



## Memorandum

*To: Mike Livak, Royal Gorge*

*From: Andria Loutsch, Paula Hansen*

*Date: May 17, 2007*

*Subject: Royal Gorge -- Estimated Water Demand*

Sierra Lakes County Water District (SLCWD) has asked for an estimate of water demand for the Royal Gorge project. SLCWD has also asked for a description of the methodology used to estimate this demand. In response to this request, we have prepared the following summary concerning the water demand estimated for the project and the methodology used to estimate demand.

### Estimated Water Demand

The preliminary estimate for water demand at the proposed Royal Gorge development is 235 acre-feet per year (AFY) for potable domestic water demand, using published estimates of demand based on residential and other uses, and assuming an initial average occupancy level of 46 percent over the course of a year. The basis for these assumptions is described below. Royal Gorge is considering a snowmaking operation, which is not required for the project. Snowmaking, if implemented, would require an additional 30 AFY.<sup>1</sup> The snowmaking demand is not included in the 235 AFY estimate of potable domestic water demand. These estimated demand amounts may be refined as development planning proceeds.

### Methodology Used for Estimating Water Demand

In developing water use rates for Royal Gorge's expansion, King Engineering Inc. (King) of Grass Valley, California, estimated demand for the different types of residential units and commercial uses represented in the development's current land use plan. Table 1 summarizes the estimated demand by type of land use.

King used unit water rates developed in Placer County Water Agency's "Water System Facilities Plan for Martis Valley" (April 2001) for different types of residential land uses. The results of the PCWA study were used because this is the most recent and relevant development plan completed in the region. The PCWA study is considered an appropriate

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<sup>1</sup> This figure on snowmaking demand was provided by Royal Gorge. CDM has not independently calculated a demand for snowmaking.

source of information for four reasons. First, the PCWA study involves a similar range of residential uses. Second, Martis Valley's climate is very similar to that of the Royal Gorge site. Third, the PCWA study was prepared relatively recently, and the information is considered representative of current conditions and practices. Fourth, both Martis Valley and the Royal Gorge site are located in Placer County; thus, the estimates set forth in the PCWA study are likely to be acceptable to the County for purposes of estimating demand for the Royal Gorge project.

For condominiums, town homes, duplex cabins, and employee housing, the average daily demand is estimated at 300 gallons per day (gpd) per unit. Single family residences are estimated to use 500 gpd per unit.

<b>Table 1 Estimated Water Demand for the Royal Gorge Development</b>					
<b>Type of Occupancy</b>	<b>Estimated Average Daily Unit Demand (gpd)</b>	<b>Number of Units</b>		<b>Average Annual Demand (gpd)</b>	<b>Average Annual Demand (AFY)</b>
Single Family Residential	500 gpd/unit	286	units	65,800	74
Condominium, Town Home, Duplex Cabin, Employee Housing Unit	300 gpd/unit	724	units	99,900	112
Headquarters/ Summit Interpretive Center, Old Summit Station	250 gpd/restroom stall	28	stalls	3,200	4
Sales Pavilion & Yurt, Post Office, Library	250 gpd/restroom stall	14	stalls	1,600	2
Commercial/lodging/amenity placeholder				20,700	23
Restaurant	1.8 gpd/sqft	11,000	sqft	9,100	10
Swimming Pools, Ice Rink, Sports Complex, Wellness Center	250 gpd/restroom stall	40	stalls	4,600	5
Playground, Park, Campground, Lakes, Parking Lot Restrooms	250 gpd/restroom stall	28	stalls	3,200	4
Fishing Cabin	300 gpd/unit	1	unit	140	0.2
Lake House				1,100	1
<b>Total Demand</b>				<b>209,340</b>	<b>235</b>

Source: Adapted from King Engineering, May 14, 2007, "Summary of Domestic Water Demands for Royal Gorge Project"

The commercial/retail amenity water demand was developed using water use rates per square foot or per restroom stall for typical uses from a study done by the St. Johns County Utility Department in St. Augustine, Florida (October 2006). There are fewer studies available

for reference regarding water use rates for commercial/retail land uses in comparison with residential land use; however, the St. Johns study is comprehensive.

Irrigation demand for lawn and common areas will be minimized by use of native drought tolerant plants and natural landscaping. The estimated demand presented above includes water needed for such uses. Royal Gorge will include low-flow facility design and conservation measures in the operations to the maximum extent feasible.

The estimated average annual demand is provided in gallons per day. This figure represents the average daily demand over the course of the year. This figure has been calculated by multiplying the number of units by the estimated daily demand per unit, multiplied by an initial average daily occupancy rate of 46%. In other words, this estimate assumes that, on average, a total of 46% of all residential units will be occupied over the course of a year. During certain times of the year, occupancy rates will be higher; at other times, occupancy rates will be lower. On average, however, the initial occupancy rate is expected to be 46%. Thus, average daily demand has been estimated by taking into account this initial average occupancy rate. In the last column of Table 1, the average daily demand in gallons per day is translated into average annual demand, expressed in acre-feet per year.<sup>2</sup>

The 46% initial occupancy rate is somewhat higher than existing use patterns for the Serene Lakes community and Donner Summit Public Utility District service area, which average about 40 percent full-time occupancy. This level is consistent with the 46% initial occupancy rate assumed for two recent Northstar residential/commercial developments approved by Placer County. The Northstar projects are considered appropriate projects for purposes of estimating occupancy rates because these projects also serve as examples of residential units located in a recreational setting in the Tahoe region.

The Royal Gorge initial occupancy rate assumption was used to calculate the 235 AFY total water demand presented in Table 1. Residential water use per unit, taking into account initial occupancy, is 230 gallons per day for single-family residential units and 138 gallons per day for condominium/town home units. The SLCWD existing water use, which is predominantly single family homes, was about 137 gallons per day per unit in 2006. Thus, the estimated residential demand for Royal Gorge for single-family residences at Royal Gorge is approximately 68% higher than it would be if usage were estimated based on existing water use at SLCWD. This higher figure has been used in order to take a conservative approach towards estimating anticipated water demand at Royal Gorge.

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<sup>2</sup> Water demand does fluctuate seasonally, with peak usage in July in this area. Based on SLCWD's records of water use, approximately 70% of SLCWD water use occurs in period of July through February. The remaining 30% occurs March through June. This memo addresses water demand on an annual basis.