Inc., 2015a. *Wastewater Facilities Engineering Report, Grapevine Project*, November 2015.
- Erler & Kalinowski, Inc., 2015b. *Water Facilities Engineering Report, Grapevine Project*, November 2015.
- Governor of California Executive Order No. B-29-15, 1 April 2015.
- Idaho Department of Water Resources, 2001. Z. Cook, S. Urban, et al. Domestic, Commercial, Municipal and Industrial Water Demand Assessment and Forecast in Ada and Canyon Counties, Idaho.
- Kern County PCDD. 2015a. *Grapevine Specific and Community Plan*. Kern County Planning & Community Development Department. March 2015.

# Evaluation of Potable, Non-Potable and Recycled Water Demands Report

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- Kern County PCDD. 2015b. *Grapevine Special Planning (SP) District Plan*. Kern County Planning & Community Development Department. March 2015.
- McIntosh & Associates. 2013. "Specific Plan Boundary GIS Data" [Shapefiles]. Received from McIntosh & Associates on July 25, 2013.
- Pacific Institute, 2003. *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, Pacific Institute for Studies in Development, Environment, and Security, November 2003.
- Santa Monica, October 2004. *Civic Center Specific Plan Comprehensive Update, Downtown Redevelopment Plan Amendment and Associated Development, Final Environment Impact Report*.
- Soquel Creek Water District. 2013. *New Applicant Water Demand Offset Form*. [http://www.soquelcreekwater.org/sites/default/files/WDO\\_New-App-Form-2013.pdf](http://www.soquelcreekwater.org/sites/default/files/WDO_New-App-Form-2013.pdf)
- Snyder, et al. 2007. *Crop Coefficients*. UC Davis Biometeorology Program. Updated March 2007. <http://biomet.ucdavis.edu/Evapotranspiration/CropCoef/Kc.pdf>.
- SWRCB. 2015. *Drought Actions and Information Webpage*: [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/drought/](http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/)
- TRC (Tejon Ranch Company). 2013a. "Tejon Ranch Boundary GIS Data" [Shapefiles]. Received from TRC on October 15, 2013.
- TRC. 2013b. "Tejon Ranch Infrastructure GIS Data" [Shapefiles]. Received from TRC on February 12, 2013.
- UCCE/DWR. 2014. *Water Use Classification of Landscape Species, WUCOLS IV 2014*. University of California Cooperative Extension and California Department of Water Resources. January 2014.
- UCCE/DWR. 2000. *A Guide to Irrigation Water Needs of Landscape Plantings in California*. University of California Cooperative Extension and California Department of Water Resources. August 2000.
- Vaughn Water Company, *Water Supply Assessment, Target Shopping Center*, March 2009 [http://www.co.kern.ca.us/planning/pdfs/eirs/RosedaleRenfro/RosedaleRenfro\\_appI.pdf](http://www.co.kern.ca.us/planning/pdfs/eirs/RosedaleRenfro/RosedaleRenfro_appI.pdf)

**Table 1**  
**Estimated Grapevine Project Annual Water Demand**  
 Grapevine Project, Kern County, California

| Development Category                         | Estimated<br>Total Water Use<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|---------------------------------------|----------------------------------------|-----------------------------------------|
| Residential (a)                              | 3,637                                 | 1,920                                  | 1,717                                   |
| Commercial, Institutional and Industrial (b) | 1,180                                 | 588                                    | 592                                     |
| Community Landscaping (c)                    | 2,415                                 | -                                      | 2,415                                   |
| Treatment system losses (d)                  | 268                                   | -                                      | -                                       |
| Distribution system losses (d)               | 362                                   | 125                                    | 236                                     |
| Subtotal Average Annual Water Demand (e)     | 7,861                                 | 2,634                                  | 4,960                                   |
| Contingency (f)                              | 400                                   | -                                      | -                                       |
| <b>Project Average Annual Water Demand</b>   | <b>8,261</b>                          | -                                      | -                                       |

Abbreviations:

"AFY" = acre-feet per year

Notes:

- (a) See Table 3 for estimated residential water uses.
- (b) See Tables 4 and 7 for estimated indoor and outdoor water use, respectively, for commercial, institutional, and industrial land uses. Includes 318 AFY of outdoor school water demand.
- (c) See Table 8 for estimated parks, roads and common area landscaping water use. Includes 554 AFY of residential common area demand.
- (d) See Table 9 for water losses associated with the project treatment and distribution systems. System losses associated with all potable outdoor uses are estimated to be 129 AFY, assumed to be 5% of the total of residential outdoor, outdoor school, and residential common area water demands.
- (e) The Project Annual Water Demand is the sum of the estimated water uses for the project, plus the assumed treatment and distribution system losses.
- (f) A contingency of 400 AFY was added to project demands. The contingency is inclusive of all losses associated with its treatment and distribution.
- (g) Totals may not add exactly due to rounding.

**Table 2**  
**Estimated Grapevine Project Annual Water Demand by Source**  
 Grapevine Project, Kern County, California

| Water Source                               | Water Use Category                 | Estimated Total Water Demand (AFY) |
|--------------------------------------------|------------------------------------|------------------------------------|
| California Aqueduct (Nickel Water)         | Potable Water (a)                  | 5,620                              |
|                                            | Supplemental Non-Potable Water (b) | 258                                |
|                                            | Contingency (c)                    | 400                                |
| <i>California Aqueduct Subtotal</i>        |                                    | 6,278                              |
| Recycled Water                             | Recycled Non-Potable Water (d)     | 1,983                              |
| <b>Project Average Annual Water Demand</b> |                                    | <b>8,261</b>                       |

Abbreviations:

"AFY" = acre-feet per year

"CII" = Commercial, Institutional and Industrial

Notes:

- (a) Potable water demand is equal to all indoor (2,508 AFY), residential outdoor (1,717 AFY), outdoor school (318 AFY), residential common area (554 AFY), associated indoor and outdoor distribution system loss demands (255 AFY), and treatment system losses (268 AFY). See Tables 1, 7, 8, and 9.
- (b) The Supplemental Non-Potable Water is equal to the CII landscaping, selected general common area landscaping minus the projected recycled water production (see Table 11). This demand is assumed to be met with filtered Nickel Water that will be served through the recycled water distribution system.
- (c) The Contingency water demand was added to Project Annual Water Demands as shown in Table 1. The contingency is assumed to be met with either fully-treated potable or filtered Nickel Water and is inclusive of all losses associated with its treatment and distribution.
- (d) See Table 11 for recycled water production and demand.
- (e) Totals may not add exactly due to rounding.

**Table 3**  
**Estimated Residential Water Use**  
 Grapevine Project, Kern County, California

| Project Development Phase<br>and Housing Product Types | Number of<br>Dwelling<br>Units (a) | Median<br>Density<br>(a)<br>(du/ac) | Household<br>Size (c)<br>(people/du) | Water Use Factor (b)   |                         |                   | Subtotal Water Use (e) |                  |                |
|--------------------------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|------------------------|-------------------------|-------------------|------------------------|------------------|----------------|
|                                                        |                                    |                                     |                                      | Indoor (c)<br>(AFY/du) | Outdoor (d)<br>(AFY/du) | Total<br>(AFY/du) | Indoor<br>(AFY)        | Outdoor<br>(AFY) | Total<br>(AFY) |
| <i>Area 1</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,250                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 200                    | 213              | 413            |
| Village Center Residential Units                       | 230                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 37                     | 18               | 55             |
| <b>Subtotal</b>                                        | <b>1,480</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>237</b>             | <b>231</b>       | <b>468</b>     |
| <i>Area 2</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,780                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 285                    | 303              | 587            |
| Village Center Residential Units                       | 980                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 157                    | 78               | 235            |
| <b>Subtotal</b>                                        | <b>2,760</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>442</b>             | <b>381</b>       | <b>823</b>     |
| <i>Area 3</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,180                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 189                    | 201              | 389            |
| Village Center Residential Units                       | 730                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 117                    | 58               | 175            |
| <b>Subtotal</b>                                        | <b>1,910</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>306</b>             | <b>259</b>       | <b>565</b>     |
| <i>Area 4</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,850                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 296                    | 315              | 611            |
| Village Center Residential Units                       | 570                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 91                     | 46               | 137            |
| <b>Subtotal</b>                                        | <b>2,420</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>387</b>             | <b>360</b>       | <b>747</b>     |
| <i>Area 5a</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,730                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 277                    | 294              | 571            |
| Village Center Residential Units                       | 330                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 53                     | 26               | 79             |
| <b>Subtotal</b>                                        | <b>2,060</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>330</b>             | <b>321</b>       | <b>650</b>     |
| <i>Area 5b</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 35                                 | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 6                      | 6                | 12             |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.09                    | 0.25              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>35</b>                          | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>6</b>               | <b>6</b>         | <b>12</b>      |
| <i>Area 6a</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 585                                | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 94                     | 99               | 193            |
| Village Center Residential Units                       | 750                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 120                    | 60               | 180            |
| <b>Subtotal</b>                                        | <b>1,335</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>214</b>             | <b>159</b>       | <b>373</b>     |

**Table 3**  
**Estimated Residential Water Use**  
 Grapevine Project, Kern County, California

| Project Development Phase<br>and Housing Product Types | Number of<br>Dwelling<br>Units (a) | Median<br>Density<br>(a)<br>(du/ac) | Household<br>Size (c)<br>(people/du) | Water Use Factor (b)   |                         |                   | Subtotal Water Use (e) |                  |                |
|--------------------------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|------------------------|-------------------------|-------------------|------------------------|------------------|----------------|
|                                                        |                                    |                                     |                                      | Indoor (c)<br>(AFY/du) | Outdoor (d)<br>(AFY/du) | Total<br>(AFY/du) | Indoor<br>(AFY)        | Outdoor<br>(AFY) | Total<br>(AFY) |
| <i>Area 6b</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <i>Area 6c</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <i>Area 6d</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <i>Area 6e</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <b>TOTAL</b>                                           | <b>12,000</b>                      | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>1,920</b>           | <b>1,717</b>     | <b>3,637</b>   |

**Abbreviations:**

"AFY" = acre-feet per year

"AFY/du" = acre-feet per year per dwelling unit

"du" = dwelling units

"du/ac" = dwelling units per acre

**Table 3**  
***Estimated Residential Water Use***  
Grapevine Project, Kern County, California

**Notes:**

- (a) The residential unit types, median residential densities for each product type, and numbers of residential units are based on the 8 June 2015 Project Land Use Program Summary.
- (b) Water use factors, expressed as the annual volume of water consumed for each dwelling unit, have been estimated using models of residential indoor and outdoor water uses as discussed in Notes (c) and (d).
- (c) Residential indoor water use factors were estimated using a model of total indoor water use developed in *Analysis of Water Use in New Single-Family Homes* dated 20 July 2011, William DeOreo, P.E., M.S. submitted to Salt Lake City Corporation and the United States Environmental Protection Agency. The statistical model is based on single family homes that meet the standards for the Federal Energy Policy Act of 1992. The following assumptions were used for estimating water uses for each housing product type:
  - 1. The average household size (i.e., number of residents per home) for each product type is assumed as 3.2 persons/dwelling unit, according to data for Kern County from: *State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2013*. Sacramento, California, May 2013.
  - 2. Home water softening systems (e.g., regenerating ion exchange units or reverse osmosis units) are prohibited.
  - 3. High-efficiency clothes washers that use less than 30 gallons of water per load are installed in 75% of residential homes.
  - 4. Significant leaks (i.e., leaks greater than 50 gallons per day) occur at approximately 9% of homes for each housing product type.
- (d) Residential outdoor water use factors were estimated in Table 6.
- (e) The subtotal water use for a residential unit type is the number of dwelling units multiplied by the corresponding water use factors.

**Table 4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
Grapevine Project, Kern County, California

|                                                            | [A]<br>Floor Area<br>(1,000 sf) | [B]<br>Floor Area<br>Ratio<br>(ac/ac) | [C]<br>Floor Area<br>(ac) | [D]<br>Area of<br>Land Use<br>(ac) | [E]<br>Employees<br>per 1,000 sf<br>(emp/1,000 sf) | [F]<br>Employees<br>(emp) | [G]<br>Employee<br>Indoor Water<br>Use Factor<br>(gpd/emp) | [H]<br>Average<br>Daily Indoor<br>Water Use<br>(gpd) | [I]<br>Total Annual<br>Indoor<br>Water Use<br>(AFY) | [J]<br>Total Annual<br>Outdoor<br>Water Use<br>(AFY) | [K]<br>Total<br>Water Use<br>(AFY) |
|------------------------------------------------------------|---------------------------------|---------------------------------------|---------------------------|------------------------------------|----------------------------------------------------|---------------------------|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------|------------------------------------|
| Commercial, Institutional, and<br>Industrial Land Uses (a) | (a)                             | (b)                                   | C = A / 43.56 (c)         | D = C / B (d)                      | (e)                                                | F = A × E (e)             | (f)                                                        | H = F × G (g)                                        | I = A x H (h)                                       | See Table 7                                          | K = I + J                          |
| <b>Area 1</b>                                              |                                 |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 28                              |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 14                              | 0.18                                  | 0.3                       | 1.8                                | 1.1                                                | 16                        | 122                                                        | 1,917                                                | 1.3                                                 | 1.00                                                 | 2.3                                |
| 21% Drug store                                             | 6                               | 0.18                                  | 0.13                      | 0.7                                | 0.8                                                | 5                         | 69                                                         | 324                                                  | 0.2                                                 | 0.41                                                 | 0.6                                |
| 14% Miscellaneous                                          | 4                               | 0.18                                  | 0.09                      | 0.5                                | 0.8                                                | 3                         | 69                                                         | 216                                                  | 0.1                                                 | 0.28                                                 | 0.4                                |
| 7% Restaurant                                              | 2                               | 0.18                                  | 0.04                      | 0.2                                | 2                                                  | 4                         | 179                                                        | 703                                                  | 0.5                                                 | 0.14                                                 | 0.6                                |
| 7% Bank                                                    | 2                               | 0.18                                  | 0.04                      | 0.2                                | 0.8                                                | 2                         | 63                                                         | 99                                                   | 0.1                                                 | 0.14                                                 | 0.2                                |
| Village Center Office                                      | 22                              | 0.18                                  | 0.5                       | 2.8                                | 2.3                                                | 51                        | 53                                                         | 2,669                                                | 1.8                                                 | 1.5                                                  | 3.4                                |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | 400                             |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 50% High Tech / Bio Tech                                   | 200                             | 0.30                                  | 4.6                       | 15                                 | 2.3                                                | 460                       | 92                                                         | 42,267                                               | 29.2                                                | 8.4                                                  | 37.6                               |
| 50% Other Office                                           | 200                             | 0.30                                  | 4.6                       | 15                                 | 2.3                                                | 460                       | 53                                                         | 24,268                                               | 16.8                                                | 8.4                                                  | 25.2                               |
| Light Industrial / Warehouse                               | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| <b>Subtotal</b>                                            | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>50</b>                                           | <b>20</b>                                            | <b>70</b>                          |
| <b>Area 2</b>                                              |                                 |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 151                             |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 77                              | 0.18                                  | 1.8                       | 9.8                                | 1.1                                                | 85                        | 122                                                        | 10,337                                               | 7.1                                                 | 5.4                                                  | 12.6                               |
| 21% Drug store                                             | 32                              | 0.18                                  | 0.7                       | 4.0                                | 0.8                                                | 25                        | 69                                                         | 1,745                                                | 1.2                                                 | 2.2                                                  | 3.4                                |
| 14% Miscellaneous                                          | 21                              | 0.18                                  | 0.5                       | 2.7                                | 0.8                                                | 17                        | 69                                                         | 1,163                                                | 0.8                                                 | 1.5                                                  | 2.3                                |
| 7% Restaurant                                              | 11                              | 0.18                                  | 0.2                       | 1.3                                | 2                                                  | 21                        | 179                                                        | 3,792                                                | 2.6                                                 | 0.7                                                  | 3.4                                |
| 7% Bank                                                    | 11                              | 0.18                                  | 0.2                       | 1.3                                | 0.8                                                | 8                         | 63                                                         | 534                                                  | 0.4                                                 | 0.7                                                  | 1.1                                |
| Village Center Office                                      | 119                             | 0.18                                  | 2.7                       | 15                                 | 2.3                                                | 274                       | 53                                                         | 14,439                                               | 10.0                                                | 8.4                                                  | 18.3                               |
| Regional / Freeway-Oriented Comm.                          | 210                             |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 78.5% Miscellaneous Retail                                 | 165                             | 0.18                                  | 3.8                       | 21                                 | 0.8                                                | 132                       | 320                                                        | 42,256                                               | 29.2                                                | 11.6                                                 | 40.8                               |
| 7.5% Restaurant                                            | 16                              | 0.18                                  | 0.4                       | 2.0                                | 2                                                  | 32                        | 847                                                        | 26,679                                               | 18.4                                                | 1.1                                                  | 19.5                               |
| 7.5% Gas Station                                           | 16                              | 0.18                                  | 0.4                       | 2.0                                | 0.9                                                | 14                        | 320                                                        | 4,542                                                | 3.1                                                 | 1.1                                                  | 4.2                                |
| 6.5% Hotel                                                 | 14                              | 0.18                                  | 0.3                       | 1.7                                | 0.48                                               | 7                         | 506                                                        | 3,315                                                | 2.3                                                 | 1.0                                                  | 3.2                                |
| Office / R&D                                               | 780                             |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 62% High Tech / Bio Tech                                   | 480                             | 0.30                                  | 11.0                      | 37                                 | 2.3                                                | 1104                      | 92                                                         | 101,440                                              | 70.0                                                | 20.3                                                 | 90.3                               |
| 38% Medical Center                                         | 300                             | 0.30                                  | 7                         | 23                                 | 2.3                                                | 690                       | 80                                                         | 55,155                                               | 38.1                                                | 12.7                                                 | 50.7                               |
| Light Industrial / Warehouse                               | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | 335                             |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 1 K-8                                                      | 96                              | 0.11                                  | 2.2                       | 20                                 | 1.3                                                | 121                       | 55                                                         | 6,665                                                | 4.6                                                 | 36.4                                                 | 41.0                               |
| 1 High School                                              | 240                             | 0.10                                  | 5.5                       | 55                                 | 1.3                                                | 302                       | 55                                                         | 16,661                                               | 11.5                                                | 100.1                                                | 111.6                              |
| <b>Subtotal</b>                                            | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>199</b>                                          | <b>203</b>                                           | <b>403</b>                         |

**Table 4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
 Grapevine Project, Kern County, California

|                                                            | [A]<br>Floor Area<br>(1,000 sf) | [B]<br>Floor<br>Area<br>Ratio<br>(ac/ac) | [C]<br>Floor Area<br>(ac) | [D]<br>Area of<br>Land Use<br>(ac) | [E]<br>Employees<br>per 1,000 sf<br>(emp/1,000 sf) | [F]<br>Employees<br>(emp) | [G]<br>Employee<br>Indoor Water<br>Use Factor<br>(gpd/emp) | [H]<br>Average<br>Daily Indoor<br>Water Use<br>(gpd) | [I]<br>Total Annual<br>Indoor<br>Water Use<br>(AFY) | [J]<br>Total Annual<br>Outdoor<br>Water Use<br>(AFY) | [K]<br>Total<br>Water Use<br>(AFY) |
|------------------------------------------------------------|---------------------------------|------------------------------------------|---------------------------|------------------------------------|----------------------------------------------------|---------------------------|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------|------------------------------------|
| Commercial, Institutional, and<br>Industrial Land Uses (a) | (a)                             | (b)                                      | C = A / 43.56 (c)         | D = C / B (d)                      | (e)                                                | F = A × E (e)             | (f)                                                        | H = F × G (g)                                        | I = A x H (h)                                       | See Table 7                                          | K = I + J                          |
| <b>Area 3</b>                                              |                                 |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 95                              |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 48                              | 0.18                                     | 1.1                       | 6.2                                | 1.1                                                | 53                        | 122                                                        | 6,503                                                | 4.5                                                 | 3.4                                                  | 7.9                                |
| 21% Drug store                                             | 20                              | 0.18                                     | 0.5                       | 2.5                                | 0.8                                                | 16                        | 69                                                         | 1,098                                                | 0.8                                                 | 1.4                                                  | 2.2                                |
| 14% Miscellaneous                                          | 13                              | 0.18                                     | 0.3                       | 1.7                                | 0.8                                                | 11                        | 69                                                         | 732                                                  | 0.5                                                 | 0.9                                                  | 1.4                                |
| 7% Restaurant                                              | 7                               | 0.18                                     | 0.2                       | 0.8                                | 2                                                  | 13                        | 179                                                        | 2,385                                                | 1.6                                                 | 0.5                                                  | 2.1                                |
| 7% Bank                                                    | 7                               | 0.18                                     | 0.2                       | 0.8                                | 0.8                                                | 5                         | 63                                                         | 336                                                  | 0.2                                                 | 0.5                                                  | 0.7                                |
| Village Center Office                                      | 75                              | 0.18                                     | 1.7                       | 10                                 | 2.3                                                | 173                       | 53                                                         | 9,100                                                | 6.3                                                 | 5.3                                                  | 11.6                               |
| Regional / Freeway-Oriented Comm.                          | 540                             |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 78.5% Miscellaneous Retail                                 | 424                             | 0.18                                     | 10                        | 54                                 | 0.8                                                | 339                       | 320                                                        | 108,659                                              | 75.0                                                | 29.8                                                 | 104.9                              |
| 7.5% Restaurant                                            | 41                              | 0.18                                     | 0.9                       | 5.2                                | 2                                                  | 81                        | 847                                                        | 68,602                                               | 47.4                                                | 2.8                                                  | 50.2                               |
| 7.5% Gas Station                                           | 41                              | 0.18                                     | 0.9                       | 5.2                                | 0.9                                                | 36                        | 320                                                        | 11,679                                               | 8.1                                                 | 2.8                                                  | 10.9                               |
| 6.5% Hotel                                                 | 35                              | 0.18                                     | 0.8                       | 4.5                                | 0.48                                               | 17                        | 506                                                        | 8,524                                                | 5.9                                                 | 2.5                                                  | 8.4                                |
| Office / R&D                                               | 650                             |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 50% High Tech / Bio Tech                                   | 325                             | 0.30                                     | 7.5                       | 25                                 | 2.3                                                | 748                       | 92                                                         | 68,683                                               | 47.4                                                | 13.7                                                 | 61.1                               |
| 50% Other Office                                           | 325                             | 0.30                                     | 7.5                       | 25                                 | 2.3                                                | 748                       | 53                                                         | 39,435                                               | 27.2                                                | 13.7                                                 | 40.9                               |
| Light Industrial / Warehouse                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | 96                              |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 1 K-8                                                      | 96                              | 0.11                                     | 2.2                       | 20                                 | 1.3                                                | 121                       | 55                                                         | 6,665                                                | 4.6                                                 | 36.4                                                 | 41.0                               |
| <b>Subtotal</b>                                            | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>230</b>                                          | <b>114</b>                                           | <b>343</b>                         |
| <b>Area 4</b>                                              |                                 |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 67                              |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 34                              | 0.18                                     | 0.8                       | 4.4                                | 1.1                                                | 38                        | 122                                                        | 4,587                                                | 3.2                                                 | 2.4                                                  | 5.6                                |
| 21% Drug store                                             | 14                              | 0.18                                     | 0.3                       | 1.8                                | 0.8                                                | 11                        | 69                                                         | 774                                                  | 0.5                                                 | 1.0                                                  | 1.5                                |
| 14% Miscellaneous                                          | 9                               | 0.18                                     | 0.2                       | 1.2                                | 0.8                                                | 8                         | 69                                                         | 516                                                  | 0.4                                                 | 0.7                                                  | 1.0                                |
| 7% Restaurant                                              | 5                               | 0.18                                     | 0.11                      | 0.6                                | 2                                                  | 9                         | 179                                                        | 1,682                                                | 1.2                                                 | 0.3                                                  | 1.5                                |
| 7% Bank                                                    | 5                               | 0.18                                     | 0.11                      | 0.6                                | 0.8                                                | 4                         | 63                                                         | 237                                                  | 0.2                                                 | 0.3                                                  | 0.5                                |
| Village Center Office                                      | 53                              | 0.18                                     | 1.2                       | 6.8                                | 2.3                                                | 122                       | 53                                                         | 6,431                                                | 4.4                                                 | 3.7                                                  | 8.2                                |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Light Industrial / Warehouse                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | 192                             |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 2 K-8                                                      | 192                             | 0.11                                     | 4.4                       | 40                                 | 1.3                                                | 241                       | 55                                                         | 13,329                                               | 9.2                                                 | 72.8                                                 | 82.0                               |
| <b>Subtotal</b>                                            | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>19</b>                                           | <b>81</b>                                            | <b>100</b>                         |

**Table 4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
Grapevine Project, Kern County, California

|                                                            | [A]<br>Floor Area<br>(1,000 sf) | [B]<br>Floor Area<br>Ratio<br>(ac/ac) | [C]<br>Floor Area<br>(ac) | [D]<br>Area of<br>Land Use<br>(ac) | [E]<br>Employees<br>per 1,000 sf<br>(emp/1,000 sf) | [F]<br>Employees<br>(emp) | [G]<br>Employee<br>Indoor Water<br>Use Factor<br>(gpd/emp) | [H]<br>Average<br>Daily Indoor<br>Water Use<br>(gpd) | [I]<br>Total Annual<br>Indoor<br>Water Use<br>(AFY) | [J]<br>Total Annual<br>Outdoor<br>Water Use<br>(AFY) | [K]<br>Total<br>Water Use<br>(AFY) |
|------------------------------------------------------------|---------------------------------|---------------------------------------|---------------------------|------------------------------------|----------------------------------------------------|---------------------------|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------|------------------------------------|
| Commercial, Institutional, and<br>Industrial Land Uses (a) | (a)                             | (b)                                   | C = A / 43.56 (c)         | D = C / B (d)                      | (e)                                                | F = A × E (e)             | (f)                                                        | H = F × G (g)                                        | I = A x H (h)                                       | See Table 7                                          | K = I + J                          |
| <b>Area 5a</b>                                             |                                 |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 22                              |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 11                              | 0.18                                  | 0.3                       | 1.4                                | 1.1                                                | 12                        | 122                                                        | 1,506                                                | 1.0                                                 | 0.8                                                  | 1.8                                |
| 21% Drug store                                             | 5                               | 0.18                                  | 0.11                      | 0.6                                | 0.8                                                | 4                         | 69                                                         | 254                                                  | 0.2                                                 | 0.3                                                  | 0.5                                |
| 14% Miscellaneous                                          | 3                               | 0.18                                  | 0.07                      | 0.4                                | 0.8                                                | 2                         | 69                                                         | 170                                                  | 0.1                                                 | 0.2                                                  | 0.3                                |
| 7% Restaurant                                              | 2                               | 0.18                                  | 0.04                      | 0.2                                | 2                                                  | 3                         | 179                                                        | 552                                                  | 0.4                                                 | 0.1                                                  | 0.5                                |
| 7% Bank                                                    | 2                               | 0.18                                  | 0.04                      | 0.2                                | 0.8                                                | 1                         | 63                                                         | 78                                                   | 0.1                                                 | 0.1                                                  | 0.2                                |
| Village Center Office                                      | 18                              | 0.18                                  | 0.4                       | 2.3                                | 2.3                                                | 41                        | 53                                                         | 2,184                                                | 1.5                                                 | 1.3                                                  | 2.8                                |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Light Industrial / Warehouse                               | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | 96                              |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     | 0                                                    |                                    |
| 1 K-8                                                      | 96                              | 0.11                                  | 2.2                       | 20                                 | 1.3                                                | 121                       | 55                                                         | 6,665                                                | 4.6                                                 | 36.4                                                 | 41.0                               |
| <b>Subtotal</b>                                            | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>8</b>                                            | <b>39</b>                                            | <b>47</b>                          |
| <b>Area 5b</b>                                             |                                 |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Village Center Office                                      | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Light Industrial / Warehouse                               | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| <b>Subtotal</b>                                            | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>0</b>                                            | <b>0</b>                                             | <b>0</b>                           |
| <b>Area 6a</b>                                             |                                 |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 84                              |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 43                              | 0.18                                  | 1.0                       | 5.5                                | 1.1                                                | 47                        | 122                                                        | 5,750                                                | 4.0                                                 | 3.0                                                  | 7.0                                |
| 21% Drug store                                             | 18                              | 0.18                                  | 0.4                       | 2.2                                | 0.8                                                | 14                        | 69                                                         | 971                                                  | 0.7                                                 | 1.2                                                  | 1.9                                |
| 14% Miscellaneous                                          | 12                              | 0.18                                  | 0.3                       | 1.5                                | 0.8                                                | 9                         | 69                                                         | 647                                                  | 0.4                                                 | 0.8                                                  | 1.3                                |
| 7% Restaurant                                              | 6                               | 0.18                                  | 0.1                       | 0.7                                | 2                                                  | 12                        | 179                                                        | 2,109                                                | 1.5                                                 | 0.4                                                  | 1.9                                |
| 7% Bank                                                    | 6                               | 0.18                                  | 0.1                       | 0.7                                | 0.8                                                | 5                         | 63                                                         | 297                                                  | 0.2                                                 | 0.4                                                  | 0.6                                |
| Village Center Office                                      | 66                              | 0.18                                  | 1.5                       | 8                                  | 2.3                                                | 152                       | 53                                                         | 8,008                                                | 5.5                                                 | 4.6                                                  | 10.2                               |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | 270                             |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 50% High Tech / Bio Tech                                   | 135                             | 0.30                                  | 3.1                       | 10                                 | 2.3                                                | 311                       | 92                                                         | 28,530                                               | 19.7                                                | 5.7                                                  | 25.4                               |
| 50% Other Office                                           | 135                             | 0.30                                  | 3.1                       | 10                                 | 2.3                                                | 311                       | 53                                                         | 16,381                                               | 11.3                                                | 5.7                                                  | 17.0                               |
| Light Industrial / Warehouse                               | 1,400                           |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 75% Light Industrial / Warehouse                           | 1,050                           | 0.30                                  | 24                        | 80                                 | 0.43                                               | 452                       | 77                                                         | 34,576                                               | 23.9                                                | 44.3                                                 | 68.2                               |
| 25% Community College                                      | 350                             | 0.29                                  | 8                         | 28                                 | 1.3                                                | 441                       | 31                                                         | 13,607                                               | 9.4                                                 | 15.3                                                 | 24.7                               |
| Schools (i)                                                | 96                              |                                       |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 1 K-8                                                      | 96                              | 0.11                                  | 2.2                       | 20                                 | 1.3                                                | 121                       | 55                                                         | 6,665                                                | 4.6                                                 | 36.4                                                 | 41.0                               |
| <b>Subtotal</b>                                            | --                              | --                                    | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>81</b>                                           | <b>118</b>                                           | <b>199</b>                         |

**Table 4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
 Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses (a)                                                                                        | [A]<br>Floor Area<br>(1,000 sf)<br>(a) | [B]<br>Floor Area<br>Ratio<br>(ac/ac)<br>(b) | [C]<br>Floor Area<br>(ac)<br>C = A / 43.56 (c) | [D]<br>Area of<br>Land Use<br>(ac)<br>D = C / B (d) | [E]<br>Employees<br>per 1,000 sf<br>(emp/1,000 sf)<br>(e) | [F]<br>Employees<br>(emp)<br>F = A × E (e) | [G]<br>Employee<br>Indoor Water<br>Use Factor<br>(gpd/emp)<br>(f) | [H]<br>Average<br>Daily Indoor<br>Water Use<br>(gpd)<br>H = F × G (g) | [I]<br>Total Annual<br>Indoor<br>Water Use<br>(AFY)<br>I = A x H (h) | [J]<br>Total Annual<br>Outdoor<br>Water Use<br>(AFY)<br>See Table 7 | [K]<br>Total<br>Water Use<br>(AFY)<br>K = I + J |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------|------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------|
| <b>Area 6b</b>                                                                                                                                 |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Village Center Retail                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Village Center Office                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Office / R&D                                                                                                                                   | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Industrial                                                                                                                                     | 50                                     |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Light Industrial / Warehouse                                                                                                                   | 50                                     | 0.05                                         | 1                                              | 23                                                  | 0.4                                                       | 22                                         | 77                                                                | 1,646                                                                 | 1.1                                                                  | 12.7                                                                | 10.4                                            |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                           | --                                             | 266                                                 | --                                                        | --                                         | --                                                                | --                                                                    | 0.03                                                                 | 1.2                                                                 | 1.2                                             |
| Schools (i)                                                                                                                                    | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | <b>1</b>                                                             | <b>13.8</b>                                                         | <b>11.6</b>                                     |
| <b>Area 6c</b>                                                                                                                                 |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Village Center Retail                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Village Center Office                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Office / R&D                                                                                                                                   | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Industrial                                                                                                                                     | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                           | --                                             | 190                                                 | --                                                        | --                                         | --                                                                | --                                                                    | 0.02                                                                 | 0.8                                                                 | 0.9                                             |
| Schools (i)                                                                                                                                    | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | <b>0</b>                                                             | <b>0.8</b>                                                          | <b>0.9</b>                                      |
| <b>Area 6d</b>                                                                                                                                 |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Village Center Retail                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Village Center Office                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Office / R&D                                                                                                                                   | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Industrial                                                                                                                                     | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                           | --                                             | 173                                                 | --                                                        | --                                         | --                                                                | --                                                                    | 0.02                                                                 | 0.8                                                                 | 0.8                                             |
| Schools (i)                                                                                                                                    | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | <b>0</b>                                                             | <b>0.8</b>                                                          | <b>0.8</b>                                      |
| <b>Area 6e</b>                                                                                                                                 |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Village Center Retail                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Village Center Office                                                                                                                          | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Office / R&D                                                                                                                                   | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Industrial                                                                                                                                     | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                           | --                                             | 171                                                 | --                                                        | --                                         | --                                                                | --                                                                    | 0.02                                                                 | 0.8                                                                 | 0.8                                             |
| Schools (i)                                                                                                                                    | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | <b>0</b>                                                             | <b>0.8</b>                                                          | <b>0.8</b>                                      |
| Total School Water Use (including state-of-the-art water conservation technologies and measures)                                               |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       | 39                                                                   | 318                                                                 | 358                                             |
| <b>Total Commercial, Institutional, and Industrial Water Use (including state-of-the-art water conservation technologies and measures) (k)</b> |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       | <b>588</b>                                                           | <b>592</b>                                                          | <b>1,177</b>                                    |

**Table 4**  
***Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses***  
Grapevine Project, Kern County, California

Abbreviations:

|                                                  |                                                  |                                         |
|--------------------------------------------------|--------------------------------------------------|-----------------------------------------|
| "1,000 sf" = 1,000 square feet                   | "emp" = employees                                | "R&D" = research and development        |
| "ac" = acre                                      | "emp/1,000 sf" = employees per 1,000 square feet | "sf" = square feet                      |
| "ac/ac" = acre per developed acre                | "gpd" = gallons per day                          | "TRCC" = Tejon Regional Commerce Center |
| "AFY" = acre-feet per year                       | "gpd/emp" = gallons per day per employee         |                                         |
| "CII" = Commercial, Institutional and Industrial | "K-8" = kindergarten through eighth grade        |                                         |

Notes:

- (a) The CII land uses and areas are based on the 8 June 2015 project Land Use Program Summary.
- (b) The floor area ratio is the ratio between floor area to gross land area. The floor area ratios for the different land use categories are based on the 8 June 2015 project Land Use Program Summary.
- (c) The floor area expressed in acres is calculated by dividing the floor area expressed in 1,000 square feet by 43.56. Note that 1 acre is equal to 43,560 square feet.
- (d) The area of land use is calculated by dividing the floor area expressed in acres, by the floor area ratio.
- (e) The employees per 1,000 square feet were based on the data in Reference 2. The number of employees was estimated by multiplying the floor area, expressed in 1,000 square feet, by the employees per 1,000 square feet.
- (f) The employee indoor water use factors, derived from Reference 1, relate the indoor water use for a specific CII land use to the number of employees based on a 225-day work year and a conservation potential, which accounts for current water efficiency standards. The conservation potential is the "best potential" estimate of conservation savings based on the use of water efficient fixtures and efficient water management techniques for each industry. Conservation potential for the Regional/Freeway-Oriented Commercial land uses were assumed to be 0%, due to the high traffic volumes that these businesses are likely to receive (similar to high traffic volumes at the TRCC). Additionally, the employee indoor water use factors for the Regional/Freeway-Oriented Commercial land uses are multiplied by an escalation factor of 3.4 which is the average difference between the project indoor water use factors and actual indoor water use at the TRCC in fiscal year 2012 - 2013, weighted by land use category.
- (g) The total average daily water use for each land use is estimated by multiplying the number of employees by the CII-specific indoor employee water use factor.
- (h) Average Annual Water Use is calculated by multiplying the Average Daily Water Use, from Column H by the 225-day work year cited in Footnote (f) for the employee indoor water use factors, then dividing by 326,000 gallons per acre-foot.
- (i) The floor area for schools is based on 11% of the total acreage for kindergarten through eighth grade and 10% of the total acreage for high schools.
- (j) Water use for the solar farms are based on the values for photovoltaic solar plants from Reference 3.
- (k) Totals may not add exactly due to rounding.

Reference:

- 1. Pacific Institute, 2003. *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003.
- 2. Energy Information Administration, 2006. *2003 Commercial Buildings Energy Consumption Survey: Building Characteristics Tables* , Revised June 2006.
- 3. Bureau of Land Management, 2012. *Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States* , Appendix M, July 2012.

**Table 5**  
**Irrigation Water Needs Estimated Using the California Department of Water Resources Model Water Efficient Landscape Model**  
 Grapevine Project, Kern County, California

|                                          | [A]<br><br>Reference Evapotranspiration (in) | High Water Use Plantings     |                                                             |                                                             |                                              | Low Water Use Plantings      |                                                           |                                                             |                                              | Combination Tree and Groundcover Plantings |                                                           |                                                            |                                             | Buffer Zone Plantings       |                                                           |                                                            |                                             |
|------------------------------------------|----------------------------------------------|------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|------------------------------|-----------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------|--------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|---------------------------------------------|-----------------------------|-----------------------------------------------------------|------------------------------------------------------------|---------------------------------------------|
|                                          |                                              | [B]<br><br>HWUP Plant Factor | [C]<br><br>Irrigation Efficiency (Spray Irrigation Systems) | [D]<br><br>HWUP Evapotranspiration Adjustment Factor (ETAF) | [E]<br><br>HWUP Evapotranspiration Rate (in) | [F]<br><br>LWUP Plant Factor | [G]<br><br>Irrigation Efficiency (Drip Irrigation System) | [H]<br><br>LWUP Evapotranspiration Adjustment Factor (ETAF) | [I]<br><br>LWUP Evapotranspiration Rate (in) | [J]<br><br>TGP Plant Factor                | [K]<br><br>Irrigation Efficiency (Drip Irrigation System) | [L]<br><br>TGP Evapotranspiration Adjustment Factor (ETAF) | [M]<br><br>TGP Evapotranspiration Rate (in) | [N]<br><br>BZP Plant Factor | [O]<br><br>Irrigation Efficiency (Drip Irrigation System) | [P]<br><br>BZP Evapotranspiration Adjustment Factor (ETAF) | [Q]<br><br>BZP Evapotranspiration Rate (in) |
| Month                                    | (a)                                          | (b)                          | (c)                                                         | D = B / C (d)                                               | E = A x D (e)                                | (f)                          | (c)                                                       | H = F / G (d)                                               | E = A x D (e)                                | (g)                                        | (c)                                                       | D = B / C (d)                                              | M = A x L (e)                               | (h)                         | (c)                                                       | P = N / O (d)                                              | E = A x P (e)                               |
| January                                  | 1.45                                         | 0.8                          | 75%                                                         | 1.07                                                        | 1.54                                         | 0.3                          | 81%                                                       | 0.37                                                        | 0.54                                         | 0.7                                        | 81%                                                       | 1.01                                                       | 1.25                                        | 0.4                         | 81%                                                       | 0.58                                                       | 0.71                                        |
| February                                 | 2.22                                         | 0.8                          | 75%                                                         | 1.07                                                        | 2.36                                         | 0.3                          | 81%                                                       | 0.37                                                        | 0.82                                         | 0.7                                        | 81%                                                       | 1.55                                                       | 1.92                                        | 0.4                         | 81%                                                       | 0.89                                                       | 1.09                                        |
| March                                    | 4.03                                         | 0.8                          | 75%                                                         | 1.07                                                        | 4.30                                         | 0.3                          | 81%                                                       | 0.37                                                        | 1.49                                         | 0.7                                        | 81%                                                       | 2.82                                                       | 3.48                                        | 0.4                         | 81%                                                       | 1.61                                                       | 1.99                                        |
| April                                    | 5.49                                         | 0.8                          | 75%                                                         | 1.07                                                        | 5.86                                         | 0.3                          | 81%                                                       | 0.37                                                        | 2.03                                         | 0.7                                        | 81%                                                       | 3.84                                                       | 4.74                                        | 0.4                         | 81%                                                       | 2.20                                                       | 2.71                                        |
| May                                      | 7.63                                         | 0.8                          | 75%                                                         | 1.07                                                        | 8.13                                         | 0.3                          | 81%                                                       | 0.37                                                        | 2.82                                         | 0.7                                        | 81%                                                       | 5.34                                                       | 6.59                                        | 0.4                         | 81%                                                       | 3.05                                                       | 3.77                                        |
| June                                     | 8.63                                         | 0.8                          | 75%                                                         | 1.07                                                        | 9.20                                         | 0.3                          | 81%                                                       | 0.37                                                        | 3.19                                         | 0.7                                        | 81%                                                       | 6.04                                                       | 7.45                                        | 0.4                         | 81%                                                       | 3.45                                                       | 4.26                                        |
| July                                     | 9.14                                         | 0.8                          | 75%                                                         | 1.07                                                        | 9.75                                         | 0.3                          | 81%                                                       | 0.37                                                        | 3.38                                         | 0.7                                        | 81%                                                       | 6.40                                                       | 7.90                                        | 0.4                         | 81%                                                       | 3.66                                                       | 4.51                                        |
| August                                   | 8.55                                         | 0.8                          | 75%                                                         | 1.07                                                        | 9.12                                         | 0.3                          | 81%                                                       | 0.37                                                        | 3.17                                         | 0.7                                        | 81%                                                       | 5.99                                                       | 7.39                                        | 0.4                         | 81%                                                       | 3.42                                                       | 4.22                                        |
| September                                | 6.18                                         | 0.8                          | 75%                                                         | 1.07                                                        | 6.59                                         | 0.3                          | 81%                                                       | 0.37                                                        | 2.29                                         | 0.7                                        | 81%                                                       | 4.32                                                       | 5.34                                        | 0.4                         | 81%                                                       | 2.47                                                       | 3.05                                        |
| October                                  | 4.06                                         | 0.8                          | 75%                                                         | 1.07                                                        | 4.33                                         | 0.3                          | 81%                                                       | 0.37                                                        | 1.50                                         | 0.7                                        | 81%                                                       | 2.84                                                       | 3.51                                        | 0.4                         | 81%                                                       | 1.62                                                       | 2.00                                        |
| November                                 | 2.01                                         | 0.8                          | 75%                                                         | 1.07                                                        | 2.14                                         | 0.3                          | 81%                                                       | 0.37                                                        | 0.74                                         | 0.7                                        | 81%                                                       | 1.41                                                       | 1.74                                        | 0.4                         | 81%                                                       | 0.80                                                       | 0.99                                        |
| December                                 | 1.41                                         | 0.8                          | 75%                                                         | 1.07                                                        | 1.51                                         | 0.3                          | 81%                                                       | 0.37                                                        | 0.52                                         | 0.7                                        | 81%                                                       | 0.99                                                       | 1.22                                        | 0.4                         | 81%                                                       | 0.56                                                       | 0.70                                        |
| Total                                    | 60.78                                        |                              |                                                             |                                                             |                                              |                              |                                                           |                                                             |                                              |                                            |                                                           |                                                            |                                             |                             |                                                           |                                                            |                                             |
| Total Annual Evapotranspiration Rate (i) |                                              |                              |                                                             |                                                             | 64.83 in<br>(5.40 AFY/ac)                    |                              |                                                           |                                                             |                                              | 22.51 in<br>(1.88 AFY/ac)                  |                                                           |                                                            |                                             | 52.53 in<br>(4.38 AFY/ac)   |                                                           |                                                            | 30.01 in<br>(2.50 AFY/ac)                   |

**Abbreviations:**  
 "AFY/ac" = acre-feet per year per acre  
 "ETAF" = Evapotranspiration Adjustment Factor  
 "HWUP" = high water use plantings  
 "in" = inches  
 "LWUP" = low water use plantings  
 "BZP" = buffer zone plantings  
 "TGP" = combination tree and groundcover plantings

**Table 5**  
***Irrigation Water Needs Estimated Using the California Department of Water Resources Model Water Efficient Landscape Model***  
Grapevine Project, Kern County, California

Notes:

- (a) Reference evapotranspiration data were obtained from the California Irrigation Management Information Services ("CIMIS") station 125 located in Arvin, CA that measured evapotranspiration from grass. Monthly averages were calculated using all available data from this CIMIS station between 1996 and 2012.
- (b) The high water use plantings plant factor is based on the middle of the range of high water use plant factors from Reference 2.
- (c) The irrigation efficiencies are taken from Reference 2, assuming use of spray irrigation systems (75% efficiency) for the high water use plants and drip irrigation systems (81% efficiency) for all other plant types.
- (d) The planting evapotranspiration adjustment factor (ETAF) is calculated by dividing the plant factor by the irrigation efficiency.
- (e) The planting evapotranspiration rate is calculated by multiplying the reference evapotranspiration by the ETAF. The evapotranspiration rate is the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants over a specific duration and represents the total irrigation requirements for the plantings.
- (f) The low water use plantings plant factor is conservatively based on the high end of the range for plant factors for low water use plants from Reference 2.
- (g) The combination trees and groundcover plant factor is based on the high end of the range for plant factors for moderate water use plants from Reference 2, as well as the high end of the range for density coefficients from Reference 1.
- (h) The buffer zone plant factor is based on the low end of the range for plant factors for moderate water use plants from Reference 2.
- (i) The total annual evapotranspiration rate is how much water use is necessary for an area of plantings over a year. Note that 1 AFY/ac is equal to 12 inches annually.

References:

- 1 University of California Cooperative Extension and California Department of Water Resources, *A Guide to Irrigation Water Needs of Landscape Plantings in California*, August 2000.
- 2 California Code of Regulations, *Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance* , July 9, 2015 Draft.

Table 6  
Estimated Residential Outdoor Water Use Factors  
Grapevine Project, Kern County, California

| Housing Category /<br>Unit Type (a)                                       | [A]<br>Median<br>Density<br>(du/ac)<br><br>(a) | [B]<br>Median<br>Size of Lot<br>(without streets)<br>(sq ft/du)<br><br>B = 43560 / A (b) | [C]<br>Area of<br>Landscaping<br>Per Lot<br>(sq ft/du)<br><br>C = B x 40% | [D]<br>Percentage<br>of Landscaping<br>Covered in<br>HWUPs<br><br>(c) | [E]<br>Area of<br>HWUPs<br>(sq ft/du)<br><br>E = C x D (c) | [F]<br>Percentage<br>of Landscaping<br>Covered in<br>LWUPs<br><br>(d) | [G]<br>Area of<br>LWUPs<br>(sq ft/du)<br><br>G = C x F (d) | [H]<br>Estimated Total<br>Water Use<br>for HWUPs<br>(AFY/du)<br><br>H = E x 5.4 / 43560 (e) | [I]<br>Estimated Total<br>Water Use<br>for LWUPs<br>(AFY/du)<br><br>I = G x 1.88 / 43560 (f) | [J]<br>Estimated Total<br>Water Use (ETWU)<br>for Landscaping<br>(AFY/du)<br><br>J = H + I (g) | [K]<br>Maximum Applied<br>Water<br>Allowance (MAWA)<br>(AFY/du)<br><br>(h) | [L]<br>Additional<br>Outdoor<br>Water Uses<br>(AFY/du)<br><br>L = 0.1 x J (i) | [M]<br>Total<br>Outdoor Water<br>Use Factor<br>(AFY/du)<br><br>M = J + L (j) |
|---------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Area 1<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 2<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 3<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 4<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 5a<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 5b<br>Standard Residential Units                                     | 7.2                                            | 6,050                                                                                    | 2,420                                                                     | 25%                                                                   | 605                                                        | 75%                                                                   | 1,815                                                      | 0.075                                                                                       | 0.078                                                                                        | 0.15                                                                                           | 0.15                                                                       | 0.015                                                                         | 0.17                                                                         |
| Area 6a<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6b<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6c<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6d<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6e<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                              | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |

Abbreviations:

"AFY" = Acre feet per year

"AFY/ac" = Acre feet per year per acre

"du/ac" = dwelling units per acre

"ETWU" = estimated total water use

"HWUPs" = high water use plantings

"LWUPs" = low water use plantings

"MAWA" = maximum allowable water allowance

"sq ft" = square feet

Notes:

(a) Residential unit types and median residential density are based on the 8 June 2015 Project Land Use Program Summary.

(b) The size of residential lots, including the area of associated surrounding streets, is calculated by dividing the residential density into 43,560 square feet per acre.

(c) High water use plantings include turf grasses. Percentage of lot covered in high water use plantings is the area of high water use plantings divided by the lot size (without streets).

(d) Low water use plantings include shrubs and native vegetation. Percentage of lot covered in low water use plantings is the area of low water use plantings divided by the lot size (without streets).

(e) The estimated total water use for high water use plantings is the area of high water use plantings, converted to acres (by dividing by 43,560), multiplied by the annual evapotranspiration rate for high water use plantings (5.4 AFY/ac) provided in Table 5.

(f) The estimated total water use for low water use plantings is the area of low water use plantings, converted to acres (by dividing by 43,560), multiplied by the annual evapotranspiration rate for low water use plantings (1.88 AFY/ac) provided in Table 5.

(g) For residential unit landscaping, the Estimated Total Water Use (ETWU) calculation described in Reference 1 is based on 100% regular landscape area, which equals the sum of the estimated total water use for high water use planting and the estimated total water use for low water use planting. This value must be less than or equal to the Maximum Applied Water Allowance (see note h).

(h) The Maximum Applied Water Allowance (MAWA) calculations are described in Reference 1. The MAWA was calculated assuming 100% regular landscaped area and an evaporation adjustment factor of 0.55 for residential areas.

(i) Additional outdoor water uses include miscellaneous outdoor water uses (e.g. car washing, outdoor cleaning, etc.), which are assumed at 10% of the applied irrigation of high and low water use plantings.

(j) The total annual outdoor water use is the sum of the ETWU for landscaping and additional outdoor water uses.

References:

1 California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance, July 9, 2015 Draft.

**Table 7**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
 Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 1</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 1.8                                      | 0.36                                        | 25%                                                      | 0.09                                            | 75%                                                      | 0.27                                            | 0.5                                                                    | 0.5                                                                     | 1.0                                                                       | 1.8                                                           |
| 21% Drug store                                      | 0.7                                      | 0.15                                        | 25%                                                      | 0.04                                            | 75%                                                      | 0.11                                            | 0.2                                                                    | 0.2                                                                     | 0.4                                                                       | 0.8                                                           |
| 14% Miscellaneous                                   | 0.5                                      | 0.10                                        | 25%                                                      | 0.02                                            | 75%                                                      | 0.07                                            | 0.1                                                                    | 0.1                                                                     | 0.3                                                                       | 0.5                                                           |
| 7% Restaurant                                       | 0.2                                      | 0.05                                        | 25%                                                      | 0.01                                            | 75%                                                      | 0.04                                            | 0.1                                                                    | 0.1                                                                     | 0.1                                                                       | 0.3                                                           |
| 7% Bank                                             | 0.2                                      | 0.05                                        | 25%                                                      | 0.01                                            | 75%                                                      | 0.04                                            | 0.1                                                                    | 0.1                                                                     | 0.1                                                                       | 0.3                                                           |
| Village Center Office                               | 2.8                                      | 0.56                                        | 25%                                                      | 0.14                                            | 75%                                                      | 0.42                                            | 0.8                                                                    | 0.8                                                                     | 1.5                                                                       | 2.8                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 50% High Tech / Bio Tech                            | 15                                       | 3.06                                        | 25%                                                      | 0.77                                            | 75%                                                      | 2.30                                            | 4.1                                                                    | 4.3                                                                     | 8.4                                                                       | 15.4                                                          |
| 50% Other Office                                    | 15                                       | 3.06                                        | 25%                                                      | 0.77                                            | 75%                                                      | 2.30                                            | 4.1                                                                    | 4.3                                                                     | 8.4                                                                       | 15.4                                                          |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>20</b>                                                                 |                                                               |
| <b>Area 2</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 9.8                                      | 1.96                                        | 25%                                                      | 0.49                                            | 75%                                                      | 1.47                                            | 2.7                                                                    | 2.8                                                                     | 5.4                                                                       | 9.9                                                           |
| 21% Drug store                                      | 4.0                                      | 0.81                                        | 25%                                                      | 0.20                                            | 75%                                                      | 0.61                                            | 1.1                                                                    | 1.1                                                                     | 2.2                                                                       | 4.1                                                           |
| 14% Miscellaneous                                   | 2.7                                      | 0.54                                        | 25%                                                      | 0.13                                            | 75%                                                      | 0.40                                            | 0.7                                                                    | 0.8                                                                     | 1.5                                                                       | 2.7                                                           |
| 7% Restaurant                                       | 1.3                                      | 0.27                                        | 25%                                                      | 0.07                                            | 75%                                                      | 0.20                                            | 0.4                                                                    | 0.4                                                                     | 0.7                                                                       | 1.4                                                           |
| 7% Bank                                             | 1.3                                      | 0.27                                        | 25%                                                      | 0.07                                            | 75%                                                      | 0.20                                            | 0.4                                                                    | 0.4                                                                     | 0.7                                                                       | 1.4                                                           |
| Village Center Office                               | 15                                       | 3.04                                        | 25%                                                      | 0.76                                            | 75%                                                      | 2.28                                            | 4.1                                                                    | 4.3                                                                     | 8.4                                                                       | 15.3                                                          |
| Regional / Freeway-Oriented Comm.                   |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 78.5% Miscellaneous Retail                          | 21                                       | 4.20                                        | 25%                                                      | 1.05                                            | 75%                                                      | 3.15                                            | 5.7                                                                    | 5.9                                                                     | 11.6                                                                      | 21.2                                                          |
| 7.5% Restaurant                                     | 2.0                                      | 0.40                                        | 25%                                                      | 0.10                                            | 75%                                                      | 0.30                                            | 0.5                                                                    | 0.6                                                                     | 1.1                                                                       | 2.0                                                           |
| 7.5% Gas Station                                    | 2.0                                      | 0.40                                        | 25%                                                      | 0.10                                            | 75%                                                      | 0.30                                            | 0.5                                                                    | 0.6                                                                     | 1.1                                                                       | 2.0                                                           |
| 6.5% Hotel                                          | 1.7                                      | 0.35                                        | 25%                                                      | 0.09                                            | 75%                                                      | 0.26                                            | 0.5                                                                    | 0.5                                                                     | 1.0                                                                       | 1.8                                                           |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 62% High Tech / Bio Tech                            | 37                                       | 7.35                                        | 25%                                                      | 1.84                                            | 75%                                                      | 5.51                                            | 9.9                                                                    | 10.3                                                                    | 20.3                                                                      | 37.0                                                          |
| 38% Medical Center                                  | 23                                       | 4.59                                        | 25%                                                      | 1.15                                            | 75%                                                      | 3.44                                            | 6.2                                                                    | 6.5                                                                     | 12.7                                                                      | 23.1                                                          |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 50%                                                      | 5.00                                            | 50%                                                      | 5.00                                            | 27.0                                                                   | 9.4                                                                     | 36.4                                                                      | 44.6                                                          |
| 1 High School                                       | 55                                       | 27.50                                       | 50%                                                      | 13.75                                           | 50%                                                      | 13.75                                           | 74.3                                                                   | 25.8                                                                    | 100.1                                                                     | 122.5                                                         |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>203</b>                                                                |                                                               |

**Table 7**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 3</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 6.2                                      | 1.24                                        | 25%                                                      | 0.31                                            | 75%                                                      | 0.93                                            | 1.7                                                                    | 1.7                                                                     | 3.4                                                                       | 6.2                                                           |
| 21% Drug store                                      | 2.5                                      | 0.51                                        | 25%                                                      | 0.13                                            | 75%                                                      | 0.38                                            | 0.7                                                                    | 0.7                                                                     | 1.4                                                                       | 2.6                                                           |
| 14% Miscellaneous                                   | 1.7                                      | 0.34                                        | 25%                                                      | 0.08                                            | 75%                                                      | 0.25                                            | 0.5                                                                    | 0.5                                                                     | 0.9                                                                       | 1.7                                                           |
| 7% Restaurant                                       | 0.8                                      | 0.17                                        | 25%                                                      | 0.04                                            | 75%                                                      | 0.13                                            | 0.2                                                                    | 0.2                                                                     | 0.5                                                                       | 0.9                                                           |
| 7% Bank                                             | 0.8                                      | 0.17                                        | 25%                                                      | 0.04                                            | 75%                                                      | 0.13                                            | 0.2                                                                    | 0.2                                                                     | 0.5                                                                       | 0.9                                                           |
| Village Center Office                               | 10                                       | 1.91                                        | 25%                                                      | 0.48                                            | 75%                                                      | 1.43                                            | 2.6                                                                    | 2.7                                                                     | 5.3                                                                       | 9.6                                                           |
| Regional / Freeway-Oriented Comm.                   |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 78.5% Miscellaneous Retail                          | 54                                       | 10.81                                       | 25%                                                      | 2.70                                            | 75%                                                      | 8.11                                            | 14.6                                                                   | 15.2                                                                    | 29.8                                                                      | 54.5                                                          |
| 7.5% Restaurant                                     | 5.2                                      | 1.03                                        | 25%                                                      | 0.26                                            | 75%                                                      | 0.77                                            | 1.4                                                                    | 1.5                                                                     | 2.8                                                                       | 5.2                                                           |
| 7.5% Gas Station                                    | 5.2                                      | 1.03                                        | 25%                                                      | 0.26                                            | 75%                                                      | 0.77                                            | 1.4                                                                    | 1.5                                                                     | 2.8                                                                       | 5.2                                                           |
| 6.5% Hotel                                          | 4.5                                      | 0.90                                        | 25%                                                      | 0.22                                            | 75%                                                      | 0.67                                            | 1.2                                                                    | 1.3                                                                     | 2.5                                                                       | 4.5                                                           |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 50% High Tech / Bio Tech                            | 25                                       | 4.97                                        | 25%                                                      | 1.24                                            | 75%                                                      | 3.73                                            | 6.7                                                                    | 7.0                                                                     | 13.7                                                                      | 25.1                                                          |
| 50% Other Office                                    | 25                                       | 4.97                                        | 25%                                                      | 1.24                                            | 75%                                                      | 3.73                                            | 6.7                                                                    | 7.0                                                                     | 13.7                                                                      | 25.1                                                          |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 50%                                                      | 5.00                                            | 50%                                                      | 5.00                                            | 27.0                                                                   | 9.4                                                                     | 36.4                                                                      | 44.6                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>114</b>                                                                |                                                               |
| <b>Area 4</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 4.4                                      | 0.87                                        | 25%                                                      | 0.22                                            | 75%                                                      | 0.65                                            | 1.2                                                                    | 1.2                                                                     | 2.4                                                                       | 4.4                                                           |
| 21% Drug store                                      | 1.8                                      | 0.36                                        | 25%                                                      | 0.09                                            | 75%                                                      | 0.27                                            | 0.5                                                                    | 0.5                                                                     | 1.0                                                                       | 1.8                                                           |
| 14% Miscellaneous                                   | 1.2                                      | 0.24                                        | 25%                                                      | 0.06                                            | 75%                                                      | 0.18                                            | 0.3                                                                    | 0.3                                                                     | 0.7                                                                       | 1.2                                                           |
| 7% Restaurant                                       | 0.6                                      | 0.12                                        | 25%                                                      | 0.03                                            | 75%                                                      | 0.09                                            | 0.2                                                                    | 0.2                                                                     | 0.3                                                                       | 0.6                                                           |
| 7% Bank                                             | 0.6                                      | 0.12                                        | 25%                                                      | 0.03                                            | 75%                                                      | 0.09                                            | 0.2                                                                    | 0.2                                                                     | 0.3                                                                       | 0.6                                                           |
| Village Center Office                               | 6.8                                      | 1.35                                        | 25%                                                      | 0.34                                            | 75%                                                      | 1.01                                            | 1.8                                                                    | 1.9                                                                     | 3.7                                                                       | 6.8                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 40                                       | 20.00                                       | 50%                                                      | 10.00                                           | 50%                                                      | 10.00                                           | 54.0                                                                   | 18.8                                                                    | 72.8                                                                      | 89.1                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>81</b>                                                                 |                                                               |

**Table 7**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 5a</b>                                      |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 1.4                                      | 0.29                                        | 25%                                                      | 0.07                                            | 75%                                                      | 0.21                                            | 0.4                                                                    | 0.4                                                                     | 0.8                                                                       | 1.4                                                           |
| 21% Drug store                                      | 0.6                                      | 0.12                                        | 25%                                                      | 0.03                                            | 75%                                                      | 0.09                                            | 0.2                                                                    | 0.2                                                                     | 0.3                                                                       | 0.6                                                           |
| 14% Miscellaneous                                   | 0.4                                      | 0.08                                        | 25%                                                      | 0.02                                            | 75%                                                      | 0.06                                            | 0.1                                                                    | 0.1                                                                     | 0.2                                                                       | 0.4                                                           |
| 7% Restaurant                                       | 0.2                                      | 0.04                                        | 25%                                                      | 0.01                                            | 75%                                                      | 0.03                                            | 0.1                                                                    | 0.1                                                                     | 0.1                                                                       | 0.2                                                           |
| 7% Bank                                             | 0.2                                      | 0.04                                        | 25%                                                      | 0.01                                            | 75%                                                      | 0.03                                            | 0.1                                                                    | 0.1                                                                     | 0.1                                                                       | 0.2                                                           |
| Village Center Office                               | 2.3                                      | 0.46                                        | 25%                                                      | 0.11                                            | 75%                                                      | 0.34                                            | 0.6                                                                    | 0.6                                                                     | 1.3                                                                       | 2.3                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 50%                                                      | 5.00                                            | 50%                                                      | 5.00                                            | 27.0                                                                   | 9.4                                                                     | 36.4                                                                      | 44.6                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>39</b>                                                                 |                                                               |
| <b>Area 5b</b>                                      |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                               | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0</b>                                                                  |                                                               |
| <b>Area 6a</b>                                      |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 5.5                                      | 1.09                                        | 25%                                                      | 0.27                                            | 75%                                                      | 0.82                                            | 1.5                                                                    | 1.5                                                                     | 3.0                                                                       | 5.5                                                           |
| 21% Drug store                                      | 2.2                                      | 0.45                                        | 25%                                                      | 0.11                                            | 75%                                                      | 0.34                                            | 0.6                                                                    | 0.6                                                                     | 1.2                                                                       | 2.3                                                           |
| 14% Miscellaneous                                   | 1.5                                      | 0.30                                        | 25%                                                      | 0.07                                            | 75%                                                      | 0.22                                            | 0.4                                                                    | 0.4                                                                     | 0.8                                                                       | 1.5                                                           |
| 7% Restaurant                                       | 0.7                                      | 0.15                                        | 25%                                                      | 0.04                                            | 75%                                                      | 0.11                                            | 0.2                                                                    | 0.2                                                                     | 0.4                                                                       | 0.8                                                           |
| 7% Bank                                             | 0.7                                      | 0.15                                        | 25%                                                      | 0.04                                            | 75%                                                      | 0.11                                            | 0.2                                                                    | 0.2                                                                     | 0.4                                                                       | 0.8                                                           |
| Village Center Office                               | 8                                        | 1.68                                        | 25%                                                      | 0.42                                            | 75%                                                      | 1.26                                            | 2.3                                                                    | 2.4                                                                     | 4.6                                                                       | 8.5                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       |                                             | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 50% High Tech / Bio Tech                            | 10                                       | 2.07                                        | 25%                                                      | 0.52                                            | 75%                                                      | 1.55                                            | 2.8                                                                    | 2.9                                                                     | 5.7                                                                       | 10.4                                                          |
| 50% Other Office                                    | 10                                       | 2.07                                        | 25%                                                      | 0.52                                            | 75%                                                      | 1.55                                            | 2.8                                                                    | 2.9                                                                     | 5.7                                                                       | 10.4                                                          |
| Light Industrial / Warehouse                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 75% Light Industrial / Warehouse                    | 80                                       | 16.07                                       | 25%                                                      | 4.02                                            | 75%                                                      | 12.05                                           | 21.7                                                                   | 22.6                                                                    | 44.3                                                                      | 81.0                                                          |
| 25% Community College                               | 28                                       | 5.54                                        | 25%                                                      | 1.39                                            | 75%                                                      | 4.16                                            | 7.5                                                                    | 7.8                                                                     | 15.3                                                                      | 27.9                                                          |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 50%                                                      | 5.00                                            | 50%                                                      | 5.00                                            | 27.0                                                                   | 9.4                                                                     | 36.4                                                                      | 44.6                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>118</b>                                                                |                                                               |

**Table 7**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses                          | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 6b</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Light Industrial / Warehouse                                                 | 23                                       | 4.59                                        | 25%                                                      | 1.15                                            | 75%                                                      | 3.44                                            | 6.2                                                                    | 6.5                                                                     | 12.7                                                                      | 23.1                                                          |
| Solar Farm (h)                                                               | 266                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 1.2                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>13.8</b>                                                               |                                                               |
| <b>Area 6c</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Solar Farm (h)                                                               | 190                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 0.8                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0.8</b>                                                                |                                                               |
| <b>Area 6d</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Solar Farm (h)                                                               | 173                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 0.8                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0.8</b>                                                                |                                                               |
| <b>Area 6e</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Solar Farm (h)                                                               | 171                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 0.8                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0.8</b>                                                                |                                                               |
| Total School Outdoor Water Use                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | 318                                                                       |                                                               |
| <b>Total Commercial, Institutional, and Industrial Outdoor Water Use (i)</b> |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>592</b>                                                                |                                                               |

Table 7  
Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses  
Grapevine Project, Kern County, California

Abbreviations:

"ac" = acre

"AFY" = acre-feet per year

"CII" = Commercial, Institutional and Industrial

"HWUP" = high water use plants

"K-8" = kindergarten through eighth grade

"LWUP" = low water use plants

"MAWA" = maximum applied water allowance

"R&D" = Research and development

Notes:

- (a) See Table 4 for area of land use calculation.
- (b) Area of landscaping is the area of land use multiplied by the percentage of landscaping. Landscaped percentage is 50% for schools and 20% for non-school CII land uses.
- (c) High water use plantings include turf grasses. Percentage of lot covered in high water use plantings is the area of high water use plantings divided by the area of land use (without streets).
- (d) Low water use plantings include shrubs and native vegetation. Percentage of lot covered in low water use plantings is the area of low water use plantings divided by the area of land use (without streets).
- (e) The estimated total water use for high water use plantings is the area of high water use plantings multiplied by the annual evapotranspiration rate for high water use plantings (5.4 AFY/ac) provided in Table 5.
- (f) The estimated total water use for low water use plantings is the area of low water use plantings multiplied by the annual evapotranspiration rate for low water use plantings (1.88 AFY/ac) provided in Table 5.
- (g) The ETWU is the sum of the estimated total water use for high water use plantings and estimated total water use for low water use plantings. The estimated total water outdoor water use must not be greater than the MAWA (see note h). The ETWU was calculated assuming all regular landscaped area, which accounts for plant type and irrigation efficiency, to estimate water demands. If special landscaped area was accounted for in the estimated total water use calculations according to Reference 1, the estimated total outdoor water use for non-school CII uses would equal the MAWA regardless of the planting types.
- (h) The Maximum Applied Water Allowance (MAWA) calculations are described in Reference 1. For the non-school CII land uses, the MAWA was calculated assuming 100% special landscaped area and an evaporation adjustment factor of 0.45. The MAWA calculations for schools assumes 33% regular landscaped area, 67% special landscaped area (assumed recreational areas), and an evaporation adjustment factor of 0.65 based on amendments to CALGreen Code approved by the Building Standards Commission on July 21, 2015.
- (h) Water use for the solar farms are based on the values for photovoltaic solar plants from Reference 2.
- (i) Kern County Code of Ordinances, Title 19, Chapter 19.86, sections 19.86.050 and 19.86.060, states that for CII land uses a "*minimum of five percent (5%) of the total developed lot area shall be landscaped.*" Approximately 20% of the total developed land area for CII is assumed to be irrigated landscape, which complies with the minimum Kern County standard.
- (k) Totals may not add exactly due to rounding.

Reference:

- 1 California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance , July 9, 2015 Draft.
- 2 Bureau of Land Management, 2012. Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States , Appendix M, July 2012.

Table 8  
Estimated Parks, Road and Common Area Landscaping Water Use Inputs and Calculations  
Grapevine, Kern County, California

| Landscaping Land Use (a)              | [A]<br><br>Total Acres<br>(ac)<br>(a) | High Water Use Plantings                            |                                                        |                                                                        |                                                                         | Low Water Use Plantings                             |                                                        |                                                                        |                                                                         | Tree and Groundcover Plantings                     |                                                       |                                                                       |                                                                        | Buffer Zone Plantings                              |                                                       |                                                                       |                                                                        | [S]<br><br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>J = E + I + M + R (I) | [T]<br><br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(I) |
|---------------------------------------|---------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|                                       |                                       | [B]<br><br>Percentage of Land as HWUP<br>(%)<br>(b) | [C]<br><br>Total Area of HWUP<br>(ac)<br>C = A × B (c) | [D]<br><br>Annual Evapo-transpiration Rate for HWUP<br>(AFY/ac)<br>(d) | [E]<br><br>Estimated Total Water Use for HWUP<br>(AFY)<br>E = C × D (e) | [F]<br><br>Percentage of Land as LWUP<br>(%)<br>(f) | [G]<br><br>Total Area of LWUP<br>(ac)<br>G = A × F (c) | [H]<br><br>Annual Evapo-transpiration Rate for LWUP<br>(AFY/ac)<br>(d) | [I]<br><br>Estimated Total Water Use for LWUP<br>(AFY)<br>I = G × H (e) | [J]<br><br>Percentage of Land as TGP<br>(%)<br>(g) | [K]<br><br>Total Area of TGP<br>(ac)<br>K = A × J (c) | [L]<br><br>Annual Evapo-transpiration Rate for TGP<br>(AFY/ac)<br>(d) | [M]<br><br>Estimated Total Water Use for TGP<br>(AFY)<br>M = K × L (e) | [O]<br><br>Percentage of Land as BZP<br>(%)<br>(h) | [P]<br><br>Total Area of BZP<br>(ac)<br>K = A × J (c) | [Q]<br><br>Annual Evapo-transpiration Rate for BZP<br>(AFY/ac)<br>(d) | [R]<br><br>Estimated Total Water Use for BZP<br>(AFY)<br>M = K × L (e) |                                                                                       |                                                                   |
| Area 1                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping                      | 26                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 26                                                    | 4.4                                                                   | 113                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 113                                                                                   | 130                                                               |
| 2 Roundabouts                         | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 2.0                                                    | 1.9                                                                    | 4                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 4                                                                                     | 10                                                                |
| Windrow                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k) | 22                                    | 25%                                                 | 5.6                                                    | 5.4                                                                    | 30                                                                      | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 11                                                    | 4.4                                                                   | 49                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 80                                                                                    | 85                                                                |
| Landscaped I-5 Buffer Zones           | 16                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 100%                                               | 16                                                    | 2.5                                                                   | 40                                                                     | 40                                                                                    | 81                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 237                                                                                   |                                                                   |
| Area 2                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 42                                    | 45%                                                 | 19                                                     | 5.4                                                                    | 102                                                                     | 45%                                                 | 18.9                                                   | 1.9                                                                    | 35                                                                      | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 138                                                                                   | 190                                                               |
| Road Landscaping                      | 42                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 42                                                    | 4.4                                                                   | 184                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 184                                                                                   | 212                                                               |
| 1 Roundabout                          | 1                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 1.0                                                    | 1.9                                                                    | 2                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 2                                                                                     | 5                                                                 |
| Windrow                               | 3                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 3                                                     | 4.4                                                                   | 13                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 13                                                                                    | 15                                                                |
| Irrigated Residential Common Area (k) | 32                                    | 25%                                                 | 8.0                                                    | 5.4                                                                    | 43                                                                      | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 16                                                    | 4.4                                                                   | 70                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 113                                                                                   | 120                                                               |
| Landscaped I-5 Buffer Zones           | 31                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 100%                                               | 31                                                    | 2.5                                                                   | 78                                                                     | 78                                                                                    | 158                                                               |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 528                                                                                   |                                                                   |
| Area 3                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 4                                     | 45%                                                 | 1.8                                                    | 5.4                                                                    | 10                                                                      | 45%                                                 | 1.8                                                    | 1.9                                                                    | 3                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 13                                                                                    | 18                                                                |
| Road Landscaping                      | 32                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 32                                                    | 4.4                                                                   | 139                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 139                                                                                   | 160                                                               |
| 2 Roundabouts                         | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 2.0                                                    | 1.9                                                                    | 4                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 4                                                                                     | 10                                                                |
| Windrow                               | 8                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 8                                                     | 4.4                                                                   | 34                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 34                                                                                    | 39                                                                |
| Irrigated Residential Common Area (k) | 21                                    | 25%                                                 | 5.3                                                    | 5.4                                                                    | 29                                                                      | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 11                                                    | 4.4                                                                   | 46                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 75                                                                                    | 80                                                                |
| Landscaped I-5 Buffer Zones           | 48                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 100%                                               | 48                                                    | 2.5                                                                   | 119                                                                    | 119                                                                                   | 239                                                               |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 384                                                                                   |                                                                   |
| Area 4                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 42                                    | 45%                                                 | 19                                                     | 5.4                                                                    | 102                                                                     | 45%                                                 | 19                                                     | 1.9                                                                    | 35                                                                      | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 138                                                                                   | 190                                                               |
| Golf Course (I)                       | 90                                    | 40%                                                 | 36                                                     | 5.4                                                                    | 194                                                                     | 30%                                                 | 27                                                     | 1.9                                                                    | 51                                                                      | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 30%                                                | 27                                                    | 2.5                                                                   | 68                                                                     | 313                                                                                   | 453                                                               |
| Road Landscaping                      | 37                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 37                                                    | 4.4                                                                   | 160                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 160                                                                                   | 184                                                               |
| 2 Roundabouts                         | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 2.0                                                    | 1.9                                                                    | 4                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 4                                                                                     | 10                                                                |
| Windrow                               | 9                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 9                                                     | 4.4                                                                   | 38                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 38                                                                                    | 44                                                                |
| Irrigated Residential Common Area (k) | 33                                    | 25%                                                 | 8.3                                                    | 5.4                                                                    | 45                                                                      | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 17                                                    | 4.4                                                                   | 72                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 117                                                                                   | 125                                                               |
| Landscaped I-5 Buffer Zones           | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 769                                                                                   |                                                                   |
| Area 5a                               |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 4                                     | 45%                                                 | 1.8                                                    | 5.4                                                                    | 10                                                                      | 45%                                                 | 1.8                                                    | 1.9                                                                    | 3                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 13                                                                                    | 18                                                                |
| Road Landscaping                      | 33                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 33                                                    | 4.4                                                                   | 144                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 144                                                                                   | 166                                                               |
| 0 Roundabouts                         | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                               | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 2                                                     | 4.4                                                                   | 9                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 9                                                                                     | 11                                                                |
| Irrigated Residential Common Area (k) | 31                                    | 25%                                                 | 7.7                                                    | 5.4                                                                    | 42                                                                      | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 15                                                    | 4.4                                                                   | 68                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 110                                                                                   | 117                                                               |
| Landscaped I-5 Buffer Zones           | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 276                                                                                   |                                                                   |
| Area 5b                               |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping                      | 7                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 7                                                     | 4.4                                                                   | 30                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 30                                                                                    | 35                                                                |
| 0 Roundabouts                         | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k) | 7                                     | 25%                                                 | 1.6                                                    | 5.4                                                                    | 8.8                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 3                                                     | 4.4                                                                   | 14                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 23                                                                                    | 25                                                                |
| Landscaped I-5 Buffer Zones           | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 53                                                                                    |                                                                   |

Table 8  
Estimated Parks, Road and Common Area Landscaping Water Use Inputs and Calculations  
Grapevine, Kern County, California

| Landscaping Land Use (a)                                                                  | [A]<br><br>Total Acres<br>(ac)<br>(a) | High Water Use Plantings                            |                                                        |                                                                        |                                                                         | Low Water Use Plantings                             |                                                        |                                                                        |                                                                         | Tree and Groundcover Plantings                     |                                                       |                                                                       |                                                                        | Buffer Zone Plantings                              |                                                       |                                                                       |                                                                        | [S]<br><br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>J = E + I + M + R (I) | [T]<br><br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(I) |
|-------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|                                                                                           |                                       | [B]<br><br>Percentage of Land as HWUP<br>(%)<br>(b) | [C]<br><br>Total Area of HWUP<br>(ac)<br>C = A × B (c) | [D]<br><br>Annual Evapo-transpiration Rate for HWUP<br>(AFY/ac)<br>(d) | [E]<br><br>Estimated Total Water Use for HWUP<br>(AFY)<br>E = C × D (e) | [F]<br><br>Percentage of Land as LWUP<br>(%)<br>(f) | [G]<br><br>Total Area of LWUP<br>(ac)<br>G = A × F (c) | [H]<br><br>Annual Evapo-transpiration Rate for LWUP<br>(AFY/ac)<br>(d) | [I]<br><br>Estimated Total Water Use for LWUP<br>(AFY)<br>I = G × H (e) | [J]<br><br>Percentage of Land as TGP<br>(%)<br>(g) | [K]<br><br>Total Area of TGP<br>(ac)<br>K = A × J (c) | [L]<br><br>Annual Evapo-transpiration Rate for TGP<br>(AFY/ac)<br>(d) | [M]<br><br>Estimated Total Water Use for TGP<br>(AFY)<br>M = K × L (e) | [O]<br><br>Percentage of Land as BZP<br>(%)<br>(h) | [P]<br><br>Total Area of BZP<br>(ac)<br>K = A × J (c) | [Q]<br><br>Annual Evapo-transpiration Rate for BZP<br>(AFY/ac)<br>(d) | [R]<br><br>Estimated Total Water Use for BZP<br>(AFY)<br>M = K × L (e) |                                                                                       |                                                                   |
| Area 6a                                                                                   |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                                                                     | 4                                     | 45%                                                 | 1.8                                                    | 5.4                                                                    | 10                                                                      | 45%                                                 | 1.8                                                    | 1.9                                                                    | 3                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 13                                                                                    | 18                                                                |
| Road Landscaping                                                                          | 21                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 21                                                    | 4.4                                                                   | 93                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 93                                                                                    | 107                                                               |
| 1 Roundabout                                                                              | 1                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 1.0                                                    | 1.9                                                                    | 2                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 2                                                                                     | 5                                                                 |
| Windrow                                                                                   | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k)                                                     | 10                                    | 25%                                                 | 2.6                                                    | 5.4                                                                    | 14                                                                      | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 50%                                                | 5                                                     | 4.4                                                                   | 23                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 37                                                                                    | 39                                                                |
| Landscaped I-5 Buffer Zones                                                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                                                                                  | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 145                                                                                   |                                                                   |
| Area 6b                                                                                   |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping                                                                          | 5                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 5                                                     | 4.4                                                                   | 23                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 23                                                                                    | 26                                                                |
| 0 Roundabouts                                                                             | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                                                                                   | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k)                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Landscaped I-5 Buffer Zones                                                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                                                                                  | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 23                                                                                    |                                                                   |
| Area 6c                                                                                   |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping (m)                                                                      | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| 0 Roundabouts                                                                             | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                                                                                   | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k)                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Landscaped I-5 Buffer Zones                                                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                                                                                  | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 0                                                                                     |                                                                   |
| Area 6d                                                                                   |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping (m)                                                                      | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| 0 Roundabouts                                                                             | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                                                                                   | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k)                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Landscaped I-5 Buffer Zones                                                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                                                                                  | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 0                                                                                     |                                                                   |
| Area 6e                                                                                   |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping (m)                                                                      | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| 0 Roundabouts                                                                             | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                                                                                   | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k)                                                     | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Landscaped I-5 Buffer Zones                                                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                                                                                  | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 0                                                                                     |                                                                   |
| Estimated Total Outdoor Water Use for Parks                                               |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        | 314                                                                                   |                                                                   |
| Estimated Total Outdoor Water Use for Irrigated Residential Common Area                   |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        | 554                                                                                   |                                                                   |
| Estimated Total Outdoor Water Use for Roadways and Other Non-Residential Landscaped Areas |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        | 1,547                                                                                 |                                                                   |
| Estimated Total Outdoor Water Use for Community Landscaping                               |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        | 2,415                                                                                 |                                                                   |

**Table 8**  
***Estimated Parks, Road and Common Area Landscaping Water Use Inputs and Calculations***  
Grapevine, Kern County, California

Abbreviations:  
"ac" = acre  
"AFY" = acre-feet per year  
"AFY/ac" = acre-feet per year per acre  
"BZP" = buffer zone plantings  
"HWUP" = high water use plantings  
"LWUP" = low water use plantings  
"MAWA" = Maximum Applied Water Allowance  
"TGP" = combination tree and groundcover plantings

Notes:  
(a) Landscaping land uses and acres are based on the 8 June 2015 Land Use Program Summary. Passive open space and unprogrammed land is not included as it will not be irrigated.  
(b) High water use plantings include turf grasses.  
(c) The area of plantings is the acreage multiplied by the percentage of the land that is covered by that kind of plantings.  
(d) The total water application rates for all plantings are estimated in Table 5.  
(e) The estimated total water use for each planting type is the area of that planting type multiplied by the annual evapotranspiration rate for that kind of planting.  
(f) Low water use plantings include shrubs and native vegetation.  
(g) Combination tree and groundcover plantings include trees with full canopy coverage and full coverage of shrubs or low water use groundcover.  
(h) Buffer zone plantings include sparsely planted trees and shrubs.  
(i) The estimated total outdoor water use is the sum of the estimated total water use for all areas and plantings. The estimated total water outdoor water use must not be greater than the MAWA (see note h). The estimated total water outdoor water use was calculated assuming all regular landscaped area, which accounts for plant type and irrigation efficiency, to estimate water demands. If special landscaped area was accounted for in the estimated total water use calculations according to Reference 1, the estimated total outdoor water use would equal the MAWA regardless of the planting types.  
(j) The Maximum Applied Water Allowance ("MAWA") calculations are described in Reference 1. The MAWA was calculated assuming 100% special landscaped area based on use of recycled water in non-residential areas and based on note k for residential areas.  
(k) The irrigated residential common area is assumed to be classified as a special landscape area based on use as a recreational area and meeting space per Reference 1.  
(l) The golf course is assumed to be a desert style course, which utilizes native vegetation and minimizes the use of turf grass, per verbal communication with staff at Todd Eckenrode Origins Golf Design.  
(m) There are no new roadways planned in Areas 6c, 6d, and 6e.

Reference:  
1 California Code of Regulations, *Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance* , July 9, 2015 Draft.

**Table 9**  
**Summary of Water Treatment and Distribution System Losses**  
 Grapevine Project, Kern County, California

| <b>Development Category</b>                                         | <b>Estimated Water Loss (AFY)</b> |
|---------------------------------------------------------------------|-----------------------------------|
| Losses at potable water treatment facility (a)                      | 268                               |
| Losses at wastewater treatment facility (b)                         | --                                |
| Distribution system losses (associated with indoor water uses) (c)  | 125                               |
| Distribution system losses (associated with outdoor water uses) (d) | 236                               |
| <b>Total water losses (e)(f)</b>                                    | <b>629</b>                        |

Abbreviations:

"AFY" = acre-feet per year

Notes:

- (a) Losses at the potable water treatment facility are estimated to be approximately 5% of the indoor and outdoor residential, indoor commercial, indoor institutional, indoor industrial, outdoor school, and outdoor irrigated residential common area uses, plus distribution system losses (see Tables 1, 4, 7 and 8)
- (b) Losses at the wastewater treatment facility are accounted for in the estimates of recycled water production (see Table 11).
- (c) Potable water system distribution system losses are estimated to be 5% of the total potable indoor demand.
- (d) Outdoor water system distribution system losses are estimated to be 5% of the sum of the total recycled and non-potable water demand and the potable water demand for outdoor uses (i.e., for residential irrigation). The portion of outdoor water system distribution losses associated with potable water uses is 129 AFY, and the portion associated with non-potable uses is 107 AFY.
- (e) Water losses were conservatively estimated for water demand calculations only and should not be used for wastewater treatment design purposes.
- (f) Values may not total exactly due to rounding.

**Table 10**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 1</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 468                                      | 237                                    | 231                                     |
| Commercial, institutional and industrial (b) | 70                                       | 50                                     | 20                                      |
| Landscaping (c)                              | 237                                      | -                                      | 237                                     |
| Treatment system losses (d)                  | 31                                       | -                                      | -                                       |
| Distribution system losses (d)               | 39                                       | 14                                     | 24                                      |
| <b>Area 1 Water Demand</b>                   | <b>845</b>                               | <b>301</b>                             | <b>513</b>                              |
| <b>Area 2</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 823                                      | 442                                    | 381                                     |
| Commercial, institutional and industrial (b) | 403                                      | 199                                    | 203                                     |
| Landscaping (c)                              | 528                                      | -                                      | 528                                     |
| Treatment system losses (d)                  | 67                                       | -                                      | -                                       |
| Distribution system losses (d)               | 88                                       | 32                                     | 56                                      |
| <b>Area 2 Water Demand</b>                   | <b>1,908</b>                             | <b>673</b>                             | <b>1,168</b>                            |
| <b>Area 3</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 565                                      | 306                                    | 259                                     |
| Commercial, institutional and industrial (b) | 343                                      | 230                                    | 114                                     |
| Landscaping (c)                              | 384                                      | -                                      | 384                                     |
| Treatment system losses (d)                  | 48                                       | -                                      | -                                       |
| Distribution system losses (d)               | 65                                       | 27                                     | 38                                      |
| <b>Area 3 Water Demand</b>                   | <b>1,404</b>                             | <b>562</b>                             | <b>794</b>                              |

**Table 10**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 4</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 747                                      | 387                                    | 360                                     |
| Commercial, institutional and industrial (b) | 100                                      | 19                                     | 81                                      |
| Landscaping (c)                              | 769                                      | -                                      | 769                                     |
| Treatment system losses (d)                  | 50                                       | -                                      | -                                       |
| Distribution system losses (d)               | 81                                       | 20                                     | 61                                      |
| <b>Area 4 Water Demand</b>                   | <b>1,747</b>                             | <b>427</b>                             | <b>1,271</b>                            |
| <b>Area 5a</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 650                                      | 330                                    | 321                                     |
| Commercial, institutional and industrial (b) | 47                                       | 7.9                                    | 39.2                                    |
| Landscaping (c)                              | 276                                      | -                                      | 276                                     |
| Treatment system losses (d)                  | 42                                       | -                                      | -                                       |
| Distribution system losses (d)               | 49                                       | 17                                     | 32                                      |
| <b>Area 5a Water Demand</b>                  | <b>1,064</b>                             | <b>354</b>                             | <b>667</b>                              |
| <b>Area 5b</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 12                                       | 5.6                                    | 6.0                                     |
| Commercial, institutional and industrial (b) | 0                                        | 0                                      | 0                                       |
| Landscaping (c)                              | 53                                       | -                                      | 53                                      |
| Treatment system losses (d)                  | 1.8                                      | -                                      | -                                       |
| Distribution system losses (d)               | 3.2                                      | 0.3                                    | 3.0                                     |
| <b>Area 5b Water Demand</b>                  | <b>70</b>                                | <b>5.9</b>                             | <b>62</b>                               |
| <b>Area 6a</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 373                                      | 214                                    | 159                                     |
| Commercial, institutional and industrial (b) | 199                                      | 81                                     | 118                                     |
| Landscaping (c)                              | 145                                      | -                                      | 145                                     |
| Treatment system losses (d)                  | 28                                       | -                                      | -                                       |
| Distribution system losses (d)               | 36                                       | 15                                     | 21                                      |
| <b>Area 6a Water Demand</b>                  | <b>781</b>                               | <b>310</b>                             | <b>444</b>                              |

**Table 10**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 6b</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 15                                       | 1                                      | 13.8                                    |
| Landscaping (c)                              | 23                                       | -                                      | 23                                      |
| Treatment system losses (d)                  | 0.1                                      | -                                      | -                                       |
| Distribution system losses (d)               | 1.9                                      | 0.1                                    | 1.8                                     |
| <b>Area 6b Water Demand</b>                  | <b>40</b>                                | <b>1</b>                               | <b>38.6</b>                             |
| <b>Area 6c</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 0.9                                      | 0.0                                    | 0.8                                     |
| Landscaping (c)                              | 0                                        | -                                      | 0                                       |
| Treatment system losses (d)                  | 0.0                                      | -                                      | -                                       |
| Distribution system losses (d)               | 0.0                                      | 0.0                                    | 0                                       |
| <b>Area 6c Water Demand</b>                  | <b>0.9</b>                               | <b>0.0</b>                             | <b>0.9</b>                              |
| <b>Area 6d</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 0.8                                      | 0.0                                    | 0.8                                     |
| Landscaping (c)                              | 0                                        | -                                      | 0                                       |
| Treatment system losses (d)                  | 0.0                                      | -                                      | -                                       |
| Distribution system losses (d)               | 0.0                                      | 0.0                                    | 0                                       |
| <b>Area 6d Water Demand</b>                  | <b>0.8</b>                               | <b>0.0</b>                             | <b>0.8</b>                              |

**Table 10**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 6e</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 0.8                                      | 0.0                                    | 0.8                                     |
| Landscaping (c)                              | 0                                        | -                                      | 0                                       |
| Treatment system losses (d)                  | 0.0                                      | -                                      | -                                       |
| Distribution system losses (d)               | 0.0                                      | 0.0                                    | 0                                       |
| <b>Area 6e Water Demand</b>                  | <b>0.8</b>                               | <b>0.0</b>                             | <b>0.8</b>                              |
| <b>Project Annual Water Demand (e)(f)</b>    | <b>7,861</b>                             | <b>2,634</b>                           | <b>4,960</b>                            |

Abbreviations:

"AFY" = acre-feet per year

Notes:

- (a) See Table 3 for estimated residential water uses.
- (b) See Tables 4 and 7 for estimated indoor and outdoor water use, respectively, for commercial, institutional, and industrial land uses.
- (c) See Table 8 for estimated parks, roads and common area landscaping water use.
- (d) See Table 9 for water losses associated with the project.
- (e) The Project Annual Water Demand is the sum of the estimated water uses for the project, plus the assumed treatment and distribution system losses. The contingency is not included.
- (f) Totals may not add exactly due to rounding.

**Table 11**  
**Recycled Water Production and Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                        | [A]<br>Recycled<br>Water<br>Produced (AFY)<br>(a) | [B]<br>Recycled<br>Water<br>Use (AFY)<br>(b) | [C]<br>Surplus or Deficit<br>of Water (AFY)<br>C = A - B<br>(c) |
|------------------------------------------|---------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Area 1</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 201                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 43                                                | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 20                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 157                                          |                                                                 |
| <b>Subtotal</b>                          | <b>244</b>                                        | <b>178</b>                                   | <b>66</b>                                                       |
| <b>Area 2</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 375                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 169                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 67                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 138                                          |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 278                                          |                                                                 |
| <b>Subtotal</b>                          | <b>545</b>                                        | <b>482</b>                                   | <b>63</b>                                                       |
| <b>Area 3</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 260                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 195                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 77                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 13                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 296                                          |                                                                 |
| <b>Subtotal</b>                          | <b>455</b>                                        | <b>386</b>                                   | <b>69</b>                                                       |
| <b>Area 4</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 329                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 16                                                | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 8                                            |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 138                                          |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 514                                          |                                                                 |
| <b>Subtotal</b>                          | <b>345</b>                                        | <b>660</b>                                   | <b>-315</b>                                                     |

**Table 11**  
**Recycled Water Production and Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                        | [A]<br>Recycled<br>Water<br>Produced (AFY)<br>(a) | [B]<br>Recycled<br>Water<br>Use (AFY)<br>(b) | [C]<br>Surplus or Deficit<br>of Water (AFY)<br>$C = A - B$<br>(c) |
|------------------------------------------|---------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------|
| <b>Area 5a</b>                           |                                                   |                                              |                                                                   |
| Residential                              |                                                   |                                              |                                                                   |
| Indoor                                   | 280                                               | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 0                                            |                                                                   |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                   |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                   |
| Indoor                                   | 7                                                 | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 3                                            |                                                                   |
| School Landscaping                       | 0                                                 | 0                                            |                                                                   |
| Parks                                    | 0                                                 | 13                                           |                                                                   |
| Road and Other Public Landscaping        | 0                                                 | 153                                          |                                                                   |
| <b>Subtotal</b>                          | <b>287</b>                                        | <b>169</b>                                   | <b>118</b>                                                        |
| <b>Area 5b</b>                           |                                                   |                                              |                                                                   |
| Residential                              |                                                   |                                              |                                                                   |
| Indoor                                   | 5                                                 | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 0                                            |                                                                   |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                   |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                   |
| Indoor                                   | 0                                                 | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 0                                            |                                                                   |
| School Landscaping                       | 0                                                 | 0                                            |                                                                   |
| Parks                                    | 0                                                 | --                                           |                                                                   |
| Road and Other Public Landscaping        | 0                                                 | 30                                           |                                                                   |
| <b>Subtotal</b>                          | <b>5</b>                                          | <b>30</b>                                    | <b>-25</b>                                                        |
| <b>Area 6a</b>                           |                                                   |                                              |                                                                   |
| Residential                              |                                                   |                                              |                                                                   |
| Indoor                                   | 182                                               | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 0                                            |                                                                   |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                   |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                   |
| Indoor                                   | 69                                                | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 82                                           |                                                                   |
| School Landscaping                       | 0                                                 | 0                                            |                                                                   |
| Parks                                    | 0                                                 | 13                                           |                                                                   |
| Road and Other Public Landscaping        | 0                                                 | 95                                           |                                                                   |
| <b>Subtotal</b>                          | <b>251</b>                                        | <b>190</b>                                   | <b>61</b>                                                         |
| <b>Area 6b</b>                           |                                                   |                                              |                                                                   |
| Residential                              |                                                   |                                              |                                                                   |
| Indoor                                   | 0                                                 | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 0                                            |                                                                   |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                   |
| Indoor                                   | 1.0                                               | 0                                            |                                                                   |
| Outdoor                                  | 0                                                 | 14                                           |                                                                   |
| School Landscaping                       | 0                                                 | 0                                            |                                                                   |
| Parks                                    | 0                                                 | --                                           |                                                                   |
| Road and Other Public Landscaping        | 0                                                 | 23                                           |                                                                   |
| <b>Subtotal</b>                          | <b>1.0</b>                                        | <b>37</b>                                    | <b>-36</b>                                                        |

**Table 11**  
**Recycled Water Production and Demand by Planning Area**  
 Grapevine Project, Kern County, California

| Development Phase                                      | [A]<br>Recycled<br>Water<br>Produced (AFY)<br>(a) | [B]<br>Recycled<br>Water<br>Use (AFY)<br>(b) | [C]<br>Surplus or Deficit<br>of Water (AFY)<br>C = A - B<br>(c) |
|--------------------------------------------------------|---------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Area 6c</b>                                         |                                                   |                                              |                                                                 |
| Residential                                            |                                                   |                                              |                                                                 |
| Indoor                                                 | 0                                                 | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial               |                                                   |                                              |                                                                 |
| Indoor                                                 | 0.02                                              | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0.8                                          |                                                                 |
| School Landscaping                                     | 0                                                 | 0                                            |                                                                 |
| Parks                                                  | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping                      | 0                                                 | 0                                            |                                                                 |
| <b>Subtotal</b>                                        | 0.02                                              | 0.8                                          | -0.8                                                            |
| <b>Area 6d</b>                                         |                                                   |                                              |                                                                 |
| Residential                                            |                                                   |                                              |                                                                 |
| Indoor                                                 | 0                                                 | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial               |                                                   |                                              |                                                                 |
| Indoor                                                 | 0.01                                              | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0.8                                          |                                                                 |
| School Landscaping                                     | 0                                                 | 0                                            |                                                                 |
| Parks                                                  | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping                      | 0                                                 | 0                                            |                                                                 |
| <b>Subtotal</b>                                        | 0.01                                              | 0.8                                          | -0.8                                                            |
| <b>Area 6e</b>                                         |                                                   |                                              |                                                                 |
| Residential                                            |                                                   |                                              |                                                                 |
| Indoor                                                 | 0                                                 | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial               |                                                   |                                              |                                                                 |
| Indoor                                                 | 0.01                                              | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0.8                                          |                                                                 |
| School Landscaping                                     | 0                                                 | 0                                            |                                                                 |
| Parks                                                  | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping                      | 0                                                 | 0                                            |                                                                 |
| <b>Subtotal</b>                                        | 0.01                                              | 0.8                                          | -0.7                                                            |
| Recycled Water Pond Net Evaporation and Rainfall (d)   | -149                                              | 0                                            |                                                                 |
| Recycled Water Distribution System Loss (5%) (e)       | 0                                                 | 107                                          |                                                                 |
| Recycled Water Produced, Used, and Surplus/Deficit (f) | 1,983                                             | 2,241                                        | -258                                                            |
| <b>Total Supplemental Non-Potable Water Needed</b>     |                                                   |                                              | <b>258</b>                                                      |

**Table 11**  
***Recycled Water Production and Demand by Planning Area***  
Grapevine Project, Kern County, California

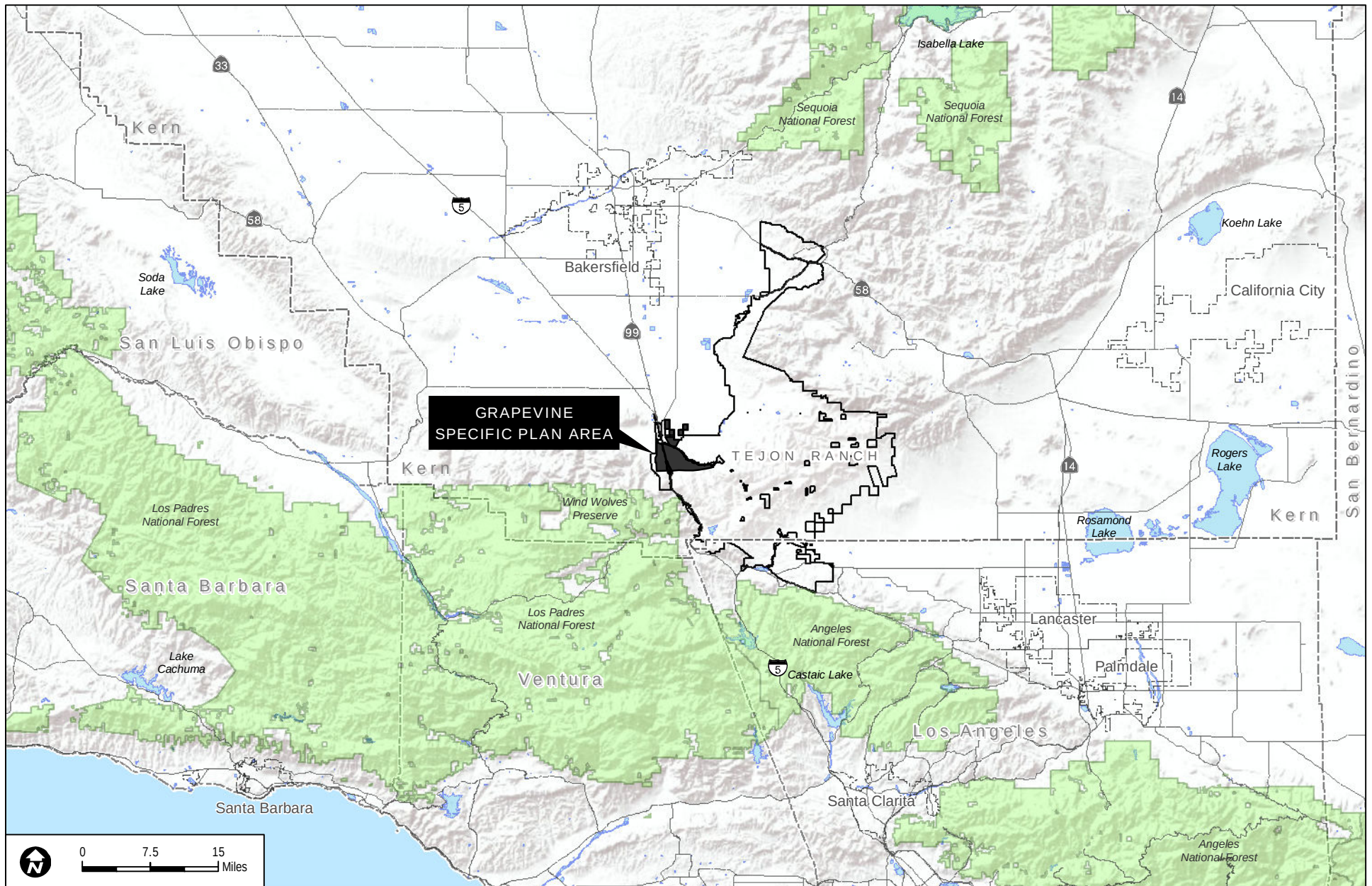
Abbreviations:

"AFY" = acre-feet per year

"CII" = Commercial, Institutional and Industrial

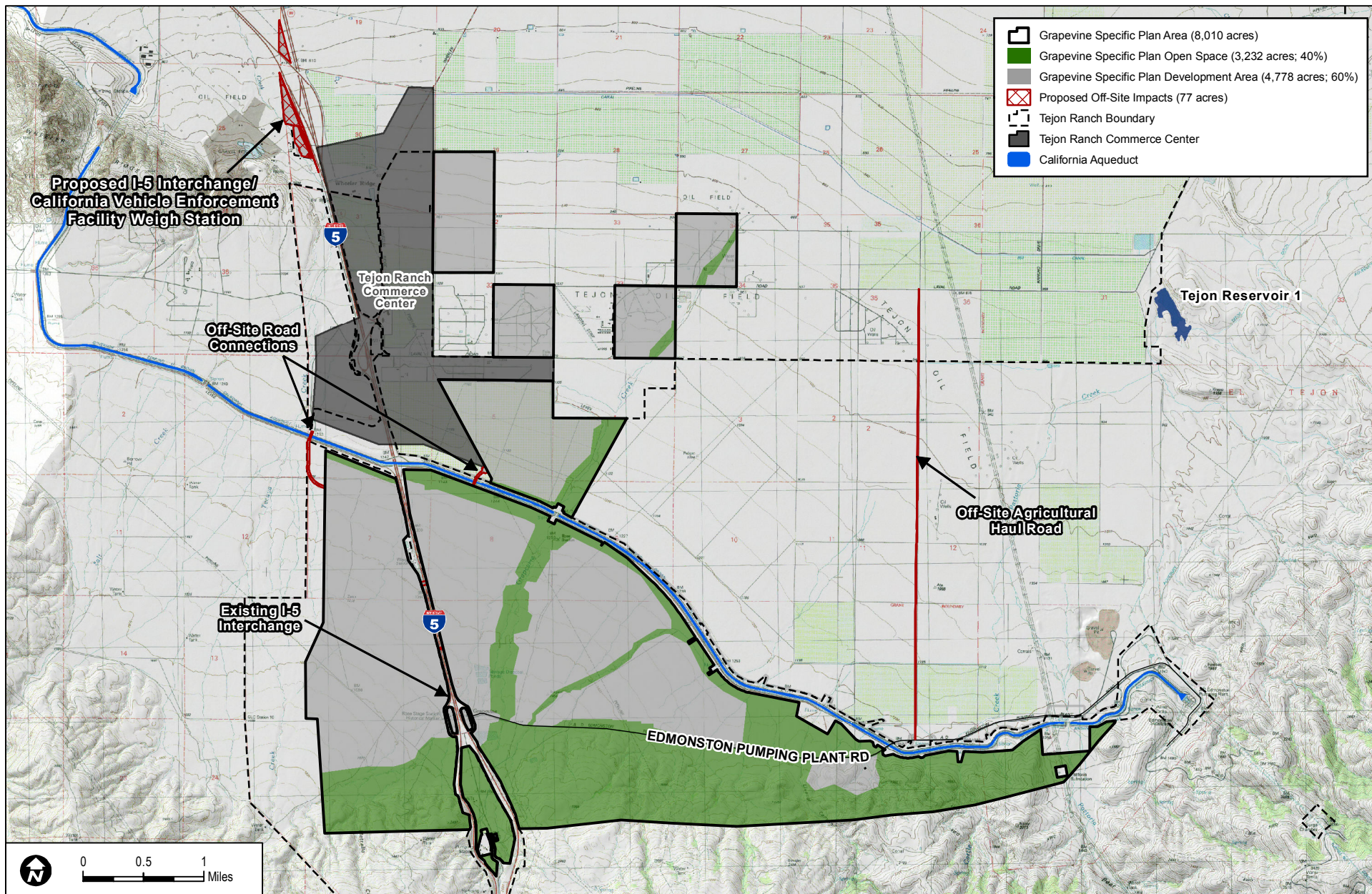
Notes:

- (a) Production of recycled water is assumed to be 85% of total indoor water use. See Tables 3 and 4.
- (b) Recycled water is assumed to be used for all CII, park and road landscape irrigation.
- (c) A positive number indicates a surplus of recycled water, and a negative number indicates a deficit. Any deficit will be supplemented with filtered non-potable Nickel Water.
- (d) Recycled water pond net evaporation and rainfall are calculated as shown in Table A-1.
- (e) Recycled water distribution system loss is assumed to be 5% of the total recycled and non-potable water use in each area.
- (f) Values may not total exactly due to rounding.
- (g) The demands listed above do not include the contingency. See Table 1.



SOURCES: McIntosh & Associates 2013; TRC 2013a

**FIGURE 1**  
**Regional Location**



SOURCES: McIntosh & Associates 2014; TRC 2013c

The California aqueduct (TRC 2013c) appears on subsequent figures; the source information will not be provided on subsequent figures.

**FIGURE 2**  
**Vicinity Map**

## **ATTACHMENT A**

### **Recycled Water Storage and Disposal Water Balance**

**Table A-1**  
**Recycled Water Storage and Disposal Water Balance (Average-Year Rainfall)**  
Grapevine Project, Kern County, California

|                                         |            |                                      |            |            |            |            |            |            |            |            |            |            |              |  |
|-----------------------------------------|------------|--------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|--|
| POND STORAGE NOVEMBER 1 (AF)            | 0          | ASSUMED ACTIVE POND AREA (AC) (a)    | 36         |            |            |            |            |            |            |            |            |            |              |  |
| POND PERCOLATION RATE (IN/DAY)          | 0          | POND CATCHMENT AREA (AC)             | 36         |            |            |            |            |            |            |            |            |            |              |  |
|                                         |            | NON-POTABLE IRRIGATION AREA (AC) (b) | 602        |            |            |            |            |            |            |            |            |            |              |  |
|                                         |            | CALC'D MAX STORAGE VOLUME (AF) (c)   | 445        |            |            |            |            |            |            |            |            |            |              |  |
|                                         |            | CALC'D MAX STORAGE DEPTH (FT) (d)    | 12.5       |            |            |            |            |            |            |            |            |            |              |  |
|                                         |            | CALC'D AVG STORAGE DEPTH (FT) (e)    | 5.7        |            |            |            |            |            |            |            |            |            |              |  |
| <b>PARAMETERS/DATA</b>                  | <b>OCT</b> | <b>NOV</b>                           | <b>DEC</b> | <b>JAN</b> | <b>FEB</b> | <b>MAR</b> | <b>APR</b> | <b>MAY</b> | <b>JUN</b> | <b>JUL</b> | <b>AUG</b> | <b>SEP</b> | <b>TOTAL</b> |  |
| DAYS IN MONTH                           | 31         | 30                                   | 31         | 31         | 28         | 31         | 30         | 31         | 30         | 31         | 31         | 30         | 365          |  |
| RECYCLED WATER FLOW (MGD) (f)           | 1.93       | 1.94                                 | 1.79       | 1.78       | 1.76       | 1.78       | 1.85       | 1.93       | 1.98       | 2.05       | 2.04       | 1.98       | 1.90         |  |
| PRECIPITATION (IN) (g)                  | 0.52       | 1.15                                 | 1.48       | 1.72       | 1.93       | 1.83       | 1.18       | 0.47       | 0.08       | 0.02       | 0.05       | 0.16       | 10.58        |  |
| REFERENCE ETo (IN) (h)                  | 4.06       | 2.01                                 | 1.41       | 1.45       | 2.22       | 4.03       | 5.49       | 7.63       | 8.63       | 9.14       | 8.55       | 6.18       | 60.78        |  |
| IRRIGATION DEMAND FACTOR (IN) (i)       | 2.84       | 1.41                                 | 0.99       | 1.01       | 1.55       | 2.82       | 3.84       | 5.33       | 6.03       | 6.39       | 5.98       | 4.32       | 42.52        |  |
| <b>POND CALCULATIONS</b>                |            |                                      |            |            |            |            |            |            |            |            |            |            |              |  |
| BEGINNING POND STORAGE (AF) (j)         | 0          | 24                                   | 126        | 244        | 361        | 430        | 445        | 400        | 281        | 120        | 0          | 0          | --           |  |
| RECYCLED WATER VOL (AF) (f)             | 184        | 179                                  | 171        | 170        | 152        | 169        | 170        | 183        | 183        | 195        | 195        | 182        | 2132         |  |
| DIRECT PRECIPITATION VOL (AF) (k)       | 2          | 3                                    | 4          | 5          | 6          | 5          | 3          | 1          | 0          | 0          | 0          | 0          | 31           |  |
| POND EVAPORATION VOL (AF) (l)           | 12         | 6                                    | 4          | 4          | 7          | 12         | 16         | 23         | 26         | 27         | 25         | 18         | 180          |  |
| NON-POTABLE IRRIGATION DEMAND (AF) (m)  | 150        | 74                                   | 52         | 54         | 82         | 149        | 202        | 281        | 318        | 337        | 315        | 228        | 2241         |  |
| STORAGE GAIN (AF) (n)                   | 24         | 102                                  | 119        | 117        | 69         | 14         | -45        | -119       | -161       | -169       | -146       | -63        | -258         |  |
| FINAL POND STORAGE (AF) (o)             | 24         | 126                                  | 244        | 361        | 430        | 445        | 400        | 281        | 120        | 0          | 0          | 0          | --           |  |
| SUPPLEMENTAL IRRIGATION DEMAND (AF) (p) | 0          | 0                                    | 0          | 0          | 0          | 0          | 0          | 0          | 49         | 146        | 63         |            | 258          |  |

**Notes**

- (a) Assumed active pond area is estimated to maintain a calculated maximum storage depth of approximately 12.5 feet. This area consists of only a portion of the total pond area designed for the 100-year rainfall year (EKI, 2015). It is assumed that the excess pond acreage will only be used during above-average rainfall years.
- (b) Non-potable irrigation area is the total landscaped area excluding residential areas and schools.
- (c) Calculated maximum storage volume is the largest final pond storage volume from the pond calculations.
- (d) Maximum storage depth is the calculated maximum storage volume divided by the active pond area. The calculated maximum storage depth does not include 2 feet for freeboard.
- (e) Average storage depth is the average final pond storage volume from the pond calculations divided by the active pond area.
- (f) Recycled water flow rate is the average indoor potable water demand less collection system and wastewater treatment losses of 15%. Note that collection system and wastewater treatment losses were not accounted for in the 100-year rainfall water balance in the *Wastewater Facilities Engineering Report* (EKI, 2015) to conservatively size the required total recycled water storage volume.
- (g) Average monthly precipitation data were collected from the Western Regional Climate Center (WRCC) for the Bakersfield Airport in Bakersfield, California (1937-2012) and Tejon Rancho, California (1895-1914) and from the CIMIS Station 125 located in Arvin, CA. Precipitation data listed is the inverse-distance weighted monthly averages of the monthly averages for each station based on the distance of each station to the center of the Grapevine Project.
- (h) Reference ETo data were obtained from the California Irrigation Management Information Services (CIMIS) station 125 located in Arvin, CA that measured evaporation from pans. Monthly averages were calculated using all available data from this CIMIS station, which has been in operation since 1995.
- (i) The irrigation demand factor is the area weighted average irrigation demand factor for each planting type (high water use plantings, low water use plantings, combination trees and ground cover plantings, and buffer zone plantings) for the areas irrigated by non-potable water (all landscaped area except residential areas, parks, and schools). Refer to Table 5.
- (j) Beginning pond storage is the final storage from the previous month.
- (k) Direct precipitation is the active pond area multiplied by the precipitation.
- (l) Pond evaporation is active pond area multiplied by the reference ETo, which is assumed to equal to the pond evaporation rate.
- (m) Irrigation demand is the irrigation demand factor multiplied by the irrigation area.
- (n) Storage gain is equal to the sum of the beginning pond storage, recycled water volume, and direct precipitation less the sum of the pond evaporation and irrigation demand. A negative storage gain represents a storage loss. The storage gain conservatively accounts for losses due to direct net evaporation when the ponds are empty. Total annual storage loss is approximately 50 AF less if it assumed that there is no net evaporation when the ponds are empty.
- (o) Final pond storage is the beginning pond storage plus the storage gain. Final storage is zero when the storage loss is greater than the beginning pond storage.
- (p) Irrigation demand includes 5% for distribution system losses. Supplemental irrigation demand is equal to the beginning pond storage less the storage loss (negative storage gain). If the storage loss is less than the beginning pond storage, the supplemental irrigation demand equals zero. It is assumed that the supplemental irrigation demand will be supplied with untreated California Aqueduct water.

**Abbreviations**

"AC" = acres  
"AF" = acre-feet  
"ETo" = reference evapotranspiration  
"FT" = feet  
"IN" = inches  
"MGD" = Million Gallons per Day

**References**

(EKI, 2015) *Wastewater Facilities Engineering Report, Grapevine Project*, Erler & Kalinowski, Inc., October 2015.

**Table A-2**  
**Estimated Total Construction Water Use**  
 Grapevine Project, Kern County, California

| [A]                                                    | [B]                    | [C]                        | [D]                                         | [E]                                                               | [F]                                        | [G]                                           | [H]                                     |
|--------------------------------------------------------|------------------------|----------------------------|---------------------------------------------|-------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-----------------------------------------|
| Grapevine Project<br>Total Grading Area<br>(ac)<br>(a) | ETo<br>Rate<br>(in/yr) | Bare Soil<br>"Crop" Factor | Bare Soil<br>Evaporation<br>Rate<br>(in/yr) | Duration of<br>Dust Control on<br>Each Acre Graded<br>(months/ac) | Total Dust Control<br>Water Demand<br>(AF) | Additional Construction<br>Water Uses<br>(AF) | Total Construction<br>Water Use<br>(AF) |
|                                                        | See Table 5            | (b)                        | D = B × C (c)                               | (d)                                                               | G = A × D/12 × E/12 (e)                    | G = F × 0.25 (f)                              | H = F + G (g)                           |
| 5,173                                                  | 60.8                   | 0.5                        | 30.4                                        | 6                                                                 | 6,600                                      | 1,650                                         | <b>8,250</b>                            |

Abbreviations:

"ac" = acre

"AF" = acre-feet

"in/yr" = inches per year

"ETo" = reference evapotranspiration

Notes:

(a) The total Grapevine Project grading area is based on information provided by Dudek in an email dated 9 November 2015.

(b) Bare soil "crop" factor derived from Reference 1, based on the ETo and assuming a 7-day frequency between significant wetting (greater than 3 x ETo) and a soil hydraulic factor of 2.6.

(c) Bare soil evaporation rate calculated by multiplying the ETo rate by the bare soil "crop" factor. Water use for dust control is assumed to be applied at the same rate as soil evaporation.

(d) Six months of dust control was assumed to be required for each acre graded.

(e) Calculated by multiplying the total grading area by the bare soil evaporation rate and the length of dust control activities, rounded to the nearest hundred AF.

(f) Additional construction water uses were assumed to be 25% of the water used for dust control during grading activities.

(g) Calculated by summing the total dust control water use and additional construction water uses. This total construction water use will be used over a 19+ year period during buildout and supplied with Nickel Water from the California Aqueduct.

Reference:

1. Snyder, et al. 2007. *Crop Coefficients*. UC Davis Biometeorology Program. Updated March 2007. <http://biomet.ucdavis.edu/Evapotranspiration/CropCoef/Kc.pdf>.

## **ATTACHMENT B**

### **Estimated Water Demands for 14,000 Residential Units Alternative Scenario**

**Table B-1**  
**Comparison of Project Development Scenarios and Annual Water Demands**  
 Grapevine Project, Kern County, California

| Water Source                                       | Water Supply Category                 | Estimated Total Water Demand (AFY)                         |                                                                      |
|----------------------------------------------------|---------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------|
|                                                    |                                       | Grapevine Plan<br>12,000 Residential<br>Unit Base Scenario | Grapevine Plan<br>14,000 Residential<br>Unit Alternative<br>Scenario |
| California Aqueduct<br>(Nickel Water)              | Potable Water                         | 5,620                                                      | 5,873                                                                |
|                                                    | Supplemental Non-Potable Water        | 258                                                        | 58                                                                   |
|                                                    | Contingency                           | 400                                                        | 350                                                                  |
| <i>California Aqueduct (Nickel Water) Subtotal</i> |                                       | 6,278                                                      | 6,281                                                                |
| Recycled Water                                     | Recycled Non-Potable Water            | 1,983                                                      | 2,188                                                                |
| <b>Overall Project Water Demand</b>                |                                       | <b>8,261</b>                                               | <b>8,469</b>                                                         |
| <b>Development Land Use Summary</b>                |                                       |                                                            |                                                                      |
| Residential Number of<br>Units                     | Standard Residential Units (a)        | 8,410                                                      | 9,810                                                                |
|                                                    | Village Center Residential Units (a)  | 3,590                                                      | 4,190                                                                |
|                                                    | <i>Total</i>                          | <i>12,000</i>                                              | <i>14,000</i>                                                        |
| Commercial and<br>Industrial Square Footage        | Village Center Retail (a)             | 450,000                                                    | 42,000                                                               |
|                                                    | Village Center Office                 | 350,000                                                    | 350,000                                                              |
|                                                    | Freeway-Oriented Commercial           | 750,000                                                    | 750,000                                                              |
|                                                    | Office/R&D                            | 2,100,000                                                  | 2,100,000                                                            |
|                                                    | Light Industrial                      | 1,450,000                                                  | 1,450,000                                                            |
| <i>Total</i>                                       |                                       | <i>5,100,000</i>                                           | <i>4,692,000</i>                                                     |
| Total School Acreage (b)                           |                                       | 175                                                        | 175                                                                  |
| Landscaping and Solar<br>Farm Acreage              | Parks (b) (c)                         | 96                                                         | 112                                                                  |
|                                                    | Road Landscaping                      | 203                                                        | 203                                                                  |
|                                                    | Roundabouts                           | 8                                                          | 8                                                                    |
|                                                    | Windrow                               | 22                                                         | 22                                                                   |
|                                                    | Irrigated Residential Common Area (b) | 156                                                        | 156                                                                  |
|                                                    | Landscaped I-5 Buffer Zones           | 95                                                         | 95                                                                   |
|                                                    | Golf Course                           | 90                                                         | 90                                                                   |
|                                                    | Solar Farms                           | 800                                                        | 800                                                                  |
| <i>Total</i>                                       |                                       | <i>1,470</i>                                               | <i>1,486</i>                                                         |

Abbreviations:

"AFY" = acre-feet per year

"CII" = Commercial, Institutional and Industrial

"SRUs" = Standard Residential Units

"VCRUs" = Village Center Residential Units

Notes:

- (a) To accommodate the additional 2,000 dwelling units in the 14,000 Residential Unit Alternative Scenario, village center retail square footage was reduced based on the vehicle trip equivalency ratios of 225 square feet per single-family dwelling unit and 155 square feet per multi-family dwelling unit. Alternatively, other commercial and industrial land areas could be reduced at their respective vehicle trip equivalency ratios.
- (b) In 14,000 Residential Unit Alternative Scenario, landscaped water efficiency was increased for noted land uses. Refer to Table B-6

**Table B-2**  
**Estimated Annual Water Demand**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| Development Category                         | Estimated<br>Total Water Use<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|---------------------------------------|----------------------------------------|-----------------------------------------|
| Residential (a)                              | 4,243                                 | 2,240                                  | 2,003                                   |
| Commercial, Institutional and Industrial (b) | 1,011                                 | 556                                    | 455                                     |
| Community Landscaping (c)                    | 2,212                                 | -                                      | 2,212                                   |
| Treatment system losses (d)                  | 280                                   | -                                      | -                                       |
| Distribution system losses (d)               | 373                                   | 140                                    | 234                                     |
| Subtotal Average Annual Water Demand (e)     | 8,119                                 | 2,935                                  | 4,904                                   |
| Contingency (f)                              | 350                                   | -                                      | -                                       |
| <b>Project Average Annual Water Demand</b>   | <b>8,469</b>                          | -                                      | -                                       |

Abbreviations:

"AFY" = acre-feet per year

Notes:

- (a) See Table B-3 for estimated residential water uses.
- (b) See Tables B-4 and B-6 for estimated indoor and outdoor water use, respectively, for commercial, institutional, and industrial land uses. Includes 210 AFY of outdoor school water demand.
- (c) See Table B-7 for estimated parks, roads and common area landscaping water use. Includes 318 AFY of residential common area demand.
- (d) See Table B-8 for water losses associated with the project treatment and distribution systems. System losses associated with all potable outdoor uses are estimated to be 127 AFY, assumed to be 5% of the total of residential outdoor, outdoor school, and residential common area water demands.
- (e) The Project Annual Water Demand is the sum of the estimated water uses for the project, plus the assumed treatment and distribution system losses.
- (f) The contingency was reduced from 400 AFY to 350 AFY under this scenario to accommodate 2,000 additional homes. The contingency is inclusive of all losses associated with its treatment and distribution.
- (g) Totals may not add exactly due to rounding.

**Table B-3**  
**Estimated Residential Water Use**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| Project Development Phase<br>and Housing Product Types | Number of<br>Dwelling<br>Units (a) | Median<br>Density<br>(a)<br>(du/ac) | Household<br>Size (c)<br>(people/du) | Water Use Factor (b)   |                         |                   | Subtotal Water Use (e) |                  |                |
|--------------------------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|------------------------|-------------------------|-------------------|------------------------|------------------|----------------|
|                                                        |                                    |                                     |                                      | Indoor (c)<br>(AFY/du) | Outdoor (d)<br>(AFY/du) | Total<br>(AFY/du) | Indoor<br>(AFY)        | Outdoor<br>(AFY) | Total<br>(AFY) |
| <i>Area 1</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,458                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 233                    | 248              | 481            |
| Village Center Residential Units                       | 269                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 43                     | 22               | 65             |
| <b>Subtotal</b>                                        | <b>1,727</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>276</b>             | <b>269</b>       | <b>546</b>     |
| <i>Area 2</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 2,076                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 332                    | 353              | 685            |
| Village Center Residential Units                       | 1,144                              | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 183                    | 92               | 275            |
| <b>Subtotal</b>                                        | <b>3,220</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>515</b>             | <b>444</b>       | <b>960</b>     |
| <i>Area 3</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 1,377                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 220                    | 234              | 454            |
| Village Center Residential Units                       | 852                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 136                    | 68               | 204            |
| <b>Subtotal</b>                                        | <b>2,229</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>357</b>             | <b>302</b>       | <b>659</b>     |
| <i>Area 4</i>                                          |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 2,158                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 345                    | 367              | 712            |
| Village Center Residential Units                       | 665                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 106                    | 53               | 160            |
| <b>Subtotal</b>                                        | <b>2,823</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>452</b>             | <b>420</b>       | <b>872</b>     |
| <i>Area 5a</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 2,018                              | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 323                    | 343              | 666            |
| Village Center Residential Units                       | 385                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 62                     | 31               | 92             |
| <b>Subtotal</b>                                        | <b>2,403</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>384</b>             | <b>374</b>       | <b>758</b>     |
| <i>Area 5b</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 41                                 | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 7                      | 7                | 14             |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.09                    | 0.25              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>41</b>                          | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>7</b>               | <b>7</b>         | <b>14</b>      |
| <i>Area 6a</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 682                                | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 109                    | 116              | 225            |
| Village Center Residential Units                       | 875                                | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 140                    | 70               | 210            |
| <b>Subtotal</b>                                        | <b>1,557</b>                       | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>249</b>             | <b>186</b>       | <b>435</b>     |

**Table B-3**  
**Estimated Residential Water Use**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| Project Development Phase<br>and Housing Product Types | Number of<br>Dwelling<br>Units (a) | Median<br>Density<br>(a)<br>(du/ac) | Household<br>Size (c)<br>(people/du) | Water Use Factor (b)   |                         |                   | Subtotal Water Use (e) |                  |                |
|--------------------------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|------------------------|-------------------------|-------------------|------------------------|------------------|----------------|
|                                                        |                                    |                                     |                                      | Indoor (c)<br>(AFY/du) | Outdoor (d)<br>(AFY/du) | Total<br>(AFY/du) | Indoor<br>(AFY)        | Outdoor<br>(AFY) | Total<br>(AFY) |
| <i>Area 6b</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <i>Area 6c</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <i>Area 6d</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <i>Area 6e</i>                                         |                                    |                                     |                                      |                        |                         |                   |                        |                  |                |
| Standard Residential Units                             | 0                                  | 7.2                                 | 3.20                                 | 0.16                   | 0.17                    | 0.33              | 0                      | 0                | 0              |
| Village Center Residential Units                       | 0                                  | 15.5                                | 3.20                                 | 0.16                   | 0.08                    | 0.24              | 0                      | 0                | 0              |
| <b>Subtotal</b>                                        | <b>0</b>                           | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>0</b>               | <b>0</b>         | <b>0</b>       |
| <b>TOTAL</b>                                           | <b>14,000</b>                      | <b>-</b>                            | <b>-</b>                             | <b>-</b>               | <b>-</b>                | <b>-</b>          | <b>2,240</b>           | <b>2,003</b>     | <b>4,243</b>   |

**Abbreviations:**

"AFY" = acre-feet per year

"AFY/du" = acre-feet per year per dwelling unit

"du" = dwelling units

"du/ac" = dwelling units per acre

**Table B-3**  
**Estimated Residential Water Use**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

**Notes:**

- (a) The residential unit types, median residential densities for each product type, and numbers of residential units are based on the 8 June 2015 Project Land Use Program Summary.
- (b) Water use factors, expressed as the annual volume of water consumed for each dwelling unit, have been estimated using models of residential indoor and outdoor water uses as discussed in Notes (c) and (d).
- (c) Residential indoor water use factors were estimated using a model of total indoor water use developed in *Analysis of Water Use in New Single-Family Homes* dated 20 July 2011, William DeOreo, P.E., M.S. submitted to Salt Lake City Corporation and the United States Environmental Protection Agency. The statistical model is based on single family homes that meet the standards for the Federal Energy Policy Act of 1992. The following assumptions were used for estimating water uses for each housing product type:
  - 1. The average household size (i.e., number of residents per home) for each product type is assumed as 3.2 persons/dwelling unit, according to data for Kern County from: *State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2013*. Sacramento, California, May 2013.
  - 2. Home water softening systems (e.g., regenerating ion exchange units or reverse osmosis units) are prohibited.
  - 3. High-efficiency clothes washers that use less than 30 gallons of water per load are installed in 75% of residential homes.
  - 4. Significant leaks (i.e., leaks greater than 50 gallons per day) occur at approximately 9% of homes for each housing product type.
- (d) Residential outdoor water use factors were estimated in Table B-5.
- (e) The subtotal water use for a residential unit type is the number of dwelling units multiplied by the corresponding water use factors.

**Table B-4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses (a) | [A]<br>Floor Area<br>(1,000 sf)<br>(a) | [B]<br>Floor Area<br>Ratio<br>(ac/ac)<br>(b) | [C]<br>Floor Area<br>(ac)<br>C = A / 43.56 (c) | [D]<br>Area of<br>Land Use<br>(ac)<br>D = C / B (d) | [E]<br>Employees<br>per 1,000 sf<br>(emp/1,000 sf)<br>(e) | [F]<br>Employees<br>(emp)<br>F = A × E (e) | [G]<br>Employee<br>Indoor Water<br>Use Factor<br>(gpd/emp)<br>(f) | [H]<br>Average<br>Daily Indoor<br>Water Use<br>(gpd)<br>H = F × G (g) | [I]<br>Total Annual<br>Indoor<br>Water Use<br>(AFY)<br>I = A x H (h) | [J]<br>Total Annual<br>Outdoor<br>Water Use<br>(AFY)<br>See Table 7 | [K]<br>Total<br>Water Use<br>(AFY)<br>K = I + J |
|---------------------------------------------------------|----------------------------------------|----------------------------------------------|------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------|
| <b>Area 1</b>                                           |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Village Center Retail                                   | 0                                      |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| 51% Grocery                                             | 0                                      | 0.18                                         | 0.0                                            | 0.0                                                 | 1.1                                                       | 0                                          | 122                                                               | 0                                                                     | 0.0                                                                  | 0.00                                                                | 0.0                                             |
| 21% Drug store                                          | 0                                      | 0.18                                         | 0.00                                           | 0.0                                                 | 0.8                                                       | 0                                          | 69                                                                | 0                                                                     | 0.0                                                                  | 0.00                                                                | 0.0                                             |
| 14% Miscellaneous                                       | 0                                      | 0.18                                         | 0.00                                           | 0.0                                                 | 0.8                                                       | 0                                          | 69                                                                | 0                                                                     | 0.0                                                                  | 0.00                                                                | 0.0                                             |
| 7% Restaurant                                           | 0                                      | 0.18                                         | 0.00                                           | 0.0                                                 | 2                                                         | 0                                          | 179                                                               | 0                                                                     | 0.0                                                                  | 0.00                                                                | 0.0                                             |
| 7% Bank                                                 | 0                                      | 0.18                                         | 0.00                                           | 0.0                                                 | 0.8                                                       | 0                                          | 63                                                                | 0                                                                     | 0.0                                                                  | 0.00                                                                | 0.0                                             |
| Village Center Office                                   | 22                                     | 0.18                                         | 0.5                                            | 2.8                                                 | 2.3                                                       | 51                                         | 53                                                                | 2,669                                                                 | 1.8                                                                  | 1.5                                                                 | 3.4                                             |
| Regional / Freeway-Oriented Comm.                       | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Office / R&D                                            | 400                                    |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| 50% High Tech / Bio Tech                                | 200                                    | 0.30                                         | 4.6                                            | 15                                                  | 2.3                                                       | 460                                        | 92                                                                | 42,267                                                                | 29.2                                                                 | 8.4                                                                 | 37.6                                            |
| 50% Other Office                                        | 200                                    | 0.30                                         | 4.6                                            | 15                                                  | 2.3                                                       | 460                                        | 53                                                                | 24,268                                                                | 16.8                                                                 | 8.4                                                                 | 25.2                                            |
| Light Industrial / Warehouse                            | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Schools (i)                                             | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| <b>Subtotal</b>                                         | <b>--</b>                              | <b>--</b>                                    | <b>--</b>                                      | <b>--</b>                                           | <b>--</b>                                                 | <b>--</b>                                  | <b>--</b>                                                         | <b>--</b>                                                             | <b>48</b>                                                            | <b>18</b>                                                           | <b>66</b>                                       |
| <b>Area 2</b>                                           |                                        |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| Village Center Retail                                   | 0                                      |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| 51% Grocery                                             | 0                                      | 0.18                                         | 0.0                                            | 0.0                                                 | 1.1                                                       | 0                                          | 122                                                               | 0                                                                     | 0.0                                                                  | 0.0                                                                 | 0.0                                             |
| 21% Drug store                                          | 0                                      | 0.18                                         | 0.0                                            | 0.0                                                 | 0.8                                                       | 0                                          | 69                                                                | 0                                                                     | 0.0                                                                  | 0.0                                                                 | 0.0                                             |
| 14% Miscellaneous                                       | 0                                      | 0.18                                         | 0.0                                            | 0.0                                                 | 0.8                                                       | 0                                          | 69                                                                | 0                                                                     | 0.0                                                                  | 0.0                                                                 | 0.0                                             |
| 7% Restaurant                                           | 0                                      | 0.18                                         | 0.0                                            | 0.0                                                 | 2                                                         | 0                                          | 179                                                               | 0                                                                     | 0.0                                                                  | 0.0                                                                 | 0.0                                             |
| 7% Bank                                                 | 0                                      | 0.18                                         | 0.0                                            | 0.0                                                 | 0.8                                                       | 0                                          | 63                                                                | 0                                                                     | 0.0                                                                  | 0.0                                                                 | 0.0                                             |
| Village Center Office                                   | 119                                    | 0.18                                         | 2.7                                            | 15                                                  | 2.3                                                       | 274                                        | 53                                                                | 14,439                                                                | 10.0                                                                 | 8.4                                                                 | 18.3                                            |
| Regional / Freeway-Oriented Comm.                       | 210                                    |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| 78.5% Miscellaneous Retail                              | 165                                    | 0.18                                         | 3.8                                            | 21                                                  | 0.8                                                       | 132                                        | 320                                                               | 42,256                                                                | 29.2                                                                 | 11.6                                                                | 40.8                                            |
| 7.5% Restaurant                                         | 16                                     | 0.18                                         | 0.4                                            | 2.0                                                 | 2                                                         | 32                                         | 847                                                               | 26,679                                                                | 18.4                                                                 | 1.1                                                                 | 19.5                                            |
| 7.5% Gas Station                                        | 16                                     | 0.18                                         | 0.4                                            | 2.0                                                 | 0.9                                                       | 14                                         | 320                                                               | 4,542                                                                 | 3.1                                                                  | 1.1                                                                 | 4.2                                             |
| 6.5% Hotel                                              | 14                                     | 0.18                                         | 0.3                                            | 1.7                                                 | 0.48                                                      | 7                                          | 506                                                               | 3,315                                                                 | 2.3                                                                  | 1.0                                                                 | 3.2                                             |
| Office / R&D                                            | 780                                    |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| 62% High Tech / Bio Tech                                | 480                                    | 0.30                                         | 11.0                                           | 37                                                  | 2.3                                                       | 1104                                       | 92                                                                | 101,440                                                               | 70.0                                                                 | 20.3                                                                | 90.3                                            |
| 38% Medical Center                                      | 300                                    | 0.30                                         | 7                                              | 23                                                  | 2.3                                                       | 690                                        | 80                                                                | 55,155                                                                | 38.1                                                                 | 12.7                                                                | 50.7                                            |
| Light Industrial / Warehouse                            | --                                     | --                                           | --                                             | --                                                  | --                                                        | --                                         | --                                                                | --                                                                    | --                                                                   | --                                                                  | --                                              |
| Schools (i)                                             | 335                                    |                                              |                                                |                                                     |                                                           |                                            |                                                                   |                                                                       |                                                                      |                                                                     |                                                 |
| 1 K-8                                                   | 96                                     | 0.11                                         | 2.2                                            | 20                                                  | 1.3                                                       | 121                                        | 55                                                                | 6,665                                                                 | 4.6                                                                  | 24.0                                                                | 28.7                                            |
| 1 High School                                           | 240                                    | 0.10                                         | 5.5                                            | 55                                                  | 1.3                                                       | 302                                        | 55                                                                | 16,661                                                                | 11.5                                                                 | 66.1                                                                | 77.6                                            |
| <b>Subtotal</b>                                         | <b>--</b>                              | <b>--</b>                                    | <b>--</b>                                      | <b>--</b>                                           | <b>--</b>                                                 | <b>--</b>                                  | <b>--</b>                                                         | <b>--</b>                                                             | <b>187</b>                                                           | <b>146</b>                                                          | <b>333</b>                                      |

**Table B-4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses (a) | [A]<br>Floor Area<br>(1,000 sf)<br>(a) | [B]<br>Floor Area Ratio<br>(ac/ac)<br>(b) | [C]<br>Floor Area<br>(ac)<br>C = A / 43.56 (c) | [D]<br>Area of Land Use<br>(ac)<br>D = C / B (d) | [E]<br>Employees per 1,000 sf<br>(emp/1,000 sf)<br>(e) | [F]<br>Employees<br>(emp)<br>F = A × E (e) | [G]<br>Employee Indoor Water Use Factor<br>(gpd/emp)<br>(f) | [H]<br>Average Daily Indoor Water Use<br>(gpd)<br>H = F × G (g) | [I]<br>Total Annual Indoor Water Use<br>(AFY)<br>I = A x H (h) | [J]<br>Total Annual Outdoor Water Use<br>(AFY)<br>See Table 7 | [K]<br>Total Water Use<br>(AFY)<br>K = I + J |
|---------------------------------------------------------|----------------------------------------|-------------------------------------------|------------------------------------------------|--------------------------------------------------|--------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|
| <b>Area 3</b>                                           |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Village Center Retail                                   | 0                                      |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| 51% Grocery                                             | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 1.1                                                    | 0                                          | 122                                                         | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 21% Drug store                                          | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 0.8                                                    | 0                                          | 69                                                          | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 14% Miscellaneous                                       | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 0.8                                                    | 0                                          | 69                                                          | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 7% Restaurant                                           | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 2                                                      | 0                                          | 179                                                         | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 7% Bank                                                 | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 0.8                                                    | 0                                          | 63                                                          | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| Village Center Office                                   | 75                                     | 0.18                                      | 1.7                                            | 10                                               | 2.3                                                    | 173                                        | 53                                                          | 9,100                                                           | 6.3                                                            | 5.3                                                           | 11.6                                         |
| Regional / Freeway-Oriented Comm.                       | 540                                    |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| 78.5% Miscellaneous Retail                              | 424                                    | 0.18                                      | 10                                             | 54                                               | 0.8                                                    | 339                                        | 320                                                         | 108,659                                                         | 75.0                                                           | 29.8                                                          | 104.9                                        |
| 7.5% Restaurant                                         | 41                                     | 0.18                                      | 0.9                                            | 5.2                                              | 2                                                      | 81                                         | 847                                                         | 68,602                                                          | 47.4                                                           | 2.8                                                           | 50.2                                         |
| 7.5% Gas Station                                        | 41                                     | 0.18                                      | 0.9                                            | 5.2                                              | 0.9                                                    | 36                                         | 320                                                         | 11,679                                                          | 8.1                                                            | 2.8                                                           | 10.9                                         |
| 6.5% Hotel                                              | 35                                     | 0.18                                      | 0.8                                            | 4.5                                              | 0.48                                                   | 17                                         | 506                                                         | 8,524                                                           | 5.9                                                            | 2.5                                                           | 8.4                                          |
| Office / R&D                                            | 650                                    |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| 50% High Tech / Bio Tech                                | 325                                    | 0.30                                      | 7.5                                            | 25                                               | 2.3                                                    | 748                                        | 92                                                          | 68,683                                                          | 47.4                                                           | 13.7                                                          | 61.1                                         |
| 50% Other Office                                        | 325                                    | 0.30                                      | 7.5                                            | 25                                               | 2.3                                                    | 748                                        | 53                                                          | 39,435                                                          | 27.2                                                           | 13.7                                                          | 40.9                                         |
| Light Industrial / Warehouse                            | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Schools (i)                                             | 96                                     |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| 1 K-8                                                   | 96                                     | 0.11                                      | 2.2                                            | 20                                               | 1.3                                                    | 121                                        | 55                                                          | 6,665                                                           | 4.6                                                            | 24.0                                                          | 28.7                                         |
| <b>Subtotal</b>                                         | <b>--</b>                              | <b>--</b>                                 | <b>--</b>                                      | <b>--</b>                                        | <b>--</b>                                              | <b>--</b>                                  | <b>--</b>                                                   | <b>--</b>                                                       | <b>222</b>                                                     | <b>95</b>                                                     | <b>317</b>                                   |
| <b>Area 4</b>                                           |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Village Center Retail                                   | 0                                      |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| 51% Grocery                                             | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 1.1                                                    | 0                                          | 122                                                         | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 21% Drug store                                          | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 0.8                                                    | 0                                          | 69                                                          | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 14% Miscellaneous                                       | 0                                      | 0.18                                      | 0.0                                            | 0.0                                              | 0.8                                                    | 0                                          | 69                                                          | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 7% Restaurant                                           | 0                                      | 0.18                                      | 0.00                                           | 0.0                                              | 2                                                      | 0                                          | 179                                                         | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| 7% Bank                                                 | 0                                      | 0.18                                      | 0.00                                           | 0.0                                              | 0.8                                                    | 0                                          | 63                                                          | 0                                                               | 0.0                                                            | 0.0                                                           | 0.0                                          |
| Village Center Office                                   | 53                                     | 0.18                                      | 1.2                                            | 6.8                                              | 2.3                                                    | 122                                        | 53                                                          | 6,431                                                           | 4.4                                                            | 3.7                                                           | 8.2                                          |
| Regional / Freeway-Oriented Comm.                       | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Office / R&D                                            | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Light Industrial / Warehouse                            | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Schools (i)                                             | 192                                    |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| 2 K-8                                                   | 192                                    | 0.11                                      | 4.4                                            | 40                                               | 1.3                                                    | 241                                        | 55                                                          | 13,329                                                          | 9.2                                                            | 48.1                                                          | 57.3                                         |
| <b>Subtotal</b>                                         | <b>--</b>                              | <b>--</b>                                 | <b>--</b>                                      | <b>--</b>                                        | <b>--</b>                                              | <b>--</b>                                  | <b>--</b>                                                   | <b>--</b>                                                       | <b>14</b>                                                      | <b>52</b>                                                     | <b>65</b>                                    |

**Table B-4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

|                                                            | [A]<br>Floor Area<br>(1,000 sf) | [B]<br>Floor<br>Area<br>Ratio<br>(ac/ac) | [C]<br>Floor Area<br>(ac) | [D]<br>Area of<br>Land Use<br>(ac) | [E]<br>Employees<br>per 1,000 sf<br>(emp/1,000 sf) | [F]<br>Employees<br>(emp) | [G]<br>Employee<br>Indoor Water<br>Use Factor<br>(gpd/emp) | [H]<br>Average<br>Daily Indoor<br>Water Use<br>(gpd) | [I]<br>Total Annual<br>Indoor<br>Water Use<br>(AFY) | [J]<br>Total Annual<br>Outdoor<br>Water Use<br>(AFY) | [K]<br>Total<br>Water Use<br>(AFY) |
|------------------------------------------------------------|---------------------------------|------------------------------------------|---------------------------|------------------------------------|----------------------------------------------------|---------------------------|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------|------------------------------------|
| Commercial, Institutional, and<br>Industrial Land Uses (a) | (a)                             | (b)                                      | C = A / 43.56 (c)         | D = C / B (d)                      | (e)                                                | F = A × E (e)             | (f)                                                        | H = F × G (g)                                        | I = A x H (h)                                       | See Table 7                                          | K = I + J                          |
| <b>Area 5a</b>                                             |                                 |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 0                               |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 0                               | 0.18                                     | 0.0                       | 0.0                                | 1.1                                                | 0                         | 122                                                        | 0                                                    | 0.0                                                 | 0.0                                                  | 0.0                                |
| 21% Drug store                                             | 0                               | 0.18                                     | 0.00                      | 0.0                                | 0.8                                                | 0                         | 69                                                         | 0                                                    | 0.0                                                 | 0.0                                                  | 0.0                                |
| 14% Miscellaneous                                          | 0                               | 0.18                                     | 0.00                      | 0.0                                | 0.8                                                | 0                         | 69                                                         | 0                                                    | 0.0                                                 | 0.0                                                  | 0.0                                |
| 7% Restaurant                                              | 0                               | 0.18                                     | 0.00                      | 0.0                                | 2                                                  | 0                         | 179                                                        | 0                                                    | 0.0                                                 | 0.0                                                  | 0.0                                |
| 7% Bank                                                    | 0                               | 0.18                                     | 0.00                      | 0.0                                | 0.8                                                | 0                         | 63                                                         | 0                                                    | 0.0                                                 | 0.0                                                  | 0.0                                |
| Village Center Office                                      | 18                              | 0.18                                     | 0.4                       | 2.3                                | 2.3                                                | 41                        | 53                                                         | 2,184                                                | 1.5                                                 | 1.3                                                  | 2.8                                |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Light Industrial / Warehouse                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | 96                              |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     | 0                                                    |                                    |
| 1 K-8                                                      | 96                              | 0.11                                     | 2.2                       | 20                                 | 1.3                                                | 121                       | 55                                                         | 6,665                                                | 4.6                                                 | 24.0                                                 | 28.7                               |
| <b>Subtotal</b>                                            | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>6</b>                                            | <b>25</b>                                            | <b>31</b>                          |
| <b>Area 5b</b>                                             |                                 |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Village Center Office                                      | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Light Industrial / Warehouse                               | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Schools (i)                                                | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| <b>Subtotal</b>                                            | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>0</b>                                            | <b>0</b>                                             | <b>0</b>                           |
| <b>Area 6a</b>                                             |                                 |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| Village Center Retail                                      | 42                              |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 51% Grocery                                                | 21                              | 0.18                                     | 0.5                       | 2.7                                | 1.1                                                | 24                        | 122                                                        | 2,875                                                | 2.0                                                 | 1.5                                                  | 3.5                                |
| 21% Drug store                                             | 9                               | 0.18                                     | 0.2                       | 1.1                                | 0.8                                                | 7                         | 69                                                         | 485                                                  | 0.3                                                 | 0.6                                                  | 1.0                                |
| 14% Miscellaneous                                          | 6                               | 0.18                                     | 0.1                       | 0.7                                | 0.8                                                | 5                         | 69                                                         | 324                                                  | 0.2                                                 | 0.4                                                  | 0.6                                |
| 7% Restaurant                                              | 3                               | 0.18                                     | 0.1                       | 0.4                                | 2                                                  | 6                         | 179                                                        | 1,055                                                | 0.7                                                 | 0.2                                                  | 0.9                                |
| 7% Bank                                                    | 3                               | 0.18                                     | 0.1                       | 0.4                                | 0.8                                                | 2                         | 63                                                         | 149                                                  | 0.1                                                 | 0.2                                                  | 0.3                                |
| Village Center Office                                      | 66                              | 0.18                                     | 1.5                       | 8                                  | 2.3                                                | 152                       | 53                                                         | 8,008                                                | 5.5                                                 | 4.6                                                  | 10.2                               |
| Regional / Freeway-Oriented Comm.                          | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | --                                                  | --                                                   | --                                 |
| Office / R&D                                               | 270                             |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 50% High Tech / Bio Tech                                   | 135                             | 0.30                                     | 3.1                       | 10                                 | 2.3                                                | 311                       | 92                                                         | 28,530                                               | 19.7                                                | 5.7                                                  | 25.4                               |
| 50% Other Office                                           | 135                             | 0.30                                     | 3.1                       | 10                                 | 2.3                                                | 311                       | 53                                                         | 16,381                                               | 11.3                                                | 5.7                                                  | 17.0                               |
| Light Industrial / Warehouse                               | 1,400                           |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 75% Light Industrial / Warehouse                           | 1,050                           | 0.30                                     | 24                        | 80                                 | 0.43                                               | 452                       | 77                                                         | 34,576                                               | 23.9                                                | 44.3                                                 | 68.2                               |
| 25% Community College                                      | 350                             | 0.29                                     | 8                         | 28                                 | 1.3                                                | 441                       | 31                                                         | 13,607                                               | 9.4                                                 | 15.3                                                 | 24.7                               |
| Schools (i)                                                | 96                              |                                          |                           |                                    |                                                    |                           |                                                            |                                                      |                                                     |                                                      |                                    |
| 1 K-8                                                      | 96                              | 0.11                                     | 2.2                       | 20                                 | 1.3                                                | 121                       | 55                                                         | 6,665                                                | 4.6                                                 | 24.0                                                 | 28.7                               |
| <b>Subtotal</b>                                            | --                              | --                                       | --                        | --                                 | --                                                 | --                        | --                                                         | --                                                   | <b>78</b>                                           | <b>103</b>                                           | <b>180</b>                         |

**Table B-4**  
**Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses (a)                                                                                        | [A]<br>Floor Area<br>(1,000 sf)<br>(a) | [B]<br>Floor Area Ratio<br>(ac/ac)<br>(b) | [C]<br>Floor Area<br>(ac)<br>C = A / 43.56 (c) | [D]<br>Area of Land Use<br>(ac)<br>D = C / B (d) | [E]<br>Employees per 1,000 sf<br>(emp/1,000 sf)<br>(e) | [F]<br>Employees<br>(emp)<br>F = A × E (e) | [G]<br>Employee Indoor Water Use Factor<br>(gpd/emp)<br>(f) | [H]<br>Average Daily Indoor Water Use<br>(gpd)<br>H = F × G (g) | [I]<br>Total Annual Indoor Water Use<br>(AFY)<br>I = A × H (h) | [J]<br>Total Annual Outdoor Water Use<br>(AFY)<br>See Table 7 | [K]<br>Total Water Use<br>(AFY)<br>K = I + J |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------|------------------------------------------------|--------------------------------------------------|--------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|
| <b>Area 6b</b>                                                                                                                                 |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Village Center Retail                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Village Center Office                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Office / R&D                                                                                                                                   | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Industrial                                                                                                                                     | 50                                     |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Light Industrial / Warehouse                                                                                                                   | 50                                     | 0.05                                      | 1                                              | 23                                               | 0.4                                                    | 22                                         | 77                                                          | 1,646                                                           | 1.1                                                            | 12.7                                                          | 10.4                                         |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                        | --                                             | 266                                              | --                                                     | --                                         | --                                                          | --                                                              | 0.03                                                           | 1.2                                                           | 1.2                                          |
| Schools (i)                                                                                                                                    | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | <b>1</b>                                                       | <b>13.8</b>                                                   | <b>11.6</b>                                  |
| <b>Area 6c</b>                                                                                                                                 |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Village Center Retail                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Village Center Office                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Office / R&D                                                                                                                                   | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Industrial                                                                                                                                     | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                        | --                                             | 190                                              | --                                                     | --                                         | --                                                          | --                                                              | 0.02                                                           | 0.8                                                           | 0.9                                          |
| Schools (i)                                                                                                                                    | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | <b>0</b>                                                       | <b>0.8</b>                                                    | <b>0.9</b>                                   |
| <b>Area 6d</b>                                                                                                                                 |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Village Center Retail                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Village Center Office                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Office / R&D                                                                                                                                   | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Industrial                                                                                                                                     | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                        | --                                             | 173                                              | --                                                     | --                                         | --                                                          | --                                                              | 0.02                                                           | 0.8                                                           | 0.8                                          |
| Schools (i)                                                                                                                                    | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | <b>0</b>                                                       | <b>0.8</b>                                                    | <b>0.8</b>                                   |
| <b>Area 6e</b>                                                                                                                                 |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 |                                                                |                                                               |                                              |
| Village Center Retail                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Village Center Office                                                                                                                          | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Regional / Freeway-Oriented Comm.                                                                                                              | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Office / R&D                                                                                                                                   | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Industrial                                                                                                                                     | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| Solar Farm (j)                                                                                                                                 | --                                     | --                                        | --                                             | 171                                              | --                                                     | --                                         | --                                                          | --                                                              | 0.02                                                           | 0.8                                                           | 0.8                                          |
| Schools (i)                                                                                                                                    | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | --                                                             | --                                                            | --                                           |
| <b>Subtotal</b>                                                                                                                                | --                                     | --                                        | --                                             | --                                               | --                                                     | --                                         | --                                                          | --                                                              | <b>0</b>                                                       | <b>0.8</b>                                                    | <b>0.8</b>                                   |
| Total School Water Use (including state-of-the-art water conservation technologies and measures)                                               |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 | 39                                                             | 210                                                           | 250                                          |
| <b>Total Commercial, Institutional, and Industrial Water Use (including state-of-the-art water conservation technologies and measures) (k)</b> |                                        |                                           |                                                |                                                  |                                                        |                                            |                                                             |                                                                 | <b>556</b>                                                     | <b>455</b>                                                    | <b>1,008</b>                                 |

Table B-4  
Estimated Water Uses for Commercial, Institutional, and Industrial Land Uses  
14,000 Residential Unit Alternative Scenario  
Grapevine Project, Kern County, California

Abbreviations:

|                                                  |                                                  |                                         |
|--------------------------------------------------|--------------------------------------------------|-----------------------------------------|
| "1,000 sf" = 1,000 square feet                   | "emp" = employees                                | "R&D" = research and development        |
| "ac" = acre                                      | "emp/1,000 sf" = employees per 1,000 square feet | "sf" = square feet                      |
| "ac/ac" = acre per developed acre                | "gpd" = gallons per day                          | "TRCC" = Tejon Regional Commerce Center |
| "AFY" = acre-feet per year                       | "gpd/emp" = gallons per day per employee         |                                         |
| "CII" = Commercial, Institutional and Industrial | "K-8" = kindergarten through eighth grade        |                                         |

Notes:

- (a) The CII land uses and areas are based on the 8 June 2015 project Land Use Program Summary.
- (b) The floor area ratio is the ratio between floor area to gross land area. The floor area ratios for the different land use categories are based on the 8 June 2015 project Land Use Program Summary.
- (c) The floor area expressed in acres is calculated by dividing the floor area expressed in 1,000 square feet by 43.56. Note that 1 acre is equal to 43,560 square feet.
- (d) The area of land use is calculated by dividing the floor area expressed in acres, by the floor area ratio.
- (e) The employees per 1,000 square feet were based on the data in Reference 2. The number of employees was estimated by multiplying the floor area, expressed in 1,000 square feet, by the employees per 1,000 square feet.
- (f) The employee indoor water use factors, derived from Reference 1, relate the indoor water use for a specific CII land use to the number of employees based on a 225-day work year and a conservation potential, which accounts for current water efficiency standards. The conservation potential is the "best potential" estimate of conservation savings based on the use of water efficient fixtures and efficient water management techniques for each industry. Conservation potential for the Regional/Freeway-Oriented Commercial land uses were assumed to be 0%, due to the high traffic volumes that these businesses are likely to receive (similar to high traffic volumes at the TRCC). Additionally, the employee indoor water use factors for the Regional/Freeway-Oriented Commercial land uses are multiplied by an escalation factor of 3.4 which is the average difference between the project indoor water use factors and actual indoor water use at the TRCC in fiscal year 2012 - 2013, weighted by land use category.
- (g) The total average daily water use for each land use is estimated by multiplying the number of employees by the CII-specific indoor employee water use factor.
- (h) Average Annual Water Use is calculated by multiplying the Average Daily Water Use, from Column H by the 225-day work year cited in Footnote (f) for the employee indoor water use factors, then dividing by 326,000 gallons per acre-foot.
- (i) The floor area for schools is based on 11% of the total acreage for kindergarten through eighth grade and 10% of the total acreage for high schools.
- (j) Water use for the solar farms are based on the values for photovoltaic solar plants from Reference 3.
- (k) Totals may not add exactly due to rounding.

Reference:

- 1. Pacific Institute, 2003. *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003.
- 2. Energy Information Administration, 2006. *2003 Commercial Buildings Energy Consumption Survey: Building Characteristics Tables* , Revised June 2006.
- 3. Bureau of Land Management, 2012. *Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States* , Appendix M, July 2012.

Table B-5  
Estimated Residential Outdoor Water Use Factors  
14,000 Residential Unit Alternative Scenario  
Grapevine Project, Kern County, California

| Housing Category / Unit Type (a)                                          | [A]<br>Median<br>Density<br>(du/ac)<br><br>(a) | [B]<br>Median<br>Size of Lot<br>(without streets)<br>(sq ft/du)<br><br>B = 43560 / A (b) | [C]<br>Area of<br>Landscaping<br>Per Lot<br>(sq ft/du)<br><br>C = B x 40% | [D]<br>Percentage<br>of Landscaping<br>Covered in<br>HWUPs<br><br>(c) | [E]<br>Area of<br>HWUPs<br>(sq ft/du)<br><br>E = C x D (c) | [F]<br>Percentage<br>of Landscaping<br>Covered in<br>LWUPs<br><br>(d) | [G]<br>Area of<br>LWUPs<br>(sq ft/du)<br><br>G = C x F (d) | [H]<br>Estimated Total<br>Water Use<br>for HWUPs<br>(AFY/du)<br><br>H = E x 5.4 /43560 (e) | [I]<br>Estimated Total<br>Water Use<br>for LWUPs<br>(AFY/du)<br><br>I = G x 1.88 / 43560 (f) | [J]<br>Estimated Total<br>Water Use (ETWU)<br>for Landscaping<br>(AFY/du)<br><br>J = H + I (g) | [K]<br>Maximum Applied<br>Water<br>Allowance (MAWA)<br>(AFY/du)<br><br>(h) | [L]<br>Additional<br>Outdoor<br>Water Uses<br>(AFY/du)<br><br>L = 0.1 x J (i) | [M]<br>Total<br>Outdoor Water<br>Use Factor<br>(AFY/du)<br><br>M = J + L (j) |
|---------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Area 1<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 2<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 3<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 4<br>Standard Residential Units<br>Village Center Residential Units  | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 5a<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 5b<br>Standard Residential Units                                     | 7.2                                            | 6,050                                                                                    | 2,420                                                                     | 25%                                                                   | 605                                                        | 75%                                                                   | 1,815                                                      | 0.075                                                                                      | 0.078                                                                                        | 0.15                                                                                           | 0.15                                                                       | 0.015                                                                         | 0.17                                                                         |
| Area 6a<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6b<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6c<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6d<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |
| Area 6e<br>Standard Residential Units<br>Village Center Residential Units | 7.2<br>15.5                                    | 6,050<br>2,810                                                                           | 2,420<br>1,124                                                            | 25%<br>25%                                                            | 605<br>281                                                 | 75%<br>75%                                                            | 1,815<br>843                                               | 0.075<br>0.035                                                                             | 0.078<br>0.036                                                                               | 0.15<br>0.07                                                                                   | 0.15<br>0.07                                                               | 0.015<br>0.007                                                                | 0.17<br>0.08                                                                 |

Abbreviations:

|                                        |                                    |                                            |
|----------------------------------------|------------------------------------|--------------------------------------------|
| "AFY" = Acre feet per year             | "ETWU" = estimated total water use | "MAWA" = maximum allowable water allowance |
| "AFY/ac" = Acre feet per year per acre | "HWUPs" = high water use plantings | "sq ft" = square feet                      |
| "du/ac" = dwelling units per acre      | "LWUPs" = low water use plantings  |                                            |

Notes:

- (a) Residential unit types and median residential density are based on the 8 June 2015 Project Land Use Program Summary.
- (b) The size of residential lots, including the area of associated surrounding streets, is calculated by dividing the residential density into 43,560 square feet per acre.
- (c) High water use plantings include turf grasses. Percentage of lot covered in high water use plantings is the area of high water use plantings divided by the lot size (without streets).
- (d) Low water use plantings include shrubs and native vegetation. Percentage of lot covered in low water use plantings is the area of low water use plantings divided by the lot size (without streets).
- (e) The estimated total water use for high water use plantings is the area of high water use plantings, converted to acres (by dividing by 43,560), multiplied by the annual evapotranspiration rate for high water use plantings (5.4 AFY/ac) provided in Table 5.
- (f) The estimated total water use for low water use plantings is the area of low water use plantings, converted to acres (by dividing by 43,560), multiplied by the annual evapotranspiration rate for low water use plantings (1.88 AFY/ac) provided in Table 5.
- (g) For residential unit landscaping, the Estimated Total Water Use (ETWU) calculation described in Reference 1 is based on 100% regular landscape area, which equals the sum of the estimated total water use for high water use planting and the estimated total water use for low water use planting. This value must be less than or equal to the Maximum Applied Water Allowance (see note h).
- (h) The Maximum Applied Water Allowance (MAWA) calculations are described in Reference 1. The MAWA was calculated assuming 100% regular landscaped area and an evaporation adjustment factor of 0.55 for residential areas.
- (i) Additional outdoor water uses include miscellaneous outdoor water uses (e.g. car washing, outdoor cleaning, etc.), which are assumed at 10% of the applied irrigation of high and low water use plantings.
- (j) The total annual outdoor water use is the sum of the ETWU for landscaping and additional outdoor water uses.

References:

- 1 California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance , July 9, 2015 Draft.

**Table B-6**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 1</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 21% Drug store                                      | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 14% Miscellaneous                                   | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Restaurant                                       | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Bank                                             | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| Village Center Office                               | 2.8                                      | 0.56                                        | 25%                                                      | 0.14                                            | 75%                                                      | 0.42                                            | 0.8                                                                    | 0.8                                                                     | 1.5                                                                       | 2.8                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 50% High Tech / Bio Tech                            | 15                                       | 3.06                                        | 25%                                                      | 0.77                                            | 75%                                                      | 2.30                                            | 4.1                                                                    | 4.3                                                                     | 8.4                                                                       | 15.4                                                          |
| 50% Other Office                                    | 15                                       | 3.06                                        | 25%                                                      | 0.77                                            | 75%                                                      | 2.30                                            | 4.1                                                                    | 4.3                                                                     | 8.4                                                                       | 15.4                                                          |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>18</b>                                                                 |                                                               |
| <b>Area 2</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 21% Drug store                                      | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 14% Miscellaneous                                   | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Restaurant                                       | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Bank                                             | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| Village Center Office                               | 15                                       | 3.04                                        | 25%                                                      | 0.76                                            | 75%                                                      | 2.28                                            | 4.1                                                                    | 4.3                                                                     | 8.4                                                                       | 15.3                                                          |
| Regional / Freeway-Oriented Comm.                   |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 78.5% Miscellaneous Retail                          | 21                                       | 4.20                                        | 25%                                                      | 1.05                                            | 75%                                                      | 3.15                                            | 5.7                                                                    | 5.9                                                                     | 11.6                                                                      | 21.2                                                          |
| 7.5% Restaurant                                     | 2.0                                      | 0.40                                        | 25%                                                      | 0.10                                            | 75%                                                      | 0.30                                            | 0.5                                                                    | 0.6                                                                     | 1.1                                                                       | 2.0                                                           |
| 7.5% Gas Station                                    | 2.0                                      | 0.40                                        | 25%                                                      | 0.10                                            | 75%                                                      | 0.30                                            | 0.5                                                                    | 0.6                                                                     | 1.1                                                                       | 2.0                                                           |
| 6.5% Hotel                                          | 1.7                                      | 0.35                                        | 25%                                                      | 0.09                                            | 75%                                                      | 0.26                                            | 0.5                                                                    | 0.5                                                                     | 1.0                                                                       | 1.8                                                           |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 62% High Tech / Bio Tech                            | 37                                       | 7.35                                        | 25%                                                      | 1.84                                            | 75%                                                      | 5.51                                            | 9.9                                                                    | 10.3                                                                    | 20.3                                                                      | 37.0                                                          |
| 38% Medical Center                                  | 23                                       | 4.59                                        | 25%                                                      | 1.15                                            | 75%                                                      | 3.44                                            | 6.2                                                                    | 6.5                                                                     | 12.7                                                                      | 23.1                                                          |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 15%                                                      | 1.50                                            | 85%                                                      | 8.50                                            | 8.1                                                                    | 15.9                                                                    | 24.0                                                                      | 44.6                                                          |
| 1 High School                                       | 55                                       | 27.50                                       | 15%                                                      | 4.13                                            | 85%                                                      | 23.38                                           | 22.3                                                                   | 43.8                                                                    | 66.1                                                                      | 122.5                                                         |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>146</b>                                                                |                                                               |

**Table B-6**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 3</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 21% Drug store                                      | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 14% Miscellaneous                                   | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Restaurant                                       | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Bank                                             | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| Village Center Office                               | 10                                       | 1.91                                        | 25%                                                      | 0.48                                            | 75%                                                      | 1.43                                            | 2.6                                                                    | 2.7                                                                     | 5.3                                                                       | 9.6                                                           |
| Regional / Freeway-Oriented Comm.                   |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 78.5% Miscellaneous Retail                          | 54                                       | 10.81                                       | 25%                                                      | 2.70                                            | 75%                                                      | 8.11                                            | 14.6                                                                   | 15.2                                                                    | 29.8                                                                      | 54.5                                                          |
| 7.5% Restaurant                                     | 5.2                                      | 1.03                                        | 25%                                                      | 0.26                                            | 75%                                                      | 0.77                                            | 1.4                                                                    | 1.5                                                                     | 2.8                                                                       | 5.2                                                           |
| 7.5% Gas Station                                    | 5.2                                      | 1.03                                        | 25%                                                      | 0.26                                            | 75%                                                      | 0.77                                            | 1.4                                                                    | 1.5                                                                     | 2.8                                                                       | 5.2                                                           |
| 6.5% Hotel                                          | 4.5                                      | 0.90                                        | 25%                                                      | 0.22                                            | 75%                                                      | 0.67                                            | 1.2                                                                    | 1.3                                                                     | 2.5                                                                       | 4.5                                                           |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 50% High Tech / Bio Tech                            | 25                                       | 4.97                                        | 25%                                                      | 1.24                                            | 75%                                                      | 3.73                                            | 6.7                                                                    | 7.0                                                                     | 13.7                                                                      | 25.1                                                          |
| 50% Other Office                                    | 25                                       | 4.97                                        | 25%                                                      | 1.24                                            | 75%                                                      | 3.73                                            | 6.7                                                                    | 7.0                                                                     | 13.7                                                                      | 25.1                                                          |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 15%                                                      | 1.50                                            | 85%                                                      | 8.50                                            | 8.1                                                                    | 15.9                                                                    | 24.0                                                                      | 44.6                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>95</b>                                                                 |                                                               |
| <b>Area 4</b>                                       |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 21% Drug store                                      | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 14% Miscellaneous                                   | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Restaurant                                       | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Bank                                             | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| Village Center Office                               | 6.8                                      | 1.35                                        | 25%                                                      | 0.34                                            | 75%                                                      | 1.01                                            | 1.8                                                                    | 1.9                                                                     | 3.7                                                                       | 6.8                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 40                                       | 20.00                                       | 15%                                                      | 3.00                                            | 85%                                                      | 17.00                                           | 16.2                                                                   | 31.9                                                                    | 48.1                                                                      | 89.1                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>52</b>                                                                 |                                                               |

**Table B-6**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|-----------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 5a</b>                                      |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 21% Drug store                                      | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 14% Miscellaneous                                   | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Restaurant                                       | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| 7% Bank                                             | 0.0                                      | 0.00                                        | 25%                                                      | 0.00                                            | 75%                                                      | 0.00                                            | 0.0                                                                    | 0.0                                                                     | 0.0                                                                       | 0.0                                                           |
| Village Center Office                               | 2.3                                      | 0.46                                        | 25%                                                      | 0.11                                            | 75%                                                      | 0.34                                            | 0.6                                                                    | 0.6                                                                     | 1.3                                                                       | 2.3                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 15%                                                      | 1.50                                            | 85%                                                      | 8.50                                            | 8.1                                                                    | 15.9                                                                    | 24.0                                                                      | 44.6                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>25</b>                                                                 |                                                               |
| <b>Area 5b</b>                                      |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                               | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Light Industrial / Warehouse                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Schools                                             | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0</b>                                                                  |                                                               |
| <b>Area 6a</b>                                      |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 51% Grocery                                         | 2.7                                      | 0.55                                        | 25%                                                      | 0.14                                            | 75%                                                      | 0.41                                            | 0.7                                                                    | 0.8                                                                     | 1.5                                                                       | 2.8                                                           |
| 21% Drug store                                      | 1.1                                      | 0.22                                        | 25%                                                      | 0.06                                            | 75%                                                      | 0.17                                            | 0.3                                                                    | 0.3                                                                     | 0.6                                                                       | 1.1                                                           |
| 14% Miscellaneous                                   | 0.7                                      | 0.15                                        | 25%                                                      | 0.04                                            | 75%                                                      | 0.11                                            | 0.2                                                                    | 0.2                                                                     | 0.4                                                                       | 0.8                                                           |
| 7% Restaurant                                       | 0.4                                      | 0.07                                        | 25%                                                      | 0.02                                            | 75%                                                      | 0.06                                            | 0.1                                                                    | 0.1                                                                     | 0.2                                                                       | 0.4                                                           |
| 7% Bank                                             | 0.4                                      | 0.07                                        | 25%                                                      | 0.02                                            | 75%                                                      | 0.06                                            | 0.1                                                                    | 0.1                                                                     | 0.2                                                                       | 0.4                                                           |
| Village Center Office                               | 8                                        | 1.68                                        | 25%                                                      | 0.42                                            | 75%                                                      | 1.26                                            | 2.3                                                                    | 2.4                                                                     | 4.6                                                                       | 8.5                                                           |
| Regional / Freeway-Oriented Comm.                   | --                                       |                                             | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 50% High Tech / Bio Tech                            | 10                                       | 2.07                                        | 25%                                                      | 0.52                                            | 75%                                                      | 1.55                                            | 2.8                                                                    | 2.9                                                                     | 5.7                                                                       | 10.4                                                          |
| 50% Other Office                                    | 10                                       | 2.07                                        | 25%                                                      | 0.52                                            | 75%                                                      | 1.55                                            | 2.8                                                                    | 2.9                                                                     | 5.7                                                                       | 10.4                                                          |
| Light Industrial / Warehouse                        |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 75% Light Industrial / Warehouse                    | 80                                       | 16.07                                       | 25%                                                      | 4.02                                            | 75%                                                      | 12.05                                           | 21.7                                                                   | 22.6                                                                    | 44.3                                                                      | 81.0                                                          |
| 25% Community College                               | 28                                       | 5.54                                        | 25%                                                      | 1.39                                            | 75%                                                      | 4.16                                            | 7.5                                                                    | 7.8                                                                     | 15.3                                                                      | 27.9                                                          |
| Schools                                             |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| 1 K-8                                               | 20                                       | 10.00                                       | 15%                                                      | 1.50                                            | 85%                                                      | 8.50                                            | 8.1                                                                    | 15.9                                                                    | 24.0                                                                      | 44.6                                                          |
| <b>Subtotal</b>                                     |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>103</b>                                                                |                                                               |

**Table B-6**  
**Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Commercial, Institutional, and Industrial Land Uses                          | [A]<br>Area of Land Use<br>(acre)<br>(a) | [B]<br>Area of Landscaping<br>(acre)<br>(b) | [C]<br>Percentage of Landscaping Covered in HWUPs<br>(c) | [D]<br>Area of HWUPs<br>(acre)<br>D = B x C (c) | [E]<br>Percentage of Landscaping Covered in LWUPs<br>(d) | [F]<br>Area of LWUPs<br>(acre)<br>F = B x E (d) | [G]<br>Estimated Total Water Use for HWUPs<br>(AFY)<br>G = D x 5.4 (e) | [H]<br>Estimated Total Water Use for LWUPs<br>(AFY)<br>H = F x 1.88 (f) | [I]<br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>I = G + H (g) | [J]<br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(h) |
|------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Area 6b</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Light Industrial / Warehouse                                                 | 23                                       | 4.59                                        | 25%                                                      | 1.15                                            | 75%                                                      | 3.44                                            | 6.2                                                                    | 6.5                                                                     | 12.7                                                                      | 23.1                                                          |
| Solar Farm (h)                                                               | 266                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 1.2                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>13.8</b>                                                               |                                                               |
| <b>Area 6c</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Solar Farm (h)                                                               | 190                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 0.8                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0.8</b>                                                                |                                                               |
| <b>Area 6d</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Solar Farm (h)                                                               | 173                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 0.8                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0.8</b>                                                                |                                                               |
| <b>Area 6e</b>                                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         |                                                                           |                                                               |
| Village Center Retail                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Village Center Office                                                        | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Regional / Freeway-Oriented Comm.                                            | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Office / R&D                                                                 | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Industrial                                                                   | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| Solar Farm (h)                                                               | 171                                      | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | 0.8                                                                       | --                                                            |
| Schools                                                                      | --                                       | --                                          | --                                                       | --                                              | --                                                       | --                                              | --                                                                     | --                                                                      | --                                                                        | --                                                            |
| <b>Subtotal</b>                                                              |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>0.8</b>                                                                |                                                               |
| Total School Outdoor Water Use                                               |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | 210                                                                       |                                                               |
| <b>Total Commercial, Institutional, and Industrial Outdoor Water Use (i)</b> |                                          |                                             |                                                          |                                                 |                                                          |                                                 |                                                                        |                                                                         | <b>455</b>                                                                |                                                               |

Table B-6  
Estimated Outdoor Water Uses for Commercial, Institutional, and Industrial Land Uses  
14,000 Residential Unit Alternative Scenario  
Grapevine Project, Kern County, California

Abbreviations:

|                                                  |                                           |                                          |
|--------------------------------------------------|-------------------------------------------|------------------------------------------|
| "ac" = acre                                      | "HWUP" = high water use plants            | "MAWA" = maximum applied water allowance |
| "AFY" = acre-feet per year                       | "K-8" = kindergarten through eighth grade | "R&D" = Research and development         |
| "CII" = Commercial, Institutional and Industrial | "LWUP" = low water use plants             |                                          |

Notes:

- (a) See Table B-4 for area of land use calculation.
- (b) Area of landscaping is the area of land use multiplied by the percentage of landscaping. Landscaped percentage is 50% for schools and 20% for non-school CII land uses.
- (c) High water use plantings include turf grasses. Percentage of lot covered in high water use plantings is the area of high water use plantings divided by the area of land use (without streets).
- (d) Low water use plantings include shrubs and native vegetation. Percentage of lot covered in low water use plantings is the area of low water use plantings divided by the area of land use (without streets).
- (e) The estimated total water use for high water use plantings is the area of high water use plantings multiplied by the annual evapotranspiration rate for high water use plantings (5.4 AFY/ac) provided in Table 5.
- (f) The estimated total water use for low water use plantings is the area of low water use plantings multiplied by the annual evapotranspiration rate for low water use plantings (1.88 AFY/ac) provided in Table 5.
- (g) The ETWU is the sum of the estimated total water use for high water use plantings and estimated total water use for low water use plantings. The estimated total water outdoor water use must not be greater than the MAWA (see note h). The ETWU was calculated assuming all regular landscaped area, which accounts for plant type and irrigation efficiency, to estimate water demands. If special landscaped area was accounted for in the estimated total water use calculations according to Reference 1, the estimated total outdoor water use for non-school CII uses would equal the MAWA regardless of the planting types.
- (h) The Maximum Applied Water Allowance (MAWA) calculations are described in Reference 1. For the non-school CII land uses, the MAWA was calculated assuming 100% special landscaped area and an evaporation adjustment factor of 0.45. The MAWA calculations for schools assumes 33% regular landscaped area, 67% special landscaped area (assumed recreational areas), and an evaporation adjustment factor of 0.65 based on amendments to CALGreen Code approved by the Building Standards Commission on July 21, 2015.
- (h) Water use for the solar farms are based on the values for photovoltaic solar plants from Reference 2.
- (i) Kern County Code of Ordinances, Title 19, Chapter 19.86, sections 19.86.050 and 19.86.060, states that for CII land uses a "*minimum of five percent (5%) of the total developed lot area shall be landscaped.*" Approximately 20% of the total developed land area for CII is assumed to be irrigated landscape, which complies with the minimum Kern County standard.
- (k) Totals may not add exactly due to rounding.

Reference:

- 1 California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance , July 9, 2015 Draft.
- 2 Bureau of Land Management, 2012. Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States , Appendix M, July 2012.

Table B-7  
Estimated Parks, Road and Common Area Landscaping Water Use Inputs and Calculations  
14,000 Residential Unit Alternative Scenario  
Grapevine, Kern County, California

| Landscaping Land Use (a)              | [A]<br><br>Total Acres<br>(ac)<br>(a) | High Water Use Plantings                            |                                                        |                                                                        |                                                                         | Low Water Use Plantings                             |                                                        |                                                                        |                                                                         | Tree and Groundcover Plantings                     |                                                       |                                                                       |                                                                        | Buffer Zone Plantings                              |                                                       |                                                                       |                                                                        | [S]<br><br>Estimated Total Outdoor Water Use (ETWU)<br>(AFY)<br>J = E + I + M + R (i) | [T]<br><br>Maximum Applied Water Allowance (MAWA)<br>(AFY)<br>(j) |
|---------------------------------------|---------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|                                       |                                       | [B]<br><br>Percentage of Land as HWUP<br>(%)<br>(b) | [C]<br><br>Total Area of HWUP<br>(ac)<br>C = A × B (c) | [D]<br><br>Annual Evapo-transpiration Rate for HWUP<br>(AFY/ac)<br>(d) | [E]<br><br>Estimated Total Water Use for HWUP<br>(AFY)<br>E = C × D (e) | [F]<br><br>Percentage of Land as LWUP<br>(%)<br>(f) | [G]<br><br>Total Area of LWUP<br>(ac)<br>G = A × F (c) | [H]<br><br>Annual Evapo-transpiration Rate for LWUP<br>(AFY/ac)<br>(d) | [I]<br><br>Estimated Total Water Use for LWUP<br>(AFY)<br>I = G × H (e) | [J]<br><br>Percentage of Land as TGP<br>(%)<br>(g) | [K]<br><br>Total Area of TGP<br>(ac)<br>K = A × J (c) | [L]<br><br>Annual Evapo-transpiration Rate for TGP<br>(AFY/ac)<br>(d) | [M]<br><br>Estimated Total Water Use for TGP<br>(AFY)<br>M = K × L (e) | [O]<br><br>Percentage of Land as BZP<br>(%)<br>(h) | [P]<br><br>Total Area of BZP<br>(ac)<br>K = A × J (c) | [Q]<br><br>Annual Evapo-transpiration Rate for BZP<br>(AFY/ac)<br>(d) | [R]<br><br>Estimated Total Water Use for BZP<br>(AFY)<br>M = K × L (e) |                                                                                       |                                                                   |
| Area 1                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping                      | 26                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 26                                                    | 4.4                                                                   | 113                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 113                                                                                   | 130                                                               |
| 2 Roundabouts                         | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 2.0                                                    | 1.9                                                                    | 4                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 4                                                                                     | 10                                                                |
| Windrow                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k) | 22                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0                                                                       | 50%                                                 | 11.2                                                   | 1.9                                                                    | 21                                                                      | 25%                                                | 6                                                     | 4.4                                                                   | 25                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 46                                                                                    | 85                                                                |
| Landscaped I-5 Buffer Zones           | 16                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 100%                                               | 16                                                    | 2.5                                                                   | 40                                                                     | 40                                                                                    | 81                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 203                                                                                   |                                                                   |
| Area 2                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 49                                    | 40%                                                 | 20                                                     | 5.4                                                                    | 106                                                                     | 50%                                                 | 24.5                                                   | 1.9                                                                    | 46                                                                      | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 152                                                                                   | 222                                                               |
| Road Landscaping                      | 42                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 42                                                    | 4.4                                                                   | 184                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 184                                                                                   | 212                                                               |
| 1 Roundabout                          | 1                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 1.0                                                    | 1.9                                                                    | 2                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 2                                                                                     | 5                                                                 |
| Windrow                               | 3                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 3                                                     | 4.4                                                                   | 13                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 13                                                                                    | 15                                                                |
| Irrigated Residential Common Area (k) | 32                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0                                                                       | 50%                                                 | 15.9                                                   | 1.9                                                                    | 30                                                                      | 25%                                                | 8                                                     | 4.4                                                                   | 35                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 65                                                                                    | 120                                                               |
| Landscaped I-5 Buffer Zones           | 31                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 100%                                               | 31                                                    | 2.5                                                                   | 78                                                                     | 78                                                                                    | 158                                                               |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 495                                                                                   |                                                                   |
| Area 3                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 5                                     | 40%                                                 | 2.0                                                    | 5.4                                                                    | 11                                                                      | 50%                                                 | 2.5                                                    | 1.9                                                                    | 5                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 15                                                                                    | 23                                                                |
| Road Landscaping                      | 32                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 32                                                    | 4.4                                                                   | 139                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 139                                                                                   | 160                                                               |
| 2 Roundabouts                         | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 2.0                                                    | 1.9                                                                    | 4                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 4                                                                                     | 10                                                                |
| Windrow                               | 8                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 8                                                     | 4.4                                                                   | 34                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 34                                                                                    | 39                                                                |
| Irrigated Residential Common Area (k) | 21                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0                                                                       | 50%                                                 | 10.6                                                   | 1.9                                                                    | 20                                                                      | 25%                                                | 5                                                     | 4.4                                                                   | 23                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 43                                                                                    | 80                                                                |
| Landscaped I-5 Buffer Zones           | 48                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 100%                                               | 48                                                    | 2.5                                                                   | 119                                                                    | 119                                                                                   | 239                                                               |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 354                                                                                   |                                                                   |
| Area 4                                |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 49                                    | 40%                                                 | 20                                                     | 5.4                                                                    | 106                                                                     | 50%                                                 | 25                                                     | 1.9                                                                    | 46                                                                      | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 152                                                                                   | 222                                                               |
| Golf Course (l)                       | 90                                    | 40%                                                 | 36                                                     | 5.4                                                                    | 194                                                                     | 30%                                                 | 27                                                     | 1.9                                                                    | 51                                                                      | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | 30%                                                | 27                                                    | 2.5                                                                   | 68                                                                     | 313                                                                                   | 453                                                               |
| Road Landscaping                      | 37                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 37                                                    | 4.4                                                                   | 160                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 160                                                                                   | 184                                                               |
| 2 Roundabouts                         | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 100%                                                | 2.0                                                    | 1.9                                                                    | 4                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 4                                                                                     | 10                                                                |
| Windrow                               | 9                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 9                                                     | 4.4                                                                   | 38                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 38                                                                                    | 44                                                                |
| Irrigated Residential Common Area (k) | 33                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0                                                                       | 50%                                                 | 16.6                                                   | 1.9                                                                    | 31                                                                      | 25%                                                | 8                                                     | 4.4                                                                   | 36                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 67                                                                                    | 125                                                               |
| Landscaped I-5 Buffer Zones           | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 733                                                                                   |                                                                   |
| Area 5a                               |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | 5                                     | 40%                                                 | 2.0                                                    | 5.4                                                                    | 11                                                                      | 50%                                                 | 2.5                                                    | 1.9                                                                    | 5                                                                       | 0%                                                 | 0                                                     | 4.4                                                                   | 0                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 15                                                                                    | 23                                                                |
| Road Landscaping                      | 33                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 33                                                    | 4.4                                                                   | 144                                                                    | --                                                 |                                                       | --                                                                    | --                                                                     | 144                                                                                   | 166                                                               |
| 0 Roundabouts                         | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                               | 2                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 2                                                     | 4.4                                                                   | 9                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 9                                                                                     | 11                                                                |
| Irrigated Residential Common Area (k) | 31                                    | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0                                                                       | 50%                                                 | 15.5                                                   | 1.9                                                                    | 29                                                                      | 25%                                                | 8                                                     | 4.4                                                                   | 34                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 63                                                                                    | 117                                                               |
| Landscaped I-5 Buffer Zones           | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 232                                                                                   |                                                                   |
| Area 5b                               |                                       |                                                     |                                                        |                                                                        |                                                                         |                                                     |                                                        |                                                                        |                                                                         |                                                    |                                                       |                                                                       |                                                                        |                                                    |                                                       |                                                                       |                                                                        |                                                                                       |                                                                   |
| Parks                                 | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Road Landscaping                      | 7                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 0%                                                  | 0.0                                                    | 1.9                                                                    | 0                                                                       | 100%                                               | 7                                                     | 4.4                                                                   | 30                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | 30                                                                                    | 35                                                                |
| 0 Roundabouts                         | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Windrow                               | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Irrigated Residential Common Area (k) | 7                                     | 0%                                                  | 0.0                                                    | 5.4                                                                    | 0.0                                                                     | 50%                                                 | 3.3                                                    | 1.9                                                                    | 6                                                                       | 25%                                                | 2                                                     | 4.4                                                                   | 7                                                                      | --                                                 |                                                       | --                                                                    | --                                                                     | 13                                                                                    | 25                                                                |
| Landscaped I-5 Buffer Zones           | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 |                                                       | --                                                                    | --                                                                     | --                                                                                    | --                                                                |
| Subtotal                              | --                                    | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                  | --                                                     | --                                                                     | --                                                                      | --                                                 | --                                                    | --                                                                    | --                                                                     | --                                                 | --                                                    | --                                                                    | --                                                                     | 43                                                                                    |                                                                   |

Table B-7  
Estimated Parks, Road and Common Area Landscaping Water Use Inputs and Calculations  
14,000 Residential Unit Alternative Scenario  
Grapevine, Kern County, California

| Landscaping Land Use (a)                                                                  | [A]<br><br>Total Acres (ac)<br>(a) | High Water Use Plantings                         |                                                     |                                                                     |                                                                      | Low Water Use Plantings                          |                                                     |                                                                     |                                                                      | Tree and Groundcover Plantings                  |                                                    |                                                                    |                                                                     | Buffer Zone Plantings                           |                                                    |                                                                    |                                                                     | [S]<br><br>Estimated Total Outdoor Water Use (ETWU) (AFY)<br>J = E + I + M + R (i) | [T]<br><br>Maximum Applied Water Allowance (MAWA) (AFY)<br>(j) |
|-------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------|
|                                                                                           |                                    | [B]<br><br>Percentage of Land as HWUP (%)<br>(b) | [C]<br><br>Total Area of HWUP (ac)<br>C = A × B (c) | [D]<br><br>Annual Evapo-transpiration Rate for HWUP (AFY/ac)<br>(d) | [E]<br><br>Estimated Total Water Use for HWUP (AFY)<br>E = C × D (e) | [F]<br><br>Percentage of Land as LWUP (%)<br>(f) | [G]<br><br>Total Area of LWUP (ac)<br>G = A × F (c) | [H]<br><br>Annual Evapo-transpiration Rate for LWUP (AFY/ac)<br>(d) | [I]<br><br>Estimated Total Water Use for LWUP (AFY)<br>I = G × H (e) | [J]<br><br>Percentage of Land as TGP (%)<br>(g) | [K]<br><br>Total Area of TGP (ac)<br>K = A × J (c) | [L]<br><br>Annual Evapo-transpiration Rate for TGP (AFY/ac)<br>(d) | [M]<br><br>Estimated Total Water Use for TGP (AFY)<br>M = K × L (e) | [O]<br><br>Percentage of Land as BZP (%)<br>(h) | [P]<br><br>Total Area of BZP (ac)<br>K = A × J (c) | [Q]<br><br>Annual Evapo-transpiration Rate for BZP (AFY/ac)<br>(d) | [R]<br><br>Estimated Total Water Use for BZP (AFY)<br>M = K × L (e) |                                                                                    |                                                                |
| Area 6a                                                                                   |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     |                                                                                    |                                                                |
| Parks                                                                                     | 4                                  | 40%                                              | 1.6                                                 | 5.4                                                                 | 9                                                                    | 50%                                              | 2.0                                                 | 1.9                                                                 | 4                                                                    | 0%                                              | 0                                                  | 4.4                                                                | 0                                                                   | --                                              |                                                    | --                                                                 | --                                                                  | 12                                                                                 | 18                                                             |
| Road Landscaping                                                                          | 21                                 | 0%                                               | 0.0                                                 | 5.4                                                                 | 0.0                                                                  | 0%                                               | 0.0                                                 | 1.9                                                                 | 0                                                                    | 100%                                            | 21                                                 | 4.4                                                                | 93                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | 93                                                                                 | 107                                                            |
| 1 Roundabout                                                                              | 1                                  | 0%                                               | 0.0                                                 | 5.4                                                                 | 0.0                                                                  | 100%                                             | 1.0                                                 | 1.9                                                                 | 2                                                                    | 0%                                              | 0                                                  | 4.4                                                                | 0                                                                   | --                                              |                                                    | --                                                                 | --                                                                  | 2                                                                                  | 5                                                              |
| Windrow                                                                                   | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Irrigated Residential Common Area (k)                                                     | 10                                 | 0%                                               | 0.0                                                 | 5.4                                                                 | 0                                                                    | 50%                                              | 5.2                                                 | 1.9                                                                 | 10                                                                   | 25%                                             | 3                                                  | 4.4                                                                | 11                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | 21                                                                                 | 39                                                             |
| Landscaped I-5 Buffer Zones                                                               | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Subtotal                                                                                  | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              | --                                                 | --                                                                 | --                                                                  | 129                                                                                |                                                                |
| Area 6b                                                                                   |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     |                                                                                    |                                                                |
| Parks                                                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Road Landscaping                                                                          | 5                                  | 0%                                               | 0.0                                                 | 5.4                                                                 | 0.0                                                                  | 0%                                               | 0.0                                                 | 1.9                                                                 | 0                                                                    | 100%                                            | 5                                                  | 4.4                                                                | 23                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | 23                                                                                 | 26                                                             |
| 0 Roundabouts                                                                             | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Windrow                                                                                   | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Irrigated Residential Common Area (k)                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Landscaped I-5 Buffer Zones                                                               | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Subtotal                                                                                  | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              | --                                                 | --                                                                 | --                                                                  | 23                                                                                 |                                                                |
| Area 6c                                                                                   |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     |                                                                                    |                                                                |
| Parks                                                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Road Landscaping (m)                                                                      | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| 0 Roundabouts                                                                             | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Windrow                                                                                   | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Irrigated Residential Common Area (k)                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Landscaped I-5 Buffer Zones                                                               | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Subtotal                                                                                  | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              | --                                                 | --                                                                 | --                                                                  | 0                                                                                  |                                                                |
| Area 6d                                                                                   |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     |                                                                                    |                                                                |
| Parks                                                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Road Landscaping (m)                                                                      | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| 0 Roundabouts                                                                             | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Windrow                                                                                   | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Irrigated Residential Common Area (k)                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Landscaped I-5 Buffer Zones                                                               | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Subtotal                                                                                  | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              | --                                                 | --                                                                 | --                                                                  | 0                                                                                  |                                                                |
| Area 6e                                                                                   |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     |                                                                                    |                                                                |
| Parks                                                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Road Landscaping (m)                                                                      | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| 0 Roundabouts                                                                             | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Windrow                                                                                   | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Irrigated Residential Common Area (k)                                                     | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Landscaped I-5 Buffer Zones                                                               | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              |                                                    | --                                                                 | --                                                                  | --                                                                                 | --                                                             |
| Subtotal                                                                                  | --                                 | --                                               | --                                                  | --                                                                  | --                                                                   | --                                               | --                                                  | --                                                                  | --                                                                   | --                                              | --                                                 | --                                                                 | --                                                                  | --                                              | --                                                 | --                                                                 | --                                                                  | 0                                                                                  |                                                                |
| Estimated Total Outdoor Water Use for Parks                                               |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     | 347                                                                                |                                                                |
| Estimated Total Outdoor Water Use for Irrigated Residential Common Area                   |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     | 318                                                                                |                                                                |
| Estimated Total Outdoor Water Use for Roadways and Other Non-Residential Landscaped Areas |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     | 1,547                                                                              |                                                                |
| Estimated Total Outdoor Water Use for Community Landscaping                               |                                    |                                                  |                                                     |                                                                     |                                                                      |                                                  |                                                     |                                                                     |                                                                      |                                                 |                                                    |                                                                    |                                                                     |                                                 |                                                    |                                                                    |                                                                     | 2,212                                                                              |                                                                |

**Table B-7**  
***Estimated Parks, Road and Common Area Landscaping Water Use Inputs and Calculations***  
***14,000 Residential Unit Alternative Scenario***  
Grapevine, Kern County, California

Abbreviations:  
"ac" = acre  
"AFY" = acre-feet per year  
"AFY/ac" = acre-feet per year per acre  
"BZP" = buffer zone plantings  
"HWUP" = high water use plantings  
"LWUP" = low water use plantings  
"MAWA" = Maximum Applied Water Allowance  
"TGP" = combination tree and groundcover plantings

Notes:  
(a) Landscaping land uses and acres are based on the 8 June 2015 project Land Use Program Summary and modified to add 2,000 additional residential units. Passive open space and unprogrammed land is not included as it will not be irrigated.  
(b) High water use plantings include turf grasses.  
(c) The area of plantings is the acreage multiplied by the percentage of the land that is covered by that kind of plantings.  
(d) The total water application rates for all plantings are estimated in Table 5.  
(e) The estimated total water use for each planting type is the area of that planting type multiplied by the annual evapotranspiration rate for that kind of planting.  
(f) Low water use plantings include shrubs and native vegetation.  
(g) Combination tree and groundcover plantings include trees with full canopy coverage and full coverage of shrubs or low water use groundcover.  
(h) Buffer zone plantings include sparsely planted trees and shrubs.  
(i) The estimated total outdoor water use is the sum of the estimated total water use for all areas and plantings. The estimated total water outdoor water use must not be greater than the MAWA (see note h). The estimated total water outdoor water use was calculated assuming all regular landscaped area, which accounts for plant type and irrigation efficiency, to estimate water demands. If special landscaped area was accounted for in the estimated total water use calculations according to Reference 1, the estimated total outdoor water use would equal the MAWA regardless of the planting types.  
(j) The Maximum Applied Water Allowance ("MAWA") calculations are described in Reference 1. The MAWA was calculated assuming 100% special landscaped area based on use of recycled water in non-residential areas and based on note k for residential areas.  
(k) The irrigated residential common area is assumed to be classified as a special landscape area based on use as a recreational area and meeting space per Reference 1.  
(l) The golf course is assumed to be a desert style course, which utilizes native vegetation and minimizes the use of turf grass, per verbal communication with staff at Todd Eckenrode Origins Golf Design.  
(m) Assumes that there are no roadways in Areas 6c, 6d, and 6e.

Reference:  
1 California Code of Regulations, *Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance* , July 9, 2015 Draft.

**Table B-8**  
**Summary of Water Treatment and Distribution System Losses**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| <b>Development Category</b>                                         | <b>Estimated Water Loss (AFY)</b> |
|---------------------------------------------------------------------|-----------------------------------|
| Losses at potable water treatment facility (a)                      | 280                               |
| Losses at wastewater treatment facility (b)                         | --                                |
| Distribution system losses (associated with indoor water uses) (c)  | 140                               |
| Distribution system losses (associated with outdoor water uses) (d) | 234                               |
| <b>Total water losses (e)(f)</b>                                    | <b>653</b>                        |

Abbreviations:

"AFY" = acre-feet per year

Notes:

- (a) Losses at the potable water treatment facility are estimated to be approximately 5% of the indoor and outdoor residential, indoor commercial, indoor institutional, indoor industrial, outdoor school, and outdoor irrigated residential common area uses, plus distribution system losses (see Tables B-1, B-4, B-6, and B-7)
- (b) Losses at the wastewater treatment facility are accounted for in the estimates of recycled water production (see Table B-10).
- (c) Potable water system distribution system losses are estimated to be 5% of the total potable indoor demand.
- (d) Outdoor water system distribution system losses are estimated to be 5% of the sum of the total recycled and non-potable water demand and the potable water demand for outdoor uses (i.e., for residential irrigation). The portion of outdoor water system distribution losses associated with potable water uses is 127 AFY, and the portion associated with non-potable uses is 107 AFY.
- (e) Water losses were conservatively estimated for water demand calculations only and should not be used for wastewater treatment design purposes.
- (f) Values may not total exactly due to rounding.

**Table B-9**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 1</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 546                                      | 276                                    | 269                                     |
| Commercial, institutional and industrial (b) | 66                                       | 48                                     | 18                                      |
| Landscaping (c)                              | 203                                      | -                                      | 203                                     |
| Treatment system losses (d)                  | 34                                       | -                                      | -                                       |
| Distribution system losses (d)               | 41                                       | 16                                     | 25                                      |
| <b>Area 1 Water Demand</b>                   | <b>889</b>                               | <b>340</b>                             | <b>515</b>                              |
| <b>Area 2</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 960                                      | 515                                    | 444                                     |
| Commercial, institutional and industrial (b) | 333                                      | 187                                    | 146                                     |
| Landscaping (c)                              | 495                                      | -                                      | 495                                     |
| Treatment system losses (d)                  | 68                                       | -                                      | -                                       |
| Distribution system losses (d)               | 89                                       | 35                                     | 54                                      |
| <b>Area 2 Water Demand</b>                   | <b>1,945</b>                             | <b>738</b>                             | <b>1,139</b>                            |
| <b>Area 3</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 659                                      | 357                                    | 302                                     |
| Commercial, institutional and industrial (b) | 317                                      | 222                                    | 95                                      |
| Landscaping (c)                              | 354                                      | -                                      | 354                                     |
| Treatment system losses (d)                  | 50                                       | -                                      | -                                       |
| Distribution system losses (d)               | 66                                       | 29                                     | 38                                      |
| <b>Area 3 Water Demand</b>                   | <b>1,446</b>                             | <b>607</b>                             | <b>789</b>                              |

**Table B-9**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 4</b>                                |                                          |                                        |                                         |
| Residential (a)                              | 872                                      | 452                                    | 420                                     |
| Commercial, institutional and industrial (b) | 65                                       | 14                                     | 52                                      |
| Landscaping (c)                              | 733                                      | -                                      | 733                                     |
| Treatment system losses (d)                  | 53                                       | -                                      | -                                       |
| Distribution system losses (d)               | 84                                       | 23                                     | 60                                      |
| <b>Area 4 Water Demand</b>                   | <b>1,807</b>                             | <b>489</b>                             | <b>1,265</b>                            |
| <b>Area 5a</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 758                                      | 384                                    | 374                                     |
| Commercial, institutional and industrial (b) | 31                                       | 6.1                                    | 25.3                                    |
| Landscaping (c)                              | 232                                      | -                                      | 232                                     |
| Treatment system losses (d)                  | 45                                       | -                                      | -                                       |
| Distribution system losses (d)               | 51                                       | 20                                     | 32                                      |
| <b>Area 5a Water Demand</b>                  | <b>1,117</b>                             | <b>410</b>                             | <b>662</b>                              |
| <b>Area 5b</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 14                                       | 6.6                                    | 7.0                                     |
| Commercial, institutional and industrial (b) | 0                                        | 0                                      | 0                                       |
| Landscaping (c)                              | 43                                       | -                                      | 43                                      |
| Treatment system losses (d)                  | 1.4                                      | -                                      | -                                       |
| Distribution system losses (d)               | 2.8                                      | 0.3                                    | 2.5                                     |
| <b>Area 5b Water Demand</b>                  | <b>61</b>                                | <b>6.9</b>                             | <b>53</b>                               |
| <b>Area 6a</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 435                                      | 249                                    | 186                                     |
| Commercial, institutional and industrial (b) | 180                                      | 78                                     | 103                                     |
| Landscaping (c)                              | 129                                      | -                                      | 129                                     |
| Treatment system losses (d)                  | 29                                       | -                                      | -                                       |
| Distribution system losses (d)               | 37                                       | 16                                     | 21                                      |
| <b>Area 6a Water Demand</b>                  | <b>811</b>                               | <b>343</b>                             | <b>438</b>                              |

**Table B-9**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 6b</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 15                                       | 1                                      | 13.8                                    |
| Landscaping (c)                              | 23                                       | -                                      | 23                                      |
| Treatment system losses (d)                  | 0.1                                      | -                                      | -                                       |
| Distribution system losses (d)               | 1.9                                      | 0.1                                    | 1.8                                     |
| <b>Area 6b Water Demand</b>                  | <b>40</b>                                | <b>1</b>                               | <b>38.6</b>                             |
| <b>Area 6c</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 0.9                                      | 0.0                                    | 0.8                                     |
| Landscaping (c)                              | 0                                        | -                                      | 0                                       |
| Treatment system losses (d)                  | 0.0                                      | -                                      | -                                       |
| Distribution system losses (d)               | 0.0                                      | 0.0                                    | 0                                       |
| <b>Area 6c Water Demand</b>                  | <b>0.9</b>                               | <b>0.0</b>                             | <b>0.9</b>                              |
| <b>Area 6d</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 0.8                                      | 0.0                                    | 0.8                                     |
| Landscaping (c)                              | 0                                        | -                                      | 0                                       |
| Treatment system losses (d)                  | 0.0                                      | -                                      | -                                       |
| Distribution system losses (d)               | 0.0                                      | 0.0                                    | 0                                       |
| <b>Area 6d Water Demand</b>                  | <b>0.8</b>                               | <b>0.0</b>                             | <b>0.8</b>                              |

**Table B-9**  
**Estimated Grapevine Project Annual Water Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
 Grapevine Project, Kern County, California

| Development Phase                            | Estimated<br>Total Water Demand<br>(AFY) | Estimated<br>Indoor Water Use<br>(AFY) | Estimated<br>Outdoor Water Use<br>(AFY) |
|----------------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------------|
| <b>Area 6e</b>                               |                                          |                                        |                                         |
| Residential (a)                              | 0                                        | 0                                      | 0                                       |
| Commercial, institutional and industrial (b) | 0.8                                      | 0.0                                    | 0.8                                     |
| Landscaping (c)                              | 0                                        | -                                      | 0                                       |
| Treatment system losses (d)                  | 0.0                                      | -                                      | -                                       |
| Distribution system losses (d)               | 0.0                                      | 0.0                                    | 0                                       |
| <b>Area 6e Water Demand</b>                  | <b>0.8</b>                               | <b>0.0</b>                             | <b>0.8</b>                              |
| <b>Project Annual Water Demand (e)(f)</b>    | <b>8,119</b>                             | <b>2,935</b>                           | <b>4,904</b>                            |

Abbreviations:

"AFY" = acre-feet per year

Notes:

- (a) See Table B-3 for estimated residential water uses.
- (b) See Tables B-4 and B-6 for estimated indoor and outdoor water use, respectively, for commercial, institutional, and industrial land uses.
- (c) See Table B-7 for estimated parks, roads and common area landscaping water use.
- (d) See Table B-8 for water losses associated with the project.
- (e) The Project Annual Water Demand is the sum of the estimated water uses for the project, plus the assumed treatment and distribution system losses. The contingency is not included.
- (f) Totals may not add exactly due to rounding.

**Table B-10**  
**Recycled Water Production and Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Development Phase                        | [A]<br>Recycled<br>Water<br>Produced (AFY)<br>(a) | [B]<br>Recycled<br>Water<br>Use (AFY)<br>(b) | [C]<br>Surplus or Deficit<br>of Water (AFY)<br>C = A - B<br>(c) |
|------------------------------------------|---------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Area 1</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 235                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 41                                                | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 18                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 157                                          |                                                                 |
| <b>Subtotal</b>                          | <b>275</b>                                        | <b>176</b>                                   | <b>100</b>                                                      |
| <b>Area 2</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 438                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 159                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 56                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 152                                          |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 278                                          |                                                                 |
| <b>Subtotal</b>                          | <b>597</b>                                        | <b>486</b>                                   | <b>111</b>                                                      |
| <b>Area 3</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 303                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 189                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 71                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 15                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 296                                          |                                                                 |
| <b>Subtotal</b>                          | <b>492</b>                                        | <b>382</b>                                   | <b>110</b>                                                      |
| <b>Area 4</b>                            |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 384                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 12                                                | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 4                                            |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 152                                          |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 514                                          |                                                                 |
| <b>Subtotal</b>                          | <b>396</b>                                        | <b>670</b>                                   | <b>-274</b>                                                     |

**Table B-10**  
**Recycled Water Production and Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Development Phase                        | [A]<br>Recycled<br>Water<br>Produced (AFY)<br>(a) | [B]<br>Recycled<br>Water<br>Use (AFY)<br>(b) | [C]<br>Surplus or Deficit<br>of Water (AFY)<br>C = A - B<br>(c) |
|------------------------------------------|---------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Area 5a</b>                           |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 327                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 5                                                 | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 1                                            |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 15                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 153                                          |                                                                 |
| <b>Subtotal</b>                          | <b>332</b>                                        | <b>170</b>                                   | <b>162</b>                                                      |
| <b>Area 5b</b>                           |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 6                                                 | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 0                                                 | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 30                                           |                                                                 |
| <b>Subtotal</b>                          | <b>6</b>                                          | <b>30</b>                                    | <b>-24</b>                                                      |
| <b>Area 6a</b>                           |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 212                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Irrigated Residential Common Area        | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 66                                                | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 79                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | 12                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 95                                           |                                                                 |
| <b>Subtotal</b>                          | <b>278</b>                                        | <b>186</b>                                   | <b>92</b>                                                       |
| <b>Area 6b</b>                           |                                                   |                                              |                                                                 |
| Residential                              |                                                   |                                              |                                                                 |
| Indoor                                   | 0                                                 | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial |                                                   |                                              |                                                                 |
| Indoor                                   | 1.0                                               | 0                                            |                                                                 |
| Outdoor                                  | 0                                                 | 14                                           |                                                                 |
| School Landscaping                       | 0                                                 | 0                                            |                                                                 |
| Parks                                    | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping        | 0                                                 | 23                                           |                                                                 |
| <b>Subtotal</b>                          | <b>1.0</b>                                        | <b>37</b>                                    | <b>-36</b>                                                      |

**Table B-10**  
**Recycled Water Production and Demand by Planning Area**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| Development Phase                                      | [A]<br>Recycled<br>Water<br>Produced (AFY)<br>(a) | [B]<br>Recycled<br>Water<br>Use (AFY)<br>(b) | [C]<br>Surplus or Deficit<br>of Water (AFY)<br>C = A - B<br>(c) |
|--------------------------------------------------------|---------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------|
| <b>Area 6c</b>                                         |                                                   |                                              |                                                                 |
| Residential                                            |                                                   |                                              |                                                                 |
| Indoor                                                 | 0                                                 | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial               |                                                   |                                              |                                                                 |
| Indoor                                                 | 0.02                                              | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0.8                                          |                                                                 |
| School Landscaping                                     | 0                                                 | 0                                            |                                                                 |
| Parks                                                  | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping                      | 0                                                 | 0                                            |                                                                 |
| <b>Subtotal</b>                                        | 0.02                                              | 0.8                                          | -0.8                                                            |
| <b>Area 6d</b>                                         |                                                   |                                              |                                                                 |
| Residential                                            |                                                   |                                              |                                                                 |
| Indoor                                                 | 0                                                 | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial               |                                                   |                                              |                                                                 |
| Indoor                                                 | 0.01                                              | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0.8                                          |                                                                 |
| School Landscaping                                     | 0                                                 | 0                                            |                                                                 |
| Parks                                                  | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping                      | 0                                                 | 0                                            |                                                                 |
| <b>Subtotal</b>                                        | 0.01                                              | 0.8                                          | -0.8                                                            |
| <b>Area 6e</b>                                         |                                                   |                                              |                                                                 |
| Residential                                            |                                                   |                                              |                                                                 |
| Indoor                                                 | 0                                                 | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0                                            |                                                                 |
| Commercial, Institutional and Industrial               |                                                   |                                              |                                                                 |
| Indoor                                                 | 0.01                                              | 0                                            |                                                                 |
| Outdoor                                                | 0                                                 | 0.8                                          |                                                                 |
| School Landscaping                                     | 0                                                 | 0                                            |                                                                 |
| Parks                                                  | 0                                                 | --                                           |                                                                 |
| Road and Other Public Landscaping                      | 0                                                 | 0                                            |                                                                 |
| <b>Subtotal</b>                                        | 0.01                                              | 0.8                                          | -0.7                                                            |
| Recycled Water Pond Net Evaporation and Rainfall (d)   | -188                                              | 0                                            |                                                                 |
| Recycled Water Distribution System Loss (5%) (e)       | 0                                                 | 107                                          |                                                                 |
| Recycled Water Produced, Used, and Surplus/Deficit (f) | 2,188                                             | 2,246                                        | -58                                                             |
| <b>Total Supplemental Non-Potable Water Needed</b>     |                                                   |                                              | <b>58</b>                                                       |

**Table B-10**  
***Recycled Water Production and Demand by Planning Area***  
***14,000 Residential Unit Alternative Scenario***  
Grapevine Project, Kern County, California

Abbreviations:

"AFY" = acre-feet per year

"CII" = Commercial, Institutional and Industrial

Notes:

- (a) Production of recycled water is assumed to be 85% of total indoor water use. See Tables B-3 and B-4.
- (b) Recycled water is assumed to be used for all CII, park and road landscape irrigation.
- (c) A positive number indicates a surplus of recycled water, and a negative number indicates a deficit. Any deficit will be supplemented with filtered non-potable Nickel Water.
- (d) Recycled water pond net evaporation and rainfall are calculated as shown in Table B-11.
- (e) Recycled water distribution system loss is assumed to be 5% of the total recycled and non-potable water use in each area.
- (f) Values may not total exactly due to rounding.
- (g) The demands listed above do not include the contingency. See Table B-2.

**Table B-11**  
**Recycled Water Storage and Disposal Water Balance (Average-Year Rainfall)**  
**14,000 Residential Unit Alternative Scenario**  
Grapevine Project, Kern County, California

| POND STORAGE NOVEMBER 1 (AF)            | 0    | ASSUMED ACTIVE POND AREA (AC) (a) 45     |      |      |      |      |      |      |      |      |      |      |       |
|-----------------------------------------|------|------------------------------------------|------|------|------|------|------|------|------|------|------|------|-------|
| POND PERCOLATION RATE (IN/DAY)          | 0    | POND CATCHMENT AREA (AC) 45              |      |      |      |      |      |      |      |      |      |      |       |
|                                         |      | NON-POTABLE IRRIGATION AREA (AC) (b) 606 |      |      |      |      |      |      |      |      |      |      |       |
|                                         |      | CALC'D MAX STORAGE VOLUME (AF) (c) 562   |      |      |      |      |      |      |      |      |      |      |       |
|                                         |      | CALC'D MAX STORAGE DEPTH (FT) (d) 12.5   |      |      |      |      |      |      |      |      |      |      |       |
|                                         |      | CALC'D AVG STORAGE DEPTH (FT) (e) 6.3    |      |      |      |      |      |      |      |      |      |      |       |
| PARAMETERS/DATA                         | OCT  | NOV                                      | DEC  | JAN  | FEB  | MAR  | APR  | MAY  | JUN  | JUL  | AUG  | SEP  | TOTAL |
| DAYS IN MONTH                           | 31   | 30                                       | 31   | 31   | 28   | 31   | 30   | 31   | 30   | 31   | 31   | 30   | 365   |
| RECYCLED WATER FLOW (MGD) (f)           | 2.15 | 2.16                                     | 2.02 | 2.01 | 1.99 | 2.00 | 2.07 | 2.14 | 2.20 | 2.26 | 2.25 | 2.19 | 2.12  |
| PRECIPITATION (IN) (g)                  | 0.52 | 1.15                                     | 1.48 | 1.72 | 1.93 | 1.83 | 1.18 | 0.47 | 0.08 | 0.02 | 0.05 | 0.16 | 10.58 |
| REFERENCE ETo (IN) (h)                  | 4.06 | 2.01                                     | 1.41 | 1.45 | 2.22 | 4.03 | 5.49 | 7.63 | 8.63 | 9.14 | 8.55 | 6.18 | 60.78 |
| IRRIGATION DEMAND FACTOR (IN) (i)       | 2.82 | 1.40                                     | 0.98 | 1.01 | 1.54 | 2.81 | 3.82 | 5.31 | 6.00 | 6.36 | 5.95 | 4.30 | 42.31 |
| <b>POND CALCULATIONS</b>                |      |                                          |      |      |      |      |      |      |      |      |      |      |       |
| BEGINNING POND STORAGE (AF) (j)         | 0    | 41                                       | 162  | 302  | 441  | 529  | 562  | 534  | 429  | 281  | 124  | 0    | --    |
| RECYCLED WATER VOL (AF) (f)             | 204  | 199                                      | 192  | 191  | 171  | 191  | 191  | 204  | 202  | 215  | 215  | 202  | 2376  |
| DIRECT PRECIPITATION VOL (AF) (k)       | 2    | 4                                        | 6    | 6    | 7    | 7    | 4    | 2    | 0    | 0    | 0    | 1    | 40    |
| POND EVAPORATION VOL (AF) (l)           | 15   | 8                                        | 5    | 5    | 8    | 15   | 21   | 29   | 32   | 34   | 32   | 23   | 228   |
| NON-POTABLE IRRIGATION DEMAND (AF) (m)  | 150  | 74                                       | 52   | 54   | 82   | 149  | 203  | 282  | 318  | 337  | 316  | 228  | 2246  |
| STORAGE GAIN (AF) (n)                   | 41   | 121                                      | 140  | 139  | 88   | 34   | -28  | -104 | -148 | -157 | -133 | -49  | -57   |
| FINAL POND STORAGE (AF) (o)             | 41   | 162                                      | 302  | 441  | 529  | 562  | 534  | 429  | 281  | 124  | 0    | 0    | --    |
| SUPPLEMENTAL IRRIGATION DEMAND (AF) (p) | 0    | 0                                        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 9    | 49   | 57    |

#### Notes

- (a) Assumed active pond area is estimated to maintain a calculated maximum storage depth of approximately 12.5 feet. This area consists of only a portion of the total pond area designed for the 100-year rainfall year (EKI, 2015). It is assumed that the excess pond acreage will only be used during above-average rainfall years.
- (b) Non-potable irrigation area is the total landscaped area excluding residential areas and schools.
- (c) Calculated maximum storage volume is the largest final pond storage volume from the pond calculations.
- (d) Maximum storage depth is the calculated maximum storage volume divided by the active pond area. The calculated maximum storage depth does not include 2 feet for freeboard.
- (e) Average storage depth is the average final pond storage volume from the pond calculations divided by the active pond area.
- (f) Recycled water flow rate is the average indoor potable water demand less collection system and wastewater treatment losses of 15%. Note that collection system and wastewater treatment losses were not accounted for in the 100-year rainfall water balance in the *Wastewater Facilities Engineering Report* (EKI, 2015) to conservatively size the required total recycled water storage volume.
- (g) Average monthly precipitation data were collected from the Western Regional Climate Center (WRCC) for the Bakersfield Airport in Bakersfield, California (1937-2012) and Tejon Rancho, California (1895-1914) and from the CIMIS Station 125 located in Arvin, CA. Precipitation data listed is the inverse-distance weighted monthly averages of the monthly averages for each station based on the distance of each station to the center of the Grapevine Project.
- (h) Reference ETo data were obtained from the California Irrigation Management Information Services (CIMIS) station 125 located in Arvin, CA that measured evaporation from pans. Monthly averages were calculated using all available data from this CIMIS station, which has been in operation since 1995.
- (i) The irrigation demand factor is the area weighted average irrigation demand factor for each planting type (high water use plantings, low water use plantings, combination trees and ground cover plantings, and buffer zone plantings) for the areas irrigated by non-potable water (all landscaped area except residential areas, parks, and schools). Refer to Table 5.
- (j) Beginning pond storage is the final storage from the previous month.
- (k) Direct precipitation is the active pond area multiplied by the precipitation.
- (l) Pond evaporation is active pond area multiplied by the reference ETo, which is assumed to equal to the pond evaporation rate.
- (m) Irrigation demand is the irrigation demand factor multiplied by the irrigation area.
- (n) Storage gain is equal to the sum of the beginning pond storage, recycled water volume, and direct precipitation less the sum of the pond evaporation and irrigation demand. A negative storage gain represents a storage loss. The storage gain conservatively accounts for losses due to direct net evaporation when the ponds are empty. Total annual storage loss is approximately 50 AF less if it assumed that there is no net evaporation when the ponds are empty.
- (o) Final pond storage is the beginning pond storage plus the storage gain. Final storage is zero when the storage loss is greater than the beginning pond storage.
- (p) Irrigation demand includes 5% for distribution system losses. Supplemental irrigation demand is equal to the beginning pond storage less the storage loss (negative storage gain). If the storage loss is less than the beginning pond storage, the supplemental irrigation demand equals zero. It is assumed that the supplemental irrigation demand will be supplied with untreated California Aqueduct water.

#### Abbreviations

"AC" = acres  
"AF" = acre-feet  
"ETo" = reference evapotranspiration  
"FT" = feet  
"IN" = inches  
"MGD" = Million Gallons per Day

#### References

(EKI, 2015) *Wastewater Facilities Engineering Report, Grapevine Project*, Erler & Kalinowski, Inc., October 2015.

## **ATTACHMENT C**

**Memorandum: Water and Wastewater Infrastructure for the New Weigh Station**



25 November 2014

## MEMORANDUM

To: Diana Hurlbert, Tejon Ranch

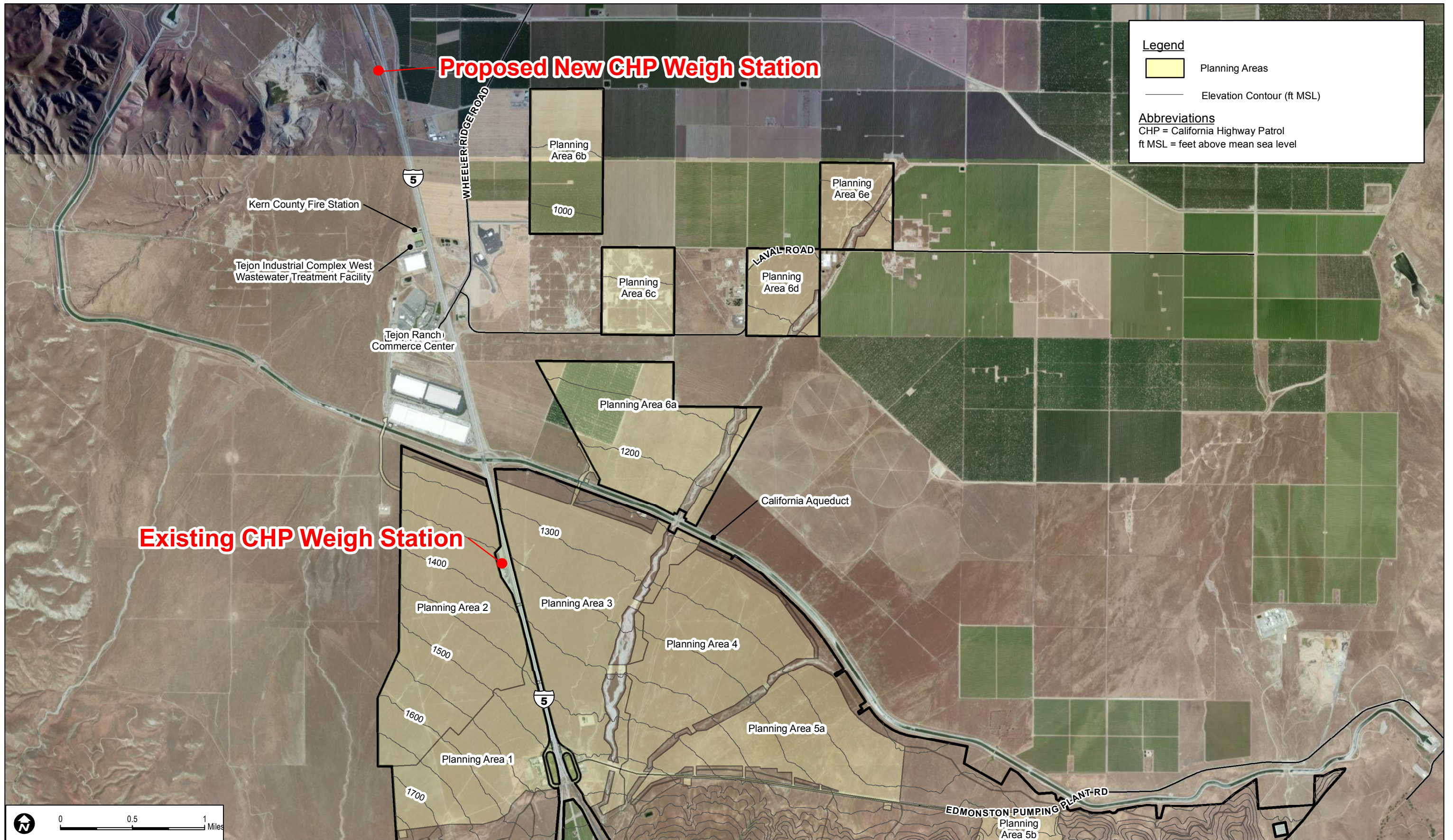
From: Erler & Kalinowski, Inc. ("EKI")

Subject: Water and Wastewater Infrastructure for the New Weigh Station  
(EKI B30043.00)

A California Highway Patrol weigh station ("weigh station") is currently located south of the California Aqueduct, as shown on Figure 1. A new interchange servicing the Grapevine Project development is planned for the location of the current weigh station. To accommodate the new interchange, a new weigh station will be constructed north of the Tejon Regional Commerce Center ("TRCC"), at the intersection of Interstate 5 and State Route 99 (see Figure 1).

Water use at the weigh station is minimal and primarily associated with lavatory use. Potable water for the weigh station is supplied by Tejon-Castac Water District ("TCWD") free of charge. Wastewater is conveyed to a septic system and treated onsite. TCWD plans to continue to supply potable water to the new weigh station and wastewater will be treated onsite using a new septic system.

A potable water distribution pipeline, owned and operated by TCWD, currently serves the Tejon Industrial Complex West Wastewater Treatment Facility and Kern County fire station ("fire station"), which are located at the northern portion of the currently developed TRCC area (see Figure 1). This water pipeline is the closest existing potable water supply to the proposed weigh station location, which is located approximately 1.25 miles to the north-northwest. The new weigh station could be served by either a new potable water pipeline extending from the fire station, or by a new groundwater well constructed at the weigh station site.



SOURCES: MCINTOSH 2013; TRC 2013; Public Land Survey

GRAPEVINE PROJECT

**FIGURE 1**  
**Existing and Proposed Weigh Station Locations**