

Attachment 12-B

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

TECHNICAL MEMORANDUM 2006-02

**EXISTING WATER NEEDS OF CAL-AM CUSTOMERS
WITHIN MPWMD BOUNDARIES AND NON CAL-AM
PRODUCERS WITHIN THE SEASIDE GROUNDWATER
BASIN ADJUSTED FOR WEATHER CONDITIONS
DURING WATER YEARS 1996 THROUGH 2006**

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Monterey Peninsula Water Management District
Technical Memorandum 2006-02

**Existing Water Needs of Cal-Am Customers within MPWMD Boundaries and
Non Cal-Am Producers within the Seaside Groundwater Basin
Adjusted for Weather Conditions During Water Years 1996 through 2006**

Introduction

This technical memorandum updates the information that was provided at the Monterey Peninsula Water Management District (District or MPWMD) Board workshop on March 23, 2006, regarding existing water needs of customers in the California American Water (Cal-Am) main distribution system¹ in the Monterey Peninsula area. Specifically, the estimate of existing average annual water demand that was developed for the workshop, based on actual production during the 1996 - 2005 period, was recalculated to include production information for Water Year (WY) 2006 and all of the annual values were adjusted to account for weather conditions during this period of analysis. In addition, this technical memorandum expands the analysis of existing water needs with the MPWMD boundaries to include:

- (1) existing water needs of customers in Cal-Am's smaller systems in the Highway 68 corridor – Ryan Ranch, Hidden Hills, and Bishop Units – that derive their source of supply from the Laguna Seca Subarea (also know as Southern Inland Subarea) of the Seaside Groundwater Basin,
- (2) existing water needs of customers in Cal-Am's main system in the event that the water rights recognized by the State Water Resources Control Board (SWRCB) in Order No. WR 95-10 and held by Cal-Am are reduced to reflect reduced storage capacity in Los Padres Reservoir due to sedimentation, and
- (3) existing water needs of non Cal-Am producers that derive their source of supply from the Coastal Subareas and Laguna Seca Subarea of the Seaside Groundwater Basin.

The purpose of the technical memorandum is to provide reasonable and defensible estimates of the amount of water currently needed by all customers served by Cal-Am within District boundaries² and non Cal-Am producers within the Seaside Groundwater Basin. In this context, the memorandum

¹ Cal-Am's "main distribution system" in the Monterey Peninsula area refers to Cal-Am's largest water distribution system in its Monterey Division. The service area for Cal-Am's main system encompasses approximately 44 square miles and includes the cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Sand City, Seaside, and Pacific Grove, and portions of unincorporated Monterey County in the Carmel Valley, Del Monte Forest, and Carmel Highland areas. Cal-Am produces water from the Carmel River, the Carmel Valley Alluvial Aquifer, and the Coastal Subareas of the Seaside Groundwater Basin to serve customers in its main system. In 2005, Cal-Am served approximately 37,400 active connections in its main distribution system.

² There are approximately 40 parcels within the service area of the main Cal-Am distribution system in the Yankee Point area that are outside the District boundaries.

provides an estimate of the amount of water that Cal-Am must develop to replace supplies that are either unlawful, exceed Cal-Am's adjudicated rights, or may be reduced by further regulatory action and that are needed to meet existing water demand within the District. These estimates of existing water demands will be compared to Cal-Am's recognized rights in the Carmel River Basin and Cal-Am and non Cal-Am adjudicated rights in the Seaside Groundwater Basin to determine the amount of "replacement" supplies needed to meet existing demand.

The technical memorandum is divided into four sections. In the first section, a technique to adjust monthly water production values for wet and dry weather conditions is described and applied to Cal-Am's monthly production from Carmel River sources and Seaside Coastal Subarea sources during the selected period of analysis. In the second section, these weather-adjusted existing demand estimates are compared to Cal-Am's recognized rights to divert Carmel River water and Cal-Am's adjudicated rights to pump groundwater from the Coastal Subareas and Laguna Seca Subarea of the Seaside Groundwater Basin to quantify the water supplies that Cal-Am must develop to replace existing supplies that are being unlawfully diverted from the Carmel River or that exceed Cal-Am's adjudicated rights in the Seaside Groundwater Basin, as specified in the recent adjudication. In the second section, the loss of storage capacity in Cal-Am's Los Padres Reservoir and its possible effect on Cal-Am's recognized rights and Cal-Am's need to develop additional replacement supplies is also discussed. In the third section, weather-adjusted existing demand estimates are developed for non Cal-Am producers in the Coastal Subareas and Laguna Seca Subarea of the Seaside Groundwater Basin and compared to the non Cal-Am adjudicated rights in these subareas to quantify additional replacement supplies needed to comply with the natural safe yield for the basin specified in the adjudication. In the fourth section, the replacement requirements are summarized and "yield targets" are recommended that should be used to size water supply alternatives being developed to meet existing water demand in the Monterey Peninsula area.

This technical memorandum should be read in conjunction with the staff note that was prepared for the March 23, 2006 workshop. This staff note includes useful background information on the regulatory and judicial constraints on water use within the District and is included as **Appendix A**.

Section 1: Weather-Related Water Demand Adjustments

Unadjusted Cal-Am Water Demand: At the March 23, 2006 Board workshop, a summary table was presented that compared Cal-Am's annual production from its Carmel River sources for the ten-year period from WY 1996 through WY 2005³ with the annual production limits set by the SWRCB in Order 95-10 for each of these water years. The table also indicated water year type (e.g., "wet", "normal", and "below normal") for each year and showed the amount of water that Cal-Am produced

³ A Water Year runs from October 1 through September 30 of the following calendar year. For example, Water Year 1996 began on October 1, 1995, and ended on September 30, 1996.

in excess of its recognized water rights. This table, updated to include production data for WY 2006, is included as **Table 1** and shows that, on average, Cal-Am produced 7,639 acre-feet per year (AFY) of water from its Carmel River sources in excess of its recognized water rights during this 11-year period. At the workshop, it was noted that the ten-year period of analysis, i.e., WY 1996 - WY 2005, was “wetter” than normal and did not include any dry or critically-years, which would be expected to occur approximately 25% of the time.

Adjusted Cal-Am Water Demand: To account for the “wet” weather condition during the period of analysis, Cal-Am’s actual production was adjusted using a monthly procedure developed for the District’s operation model, known as the Carmel Valley Simulation Model (CVSIM). With this procedure, monthly unimpaired streamflow at the San Clemente Dam site is used as a proxy value for weather conditions. Based on predetermined exceedence frequency values, the monthly unimpaired flow is classified as wet, normal, dry, or critically-dry⁴. Based on the assumption that the streamflow values accurately reflect weather conditions that influence water demand (e.g., air temperature and rainfall) actual water production is decreased during wet months, unchanged during normal months, and increased during dry and critically dry months. The change in actual monthly production for weather conditions varies by month and was determined by reviewing historical production records under varying weather conditions.

Table 2 summarizes the monthly adjustments that were made to the Cal-Am’s production from its sources in the Carmel River Basin and Coastal Subareas of the Seaside Groundwater Basin during the 11-year period of analysis, WY 1996 through WY 2006. Columns 2, 3 and 4 show Cal-Am’s unadjusted monthly production from the Carmel River Basin (CRB), Coastal Subareas of the Seaside Groundwater Basin (SCS), and Monterey Peninsula Water Resources System (MPWRS), respectively. The MPWRS value is the sum of the CRB and SCS values and represents Cal-Am’s total monthly production for customers in its main system. Columns 5, 6 and 7 show the monthly unimpaired inflow at San Clemente Dam, its inflow status⁵, and weather condition type, respectively. Columns 8, 9 and 10 show the first adjustment made to the monthly MPWRS production values. In this first adjustment, all of the values are normalized or adjusted to the normal range. In this first step, normal monthly values (e.g., 369 AF in October 1995) are unchanged; wet values (e.g., 29,961 AF in February 1996) are increased; and dry or critically-dry values (e.g., 680 AF in December 1999) are decreased. Columns 11, 12 and 13 and columns 14, 15 and 16 show the second adjustment made to the monthly MPWRS production values. In this second step, all of the normalized monthly

⁴ A month is classified as “wet” if the unimpaired flow at the San Clemente Dam site in that month is equal to or greater than the 75% exceedence flow value. Similarly, a month is classified as “normal” if the unimpaired flow at the San Clemente Dam site is between the 75% and 25% exceedence flow values for the specified month. The month is classified as “dry” if the unimpaired flow at the San Clemente Dam site is between the 25% and 12.5% exceedence flow values. Finally, the month is classified as “critically-dry” if the unimpaired flow at the San Clemente Dam site in that month is less than the 12.5% exceedence flow value.

⁵ “Wet” conditions are represented by “1”, “normal” conditions by “2”, “dry” conditions by “3”, and “critically-dry” conditions by “4”.

MPWRS values are increased as if all of the months during the period of analysis had been dry (columns 11, 12, and 13) or critically-dry (columns 14, 15, and 16), respectively.

Table 3 summarizes the unadjusted annual production values and the adjusted normal, dry, and critically-dry year production values by Cal-Am from the MPWRS for customers in Cal-Am's main system for the period of analysis. As shown, Cal-Am's average annual unadjusted production from the MPWRS was 14,710 AFY. Cal-Am's average annual adjusted production from the MPWRS, assuming each month during the period of analysis had been normal, would have been 15,095 AFY or approximately 2.5% greater than reported. **Table 3** also shows that Cal-Am's average annual adjusted production from the MPWRS, assuming each month during the period of analysis had been dry, would have been 15,474 AFY or approximately 5.2% greater than reported. Similarly, **Table 3** shows that Cal-Am's average annual adjusted production from the MPWRS, assuming each month during the period of analysis had been critically-dry, would have been 15,858 AFY or approximately 7.8% greater than reported. While it is unlikely that every month during the 132-month period of analysis would have been critically-dry, the critically-dry year values provide a worst-case basis for assessing the effect of weather on water production during the period of analysis.

If the adjustment factor for critically-dry years (7.8%) is applied to Cal-Am's average annual unadjusted production from Carmel River sources during the period of analysis (11,015 AFY, see **Table 1**) and also applied to Cal-Am's average annual unadjusted production from sources in the coastal area of the Seaside Groundwater Basin during the period of analysis (3,695 AFY, see **Table 4**), then the weather-adjusted average annual production by Cal-Am from Carmel River and Seaside Coastal sources during the period of analysis assuming constant critically-dry conditions would be 11,874 AFY and 3,983 AFY, respectively. Notably, there are other factors that have affected the amount of water demanded by customers in Cal-Am's main system and produced by Cal-Am from its sources in the Carmel River and Seaside Groundwater Basin during the period of analysis. These factors include the threat of action by the SWRCB and significant fines if Cal-Am exceeds the production limit set by Order 95-10, increased water rates, extensive public outreach regarding the need to conserve water, resource management by the District, appreciable unaccounted-for-water losses in Cal-Am's main distribution system, and new technologies. Notwithstanding, it is believed that the weather-adjusted production estimates are reasonable and defensible as conservative values and should be used for water supply planning rather than the unadjusted production values that do not account for the wetter-than-normal period of analysis. Thus, in the following sections the term "weather-adjusted" means that the critically-dry year factor (i.e., 7.8% increase in normal year demand) has been applied to the reported production during the period of analysis.

Section 2: Cal-Am Replacement Requirements within MPWMD Boundaries

Carmel River Replacement Requirement: Based on the weather-adjusted average annual production estimate by Cal-Am from Carmel River sources for the period of analysis (11,874 AFY) and Cal-Am's recognized rights to divert Carmel River waters (3,376 AFY), Cal-Am needs to

develop 8,498 AFY of replacement supplies to legalize its recent diversions from Carmel River sources for customers in its main distribution system.

Seaside Coastal Subareas Replacement Requirement: Table 4 shows Cal-Am's annual production from sources in the Coastal Subareas of the Seaside Groundwater Basin for the period of analysis. Table 4 also shows Cal-Am's "eventual" allocation from the Coastal Subareas of the Seaside Groundwater Basin that was specified in the final decision for the Seaside basin adjudication (*California American Water v. City of Seaside, et al.*, Case No. 66343, Monterey County Superior Court, March 27, 2006). This "eventual" allocation represents Cal-Am's share of the "Natural Safe Yield" for the Coastal Subareas of the Seaside Basin. As shown, Cal-Am's annual production from the Coastal Subareas during the period of analysis averaged 3,695 AFY. Based on the weather-adjusted average annual production estimate by Cal-Am from Seaside Basin coastal sources for the period of analysis (3,983 AFY) and Cal-Am's eventual allocation to pump water from the Coastal Subareas (1,494 AFY), Cal-Am's needs to develop 2,489 AFY to comply with the adjudication decision concerning the Coastal Subareas of the basin.

Laguna Seca Subarea Replacement Requirement: In addition to Cal-Am's replacement requirement in the Coastal Subareas of the Seaside Basin under the adjudication decision, Cal-Am also needs to develop replacement supplies for its three smaller systems in the Laguna Seca Subarea of the Seaside Basin (i.e., Ryan Ranch, Hidden Hills, and Bishop Units). Table 5 shows annual production from Cal-Am's smaller systems in the Laguna Seca Subarea of the Seaside Groundwater Basin for the period of analysis. Table 5 also shows Cal-Am's "eventual" allocation from the Laguna Seca Subarea of the Seaside Groundwater Basin that was specified in the final decision for the Seaside Basin adjudication. This "eventual" allocation represents Cal-Am's share of the "Natural Safe Yield" for the Laguna Seca Subarea of the Seaside Basin and is zero because the amount of water allocated to the "Alternative Producers"⁶ exceeds the Natural Safe Yield specified for the Laguna Seca Subarea in the final decision. As shown, Cal-Am's annual production from the

⁶ In the Seaside Basin adjudication decision, two types of "allocations" were defined for the various producers in the basin. The first type, i.e., "Alternative Production Allocation", referred to a fixed amount of water that could be pumped by each "Alternative Producer" from the basin each year. This first type is analogous to an "overlying" groundwater right. The second type, i.e., "Standard Production Allocation", referred to the amount of water that a "Standard Producer" could pump each year, calculated as a percentage of the safe yield of the basin available after subtracting the Alternative Producers' allocations. This second type is analogous to an "appropriative" groundwater right.

In California, overlying rights allow property owners to pump water from beneath their properties for use on their overlying properties. In contrast, appropriative rights allow producers to use groundwater produced from the basin on non-overlying properties or for municipal supply, which is not considered an overlying use. Overlying rights are considered prior and paramount to appropriative rights. Usually, appropriators can only pump the amount of groundwater in the basin that is surplus to the cumulative production of the overlying producers.

The "Alternative Producers" in the Laguna Seca Subarea include Pasadera Country Club, Laguna Seca Golf Ranch, York School, and Laguna Seca County Park.

Laguna Seca Subarea of the Seaside Basin during the period of analysis averaged 432 AFY. Based on the weather-adjusted average annual production estimate by Cal-Am from the Laguna Seca Subarea for the period of analysis (466 AFY) and Cal-Am's eventual allocation to pump water from the Laguna Seca Subarea (0 AFY), Cal-Am's needs to develop **466 AFY** to comply with the adjudication decision and continue to serve its customers in this area.

Los Padres Reservoir Replacement Requirement: Cal-Am's replacement requirement for the Carmel River (8,498 AFY) is based on Cal-Am's water rights that were recognized by the SWRCB in Order 95-10 (3,376 AFY). These recognized rights included:

- (1) right to divert to storage 2,179 AFY of water at Los Padres Reservoir, based on a post-1914 appropriative right (License 11866),
- (2) right to divert 1,137 AF directly from the Carmel River, based on a pre-1914 appropriative right, and
- (3) right to divert 60 AFY from the Carmel River, based on riparian rights.

If these recognized rights are reduced, then Cal-Am's replacement requirement for Carmel River sources will increase correspondingly.

In this regard, the continuing sedimentation and loss of storage capacity in Los Padres Reservoir can affect the amount of replacement water that Cal-Am is required to develop to cease its unlawful diversions from the Carmel River. In Order 95-10, the SWRCB reduced the quantity of water that Cal-Am could divert to storage in Los Padres Reservoir under Cal-Am's licensed right from 3,030 AFY to 2,179 AFY. This reduction was based on the amount of reservoir storage capacity that Cal-Am had estimated was available in Los Padres Reservoir in 1984 and had provided to the SWRCB as part of the water right hearings in 1992 and 1994.

It should be noted that, although used by the SWRCB in Order 95-10, the 1984 estimate by Cal-Am is inconsistent with previous and subsequent storage estimates and likely in error. A more accurate estimate was made by the United States Geological Survey (USGS, 1981⁷) for the District, following the Marble Cone Fire in 1977. The USGS estimated that the total storage capacity in Los Padres Reservoir was 1,950 AF at elevation 1,040 feet in 1978. Based on this 1978 USGS estimate, and Cal-Am's most recent estimate of storage capacity in Los Padres Reservoir of 1,569 AF at elevation 1,040 feet in 1998, the average annual loss in storage capacity in Los Padres Reservoir is approximately 19 AFY ($381 \text{ AF} \div 20 \text{ years} = 19 \text{ AFY}$). Assuming that this rate is correct and that average sedimentation conditions have continued over the last eight years, the storage capacity in Los Padres Reservoir is now estimated to be 1,417 AF ($1,569 \text{ AF} - 152 \text{ AF} = 1,417 \text{ AF}$).

⁷ Letter report from Richard M. Bloyd, USGS District Chief, to Bruce Buel, MPWMD General Manager, regarding sediment deposition studies at Los Padres Reservoir in 1977, 1978, and 1980, dated February 10, 1981.

Therefore, if the SWRCB revisited Order 95-10 and applied the same logic regarding current recognized storage rights, i.e., the legal right to divert water to storage is limited by the physical capacity to store water, then Cal-Am's recognized rights for diversion from the Carmel River could be reduced from 3,376 AFY to 2,766 AFY, based on Cal-Am's 1998 estimate of storage capacity in Los Padres Reservoir, or 2,614 AFY, based on estimated storage capacity in 2006. In the first case, Cal-Am would need to develop an additional 610 AFY of replacement water. In the second case, Cal-Am would need to develop an additional 762 AFY of replacement water. Eventually, unless Cal-Am implements some type of dredging program at Los Padres Reservoir to maintain or recover storage capacity, Cal-Am will need to develop an additional 2,179 AFY of replacement water to comply with Order 95-10 and meet its customers needs. For purposes of this memorandum, it is recommended that a replacement requirement for lost storage capacity in Los Padres Reservoir of 762 AFY should be used, based on estimated current storage capacity in Los Padres Reservoir. If Cal-Am indicates that they do not plan to implement either a maintenance or recovery dredging program at Los Padres Reservoir, then this requirement will need to be revised.

Section 3: Non Cal-Am Replacement Requirements in the Seaside Groundwater Basin

Seaside Coastal Subareas Replacement Requirement: Table 6 shows non Cal-Am annual standard production from sources in the Coastal Subareas of the Seaside Groundwater Basin for the period of analysis. The production values shown for "Non Cal-Am Production" include production by the City of Seaside Municipal Water Utility, Granite Rock Company, and DBO Development No. 27. It should be noted that the reported production from the Granite Rock Company and DBO Development No. 27 has been zero AF for the last nine years, as these wells are either inactive or abandoned. Table 6 also shows the "eventual" allocation for "Standard" non Cal-Am producers from the Coastal Subareas of the Seaside Groundwater Basin that was specified in the final decision for the Seaside Basin adjudication. This "eventual" allocation represents the non Cal-Am standard allocation share of the "Natural Safe Yield" for the Coastal Subareas of the Seaside Basin. As shown, the non Cal-Am annual standard production from the Coastal Subareas during the period of analysis averaged 316 AFY. Based on the weather-adjusted average annual production estimate for non Cal-Am standard production from the Coastal Subareas of the Seaside Basin for the period of analysis (341 AFY) and the non Cal-Am eventual standard allocation to pump water from the Coastal Subareas (155 AFY), the non Cal-Am producers need to develop **186 AFY** to comply with the adjudication decision concerning the Coastal Subareas of the basin. Note that the average annual production value shown in Table 6 is for the WY 1996 – WY 2005 period, because production information for WY 2006 for the non Cal-Am standard producers in the Coastal Subareas is not available at this time.

Laguna Seca Subarea Replacement Requirement: Table 7 shows annual production by the "Alternative" producers in the Laguna Seca Subarea of the Seaside Groundwater Basin for the period of analysis. As shown, for the ten-year period (WY 1996 through WY 2005), the non Cal-Am

alternative production from the Laguna Seca Subarea averaged 418 AFY. For the more recent five-year period (WY 2001 through WY 2005), however, the non Cal-Am alternative production from the Laguna Seca Subarea averaged 644 AFY. Given the significant increase in production during the recent five years, it is recommended that the average annual production during the WY 2001 through 2005 period should be used to more accurately represent current pumping by the non Cal-Am alternative producers in the Laguna Seca Subarea of the Seaside Groundwater Basin. **Table 7** also shows the “eventual” alternative allocation from the Laguna Seca Subarea of the Seaside Groundwater Basin that was specified in the adjudication decision. This “eventual” allocation represents the non Cal-Am producers’ share of the “Natural Safe Yield” for the Laguna Seca Subarea of the Seaside Basin. Because the non Cal-Am alternative production allocation exceeds the Natural Safe Yield, the non Cal-Am alternative producers will need to reduce their water demand or develop a replacement supply. As shown, the non Cal-Am annual production from the Laguna Seca Subarea of the Seaside Basin during the shortened period of analysis averaged 644 AFY. Based on the weather-adjusted average annual production estimate for the non Cal-Am producers from the Laguna Seca Subarea for the period of analysis (694 AFY) and the non Cal-Am eventual alternative allocation to pump water from the Laguna Seca Subarea (608 AFY), the non Cal-Am producers in the Laguna Seca Subareas need to develop **86 AFY** to comply with the adjudication decision.

Section 4: Summary and Recommendations

This technical memorandum provides reasonable and defensible estimates of the amount of water that is produced by Cal-Am to meet existing customer demand in Cal-Am’s water distribution systems within District boundaries. The production estimates have been adjusted to account for the wetter-than-normal conditions that occurred during the 11-year period of analysis, i.e., Water Years 1996 through 2006. Specifically, based on results from a monthly analysis, the reported annual production values were increased 7.8% to reflect critically-dry conditions during the period of analysis. The decision to use critically-dry conditions was made to provide a worst-case basis for assessing the effect of weather on reported production during the period of analysis and is considered appropriate for conservative water supply planning purposes. Based on the adjustments made, Cal-Am’s reported average annual production for customers in its main system during the period of analysis increased from 14,710 AFY to 15,858 AFY, an increase of 1,148 AFY. This technical memorandum also provides weather-adjusted estimates of the amount of water that is produced by non Cal-Am producers to meet existing needs in the Seaside Groundwater Basin.

These weather-adjusted production values for Cal-Am were compared to Cal-Am’s recognized rights to divert water from the Carmel River and Cal-Am’s adjudicated rights to produce groundwater from the Coastal Subareas and the Laguna Seca Subarea of the Seaside Groundwater Basin to quantify the water supplies that Cal-Am must develop to replace existing unlawful diversions from the Carmel River or production in excess of its eventual adjudicated rights in the Seaside Groundwater Basin. To comply with SWRCB Order 95-10 and the adjudication decision in the Coastal Subareas, Cal-Am needs to develop 10,987 AFY of replacement supplies. In addition, to continue to serve its

customers in the Laguna Seca Subarea, Cal-Am needs to develop an additional 466 AFY of replacement supplies. Also, if Cal-Am's recognized rights to divert Carmel River water were reduced by the SWRCB to reflect the reduced storage capacity in Cal-Am's Los Padres Reservoir due to sedimentation, then Cal-Am's replacement requirement to comply with Order 95-10 would increase accordingly. Based on the current estimated storage capacity in Los Padres Reservoir, Cal-Am would need to develop an additional 762 AFY of replacement supplies. Altogether, assuming critically-dry conditions during the period of analysis, Cal-Am would need to develop 12,215 AFY of replacement supplies to continue to meet existing customer demand for its systems within the District, comply with SWRCB Order 95-10, and conform with the natural safe yield that was specified for the Seaside Groundwater Basin in the adjudication decision. The replacement requirements for the Cal-Am systems within the District are summarized in **Table 8**.

For this technical memorandum, it was assumed that the project or projects that Cal-Am develops to provide the required replacement supplies would be sized to meet existing non Cal-Am water needs in the Seaside Groundwater Basin. While Cal-Am is not directly responsible for developing replacement supplies for the non Cal-Am producers in the Seaside Basin, it is reasonable to assume that based on economies of scale, Cal-Am should be able to provide the least costly replacement supplies for the non Cal-Am producers in the Seaside Basin as part of the proposed Coastal Water Project (CWP). This assumption is consistent with Section III.M.1, *California American Obligation to Augment Water Supply*, in the Seaside Basin adjudication decision. In this regard, non Cal-Am production values for the Coastal Subareas and Laguna Seca Subarea were compiled and adjusted for weather conditions, using the same factor as used for Cal-Am production. The weather-adjusted production values for the non Cal-Am standard producers in the Coastal Subareas and the production values for the non Cal-Am alternative producers in the Laguna Seca Subarea were compared with the non Cal-Am standard producers' eventual allocation in the Coastal Subareas and with the assumed natural safe yield in the Laguna Seca Subarea to determine non Cal-Am replacement requirements in the Seaside Basin. These requirements for the Coastal Subareas and Laguna Seca Subarea are 186 AFY and 86 AFY, respectively, and are also shown in **Table 8**. If these non Cal-Am replacement requirements in the Seaside Basin are summed (272 AFY) and added to Cal-Am's replacement requirements, the total replacement requirement is 12,487 AFY.

Based on the analysis described above, it is recommended that the yield from any project that is proposed to satisfy the existing water demands within the District should be sized to provide approximately **12,500 AFY** of replacement water. This quantity, coupled with Cal-Am's legal supplies in the Carmel River Basin and Seaside Groundwater Basin, should be sufficient to serve existing customer demand in Cal-Am's systems within the District and provide the necessary amount of replacement water for non Cal-Am producers in the Seaside Groundwater Basin.

In closing, it should be noted that while the replacement requirement (12,500 AFY) recommended in this technical memorandum to meet existing water needs is within 770 AFY or 7% of the replacement requirement proposed by Cal-Am in their application to the California Public Utilities

Commission (CPUC) for a Certificate of Public Convenience and Necessity (CPCN) to build, own, and operate the proposed CWP (11,730 AFY), the derivation of the replacement requirement recommended in this technical memorandum is significantly different and represents current conditions and constraints. Specifically, the recommended requirement provides 2,232 AFY less water for legalizing unlawful diversions by Cal-Am from the Carmel River (10,730 AFY – 8,498 AFY = 2,232 AFY) consistent with reduced customer demand in Cal-Am's main distribution system during the recent period of analysis compared to the earlier period that was used by the SWRCB to illustrate the extent of Cal-Am's unlawful diversions based on average historical conditions between 1979 and 1988. Conversely, the recommended requirement provides 2,227 AFY more water for balancing existing Cal-Am and non Cal-Am production from the Seaside Groundwater Basin with the natural safe yield of the Seaside Basin than proposed by Cal-Am to address overdraft conditions in the Seaside Basin (3,227 AFY – 1,000 AFY = 2,227 AFY). Lastly, the recommended requirement includes 762 AFY more water to replace a portion of Cal-Am's recognized right to store Carmel River water in Los Padres Reservoir. This portion, which represents the storage capacity in Los Padres Reservoir that is estimated to have been lost to sedimentation between 1984 and 2006, was not considered in Cal-Am's CWP application.

Table 1

**California American Water Annual Production from Carmel River Sources
Compared to Diversion Limits Set By State Water Resources Control Board
Order 95-10 for Water Years 1996 through 2006**

Water Year	SWRCB Limit (AF)	Cal-Am Production (AF)	Difference		Water Year Class	Unlawful Diversions (AF)
			(AF)	(%)		
1996	11,990	11,701	-289	-2.4%	Above Normal	8,325
1997	11,285	12,847	1,562	13.8%	Above Normal	9,471
1998	11,285	10,133	-1,152	-10.2%	Extremely Wet	6,757
1999	11,285	10,384	-901	-8.0%	Normal	7,008
2000	11,285	11,179	-106	-0.9%	Normal	7,803
2001	11,285	10,721	-564	-5.0%	Normal	7,345
2002	11,285	10,759	-526	-4.7%	Below Normal	7,383
2003	11,285	11,131	-154	-1.4%	Normal	7,755
2004	11,285	11,094	-191	-1.7%	Below Normal	7,718
2005	11,285	10,675	-610	-5.4%	Wet	7,299
2006	11,285	10,542	-743	-6.6%	Wet	7,166
Average:		11,015	-334	-2.9%		7,639

Source: California American Water, Monthly Production Reports

Notes:

1. Production values have been adjusted to exclude diversions that were made for injection into the coastal subareas of the Seaside Groundwater Basin.
2. Cal-Am's annual "unlawful diversions" are calculated as Cal-Am's actual annual diversions from Carmel River sources minus Cal-Am's "recognized" rights to divert from the Carmel River system, i.e., 3,376 acre-feet per year.

Table 2

California American Water Main System Production for Water Years 1996 -2006 Adjusted for Weather Conditions

Month	Cal-Am Production (Acre-Feet)		Unimpaired Flow (Acre-Feet)	Inflow Status	Weather Condition	Demand Adjustment #1: Normal		Demand Adjustment #2: Dry		Demand Adjustment #3: Critical					
	CRB	SCS				MPWRS	CR at SCD	(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)
Oct-95	879	544	1,423	369	2	Normal	0.00	0	1,423	0.01	14	1,437	0.01	14	1,437
Nov-95	704	453	1,157	419	2	Normal	0.00	0	1,157	0.02	23	1,180	0.03	35	1,192
Dec-95	564	421	985	2,433	2	Normal	0.00	0	985	0.02	20	1,005	0.05	49	1,034
Jan-96	534	415	949	4,991	2	Normal	0.00	0	949	0.03	28	977	0.07	66	1,015
Feb-96	738	154	892	29,961	1	Wet	-0.05	-45	937	0.04	37	974	0.08	75	1,012
Mar-96	1,044	0	1,044	21,108	2	Normal	0.00	0	1,044	0.05	52	1,096	0.10	104	1,148
Apr-96	1,172	42	1,214	8,325	2	Normal	0.00	0	1,214	0.06	73	1,287	0.13	158	1,372
May-96	1,279	234	1,513	4,583	1	Wet	-0.20	-303	1,816	0.03	54	1,870	0.08	145	1,961
Jun-96	1,174	475	1,649	2,029	2	Normal	0.00	0	1,649	0.02	33	1,682	0.06	99	1,748
Jul-96	1,253	534	1,787	772	2	Normal	0.00	0	1,787	0.02	36	1,823	0.02	36	1,823
Aug-96	1,227	527	1,754	281	2	Normal	0.00	0	1,754	0.01	18	1,772	0.01	18	1,772
Sep-96	1,133	520	1,653	139	2	Normal	0.00	0	1,653	0.01	17	1,670	0.01	17	1,670
Oct-96	995	458	1,453	293	2	Normal	0.00	0	1,453	0.01	15	1,468	0.01	15	1,468
Nov-96	649	476	1,125	2,038	1	Wet	-0.02	-23	1,148	0.02	23	1,170	0.03	34	1,182
Dec-96	681	294	975	15,310	1	Wet	-0.03	-29	1,004	0.02	20	1,024	0.05	50	1,054
Jan-97	916	106	1,022	53,700	1	Wet	-0.05	-51	1,073	0.03	32	1,105	0.07	75	1,148
Feb-97	908	100	1,008	15,700	2	Normal	0.00	0	1,008	0.04	40	1,048	0.08	81	1,089
Mar-97	1,282	112	1,394	5,605	2	Normal	0.00	0	1,394	0.05	70	1,464	0.10	139	1,533
Apr-97	1,180	337	1,517	2,947	2	Normal	0.00	0	1,517	0.06	91	1,608	0.13	197	1,714
May-97	1,168	612	1,780	1,450	2	Normal	0.00	0	1,780	0.03	53	1,833	0.08	142	1,922
Jun-97	1,110	575	1,685	792	2	Normal	0.00	0	1,685	0.02	34	1,719	0.06	101	1,786
Jul-97	1,132	545	1,677	489	2	Normal	0.00	0	1,677	0.02	34	1,711	0.02	34	1,711
Aug-97	1,390	278	1,668	202	2	Normal	0.00	0	1,668	0.01	17	1,685	0.01	17	1,685
Sep-97	1,436	132	1,568	35	2	Normal	0.00	0	1,568	0.01	16	1,584	0.01	16	1,584
Oct-97	1,018	392	1,410	148	2	Normal	0.00	0	1,410	0.01	14	1,424	0.01	14	1,424
Nov-97	655	419	1,074	1,120	2	Normal	0.00	0	1,074	0.02	21	1,095	0.03	32	1,106
Dec-97	869	98	967	6,569	2	Normal	0.00	0	967	0.02	19	986	0.05	48	1,015
Jan-98	980	0	980	28,108	1	Wet	-0.05	-49	1,029	0.03	31	1,060	0.07	72	1,101
Feb-98	706	185	891	114,253	1	Wet	-0.10	-89	980	0.04	39	1,019	0.08	78	1,059
Mar-98	984	0	984	27,016	1	Wet	-0.20	-197	1,180	0.05	59	1,239	0.10	118	1,298
Apr-98	555	421	976	23,873	1	Wet	-0.20	-195	1,171	0.06	70	1,241	0.13	152	1,323
May-98	616	527	1,143	13,078	1	Wet	-0.20	-229	1,372	0.03	41	1,413	0.08	110	1,481
Jun-98	719	566	1,285	6,866	1	Wet	-0.07	-90	1,375	0.02	27	1,402	0.06	82	1,457
Jul-98	874	558	1,432	3,282	1	Wet	-0.05	-72	1,504	0.02	30	1,534	0.02	30	1,534

Table 2

California American Water Main System Production for Water Years 1996 -2006 Adjusted for Weather Conditions

Month	Cal-Am Production		Unimpaired Flow (Acre-Feet) CR at SCD	Inflow Status	Weather Condition	Demand Adjustment #1: Normal		Demand Adjustment #2: Dry		Demand Adjustment #3: Critical				
	CRB	SCS				MPWRS	(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)
Aug-98	979	555	1,534	1	Wet	-0.02	-31	1,565	0.01	16	1,580	0.01	16	1,580
Sep-98	1,178	189	1,367	1	Wet	-0.02	-27	1,394	0.01	14	1,408	0.01	14	1,408
Oct-98	969	321	1,290	1	Wet	-0.02	-26	1,316	0.01	13	1,329	0.01	13	1,329
Nov-98	625	388	1,013	1	Wet	-0.02	-20	1,033	0.02	21	1,054	0.03	31	1,064
Dec-98	554	392	946	2	Normal	0.00	0	946	0.02	19	965	0.05	47	993
Jan-99	737	260	997	2	Normal	0.00	0	997	0.03	30	1,027	0.07	70	1,067
Feb-99	791	0	791	2	Normal	0.00	0	791	0.04	32	823	0.08	63	854
Mar-99	876	0	876	2	Normal	0.00	0	876	0.05	44	920	0.10	88	964
Apr-99	1,060	15	1,075	1	Wet	-0.20	-215	1,290	0.06	77	1,367	0.13	168	1,458
May-99	1,044	354	1,398	2	Normal	0.00	0	1,398	0.03	42	1,440	0.08	112	1,510
Jun-99	854	544	1,398	2	Normal	0.00	0	1,398	0.02	28	1,426	0.06	84	1,482
Jul-99	1,021	592	1,613	2	Normal	0.00	0	1,613	0.02	32	1,645	0.02	32	1,645
Aug-99	957	622	1,579	1	Wet	-0.02	-32	1,611	0.01	16	1,627	0.01	16	1,627
Sep-99	896	494	1,390	1	Wet	-0.02	-28	1,418	0.01	14	1,432	0.01	14	1,432
Oct-99	824	541	1,365	2	Normal	0.00	0	1,365	0.01	14	1,379	0.01	14	1,379
Nov-99	657	459	1,116	2	Normal	0.00	0	1,116	0.02	22	1,138	0.03	33	1,149
Dec-99	693	442	1,135	3	Dry	0.02	23	1,112	0.02	22	1,135	0.05	56	1,168
Jan-00	903	98	1,001	2	Normal	0.00	0	1,001	0.03	30	1,031	0.07	70	1,071
Feb-00	843	0	843	1	Wet	-0.10	-84	927	0.04	37	964	0.08	74	1,001
Mar-00	1,007	0	1,007	2	Normal	0.00	0	1,007	0.05	50	1,057	0.10	101	1,108
Apr-00	1,221	0	1,221	2	Normal	0.00	0	1,221	0.06	73	1,294	0.13	159	1,380
May-00	1,140	257	1,397	2	Normal	0.00	0	1,397	0.03	42	1,439	0.08	112	1,509
Jun-00	959	507	1,466	2	Normal	0.00	0	1,466	0.02	29	1,495	0.06	88	1,554
Jul-00	970	507	1,477	1	Wet	-0.05	-74	1,551	0.02	31	1,582	0.02	31	1,582
Aug-00	1,016	505	1,521	1	Wet	-0.02	-30	1,551	0.01	16	1,567	0.01	16	1,567
Sep-00	946	438	1,384	1	Wet	-0.02	-28	1,412	0.01	14	1,426	0.01	14	1,426
Oct-00	755	381	1,136	1	Wet	-0.02	-23	1,159	0.01	12	1,170	0.01	12	1,170
Nov-00	657	293	950	2	Normal	0.00	0	950	0.02	19	969	0.03	29	979
Dec-00	633	339	972	3	Dry	0.02	19	953	0.02	19	972	0.05	48	1,000
Jan-01	901	32	933	2	Normal	0.00	0	933	0.03	28	961	0.07	65	999
Feb-01	807	0	807	2	Normal	0.00	0	807	0.04	32	839	0.08	65	872
Mar-01	933	0	933	2	Normal	0.00	0	933	0.05	47	980	0.10	93	1,026
Apr-01	1,034	0	1,034	2	Normal	0.00	0	1,034	0.06	62	1,096	0.13	134	1,168
May-01	1,167	268	1,435	2	Normal	0.00	0	1,435	0.03	43	1,478	0.08	115	1,550

Table 2

California American Water Main System Production for Water Years 1996-2006 Adjusted for Weather Conditions

Month	Cal-Am Production (Acre-Feet)		Unimpaired Flow (Acre-Feet)	Inflow Status	Weather Condition	Demand Adjustment #1: Normal		Demand Adjustment #2: Dry		Demand Adjustment #3: Critical				
	CRB	SCS				MPWRS	CR at SCD	(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)	MPWRS	(Percent)
Jun-01	1,015	544	1,559	2	Normal	0.00	0	1,559	0.02	31	1,590	0.06	94	1,653
Jul-01	1,012	530	1,542	2	Normal	0.00	0	1,542	0.02	31	1,573	0.02	31	1,573
Aug-01	1,001	542	1,543	1	Wet	-0.02	-31	1,574	0.01	16	1,590	0.01	16	1,590
Sep-01	806	515	1,321	1	Wet	-0.02	-26	1,347	0.01	13	1,361	0.01	13	1,361
Oct-01	790	506	1,296	2	Normal	0.00	0	1,296	0.01	13	1,309	0.01	13	1,309
Nov-01	575	428	1,003	2	Normal	0.00	0	1,003	0.02	20	1,023	0.03	30	1,033
Dec-01	774	57	831	1	Wet	-0.03	-25	856	0.02	17	873	0.05	43	899
Jan-02	840	0	840	2	Normal	0.00	0	840	0.03	25	865	0.07	59	899
Feb-02	817	0	817	3	Dry	0.04	33	784	0.04	31	816	0.08	63	847
Mar-02	945	0	945	2	Normal	0.00	0	945	0.05	47	992	0.10	95	1,040
Apr-02	1,089	55	1,144	2	Normal	0.00	0	1,144	0.06	69	1,213	0.13	149	1,293
May-02	940	430	1,370	2	Normal	0.00	0	1,370	0.03	41	1,411	0.08	110	1,480
Jun-02	974	485	1,459	2	Normal	0.00	0	1,459	0.02	29	1,488	0.06	88	1,547
Jul-02	1,034	543	1,577	2	Normal	0.00	0	1,577	0.02	32	1,609	0.02	32	1,609
Aug-02	1,023	532	1,555	2	Normal	0.00	0	1,555	0.01	16	1,571	0.01	16	1,571
Sep-02	958	485	1,443	2	Normal	0.00	0	1,443	0.01	14	1,457	0.01	14	1,457
Oct-02	841	527	1,368	2	Normal	0.00	0	1,368	0.01	14	1,382	0.01	14	1,382
Nov-02	713	355	1,068	1	Wet	-0.02	-21	1,089	0.02	22	1,111	0.03	33	1,122
Dec-02	685	254	939	1	Wet	-0.03	-28	967	0.02	19	987	0.05	48	1,016
Jan-03	876	6	882	2	Normal	0.00	0	882	0.03	26	908	0.07	62	944
Feb-03	867	0	867	2	Normal	0.00	0	867	0.04	35	902	0.08	69	936
Mar-03	986	0	986	2	Normal	0.00	0	986	0.05	49	1,035	0.10	99	1,085
Apr-03	993	0	993	2	Normal	0.00	0	993	0.06	60	1,053	0.13	129	1,122
May-03	1,078	148	1,226	1	Wet	-0.20	-245	1,471	0.03	44	1,515	0.08	118	1,589
Jun-03	978	520	1,498	1	Wet	-0.07	-105	1,603	0.02	32	1,635	0.06	96	1,699
Jul-03	1,076	574	1,650	1	Wet	-0.05	-83	1,733	0.02	35	1,767	0.02	35	1,767
Aug-03	1,074	574	1,648	1	Wet	-0.02	-33	1,681	0.01	17	1,698	0.01	17	1,698
Sep-03	963	549	1,512	1	Wet	-0.02	-30	1,542	0.01	15	1,558	0.01	15	1,558
Oct-03	885	540	1,425	2	Normal	0.00	0	1,425	0.01	14	1,439	0.01	14	1,439
Nov-03	614	394	1,008	2	Normal	0.00	0	1,008	0.02	20	1,028	0.03	30	1,038
Dec-03	667	245	912	2	Normal	0.00	0	912	0.02	18	930	0.05	46	957
Jan-04	875	10	885	2	Normal	0.00	0	885	0.03	27	912	0.07	62	947
Feb-04	852	0	852	2	Normal	0.00	0	852	0.04	34	886	0.08	68	920
Mar-04	1,074	0	1,074	2	Normal	0.00	0	1,074	0.05	54	1,128	0.10	107	1,181

Table 2

California American Water Main System Production for Water Years 1996 -2006 Adjusted for Weather Conditions

Month	Cal-Am Production (Acre-Feet)		Unimpaired Flow (Acre-Feet)		Inflow Status	Weather Condition	Demand Adjustment #1: Normal		Demand Adjustment #2: Dry		Demand Adjustment #3: Critical				
	CRB	SCS	MPWRS	CR at SCD			(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)	MPWRS	(Percent)	(Acre-Feet)	
Apr-04	1,253	72	1,325	2,467	3	Dry	0.06	80	1,246	0.06	75	1,320	0.13	162	1,407
May-04	1,037	569	1,606	1,397	3	Dry	0.03	48	1,558	0.03	47	1,605	0.08	125	1,682
Jun-04	957	568	1,525	796	2	Normal	0.00	0	1,525	0.02	31	1,556	0.06	92	1,617
Jul-04	938	548	1,486	342	2	Normal	0.00	0	1,486	0.02	30	1,516	0.02	30	1,516
Aug-04	972	501	1,473	225	2	Normal	0.00	0	1,473	0.01	15	1,488	0.01	15	1,488
Sep-04	970	471	1,441	195	2	Normal	0.00	0	1,441	0.01	14	1,455	0.01	14	1,455
Oct-04	716	431	1,147	961	1	Wet	-0.02	-23	1,170	0.01	12	1,182	0.01	12	1,182
Nov-04	736	202	938	1,083	2	Normal	0.00	0	938	0.02	19	957	0.03	28	966
Dec-04	636	301	937	7,985	1	Wet	-0.03	-28	965	0.02	19	984	0.05	48	1,013
Jan-05	844	26	870	29,712	1	Wet	-0.05	-44	914	0.03	27	941	0.07	64	977
Feb-05	804	0	804	22,185	2	Normal	0.00	0	804	0.04	32	836	0.08	64	868
Mar-05	919	0	919	25,309	1	Wet	-0.20	-184	1,103	0.05	55	1,158	0.10	110	1,213
Apr-05	979	0	979	12,584	1	Wet	-0.20	-196	1,175	0.06	70	1,245	0.13	153	1,328
May-05	1,067	220	1,287	6,057	1	Wet	-0.20	-257	1,544	0.03	46	1,591	0.08	124	1,668
Jun-05	1,015	406	1,421	2,952	1	Wet	-0.07	-99	1,520	0.02	30	1,551	0.06	91	1,612
Jul-05	998	516	1,514	1,429	1	Wet	-0.05	-76	1,590	0.02	32	1,621	0.02	32	1,621
Aug-05	1,010	464	1,474	652	1	Wet	-0.02	-29	1,503	0.01	15	1,519	0.01	15	1,519
Sep-05	951	437	1,388	447	1	Wet	-0.02	-28	1,416	0.01	14	1,430	0.01	14	1,430
Oct-05	868	446	1,314	487	1	Wet	-0.02	-26	1,340	0.01	13	1,354	0.01	13	1,354
Nov-05	646	440	1,086	519	2	Normal	0.00	0	1,086	0.02	22	1,108	0.03	33	1,119
Dec-05	615	263	878	5,368	2	Normal	0.00	0	878	0.02	18	896	0.05	44	922
Jan-06	804	30	834	12,970	2	Normal	0.00	0	834	0.03	25	859	0.07	58	892
Feb-06	854	21	875	7,367	2	Normal	0.00	0	875	0.04	35	910	0.08	70	945
Mar-06	860	0	860	22,962	1	Wet	-0.20	-172	1,032	0.05	52	1,084	0.10	103	1,135
Apr-06	812	0	812	43,132	1	Wet	-0.20	-162	974	0.06	58	1,033	0.13	127	1,101
May-06	1,041	250	1,291	8,667	1	Wet	-0.20	-258	1,549	0.03	46	1,596	0.08	124	1,673
Jun-06	1,027	391	1,418	3,333	1	Wet	-0.07	-99	1,517	0.02	30	1,548	0.06	91	1,608
Jul-06	1,097	497	1,594	1,324	1	Wet	-0.05	-80	1,674	0.02	33	1,707	0.02	33	1,707
Aug-06	988	534	1,522	656	1	Wet	-0.02	-30	1,552	0.01	16	1,568	0.01	16	1,568
Sep-06	930	391	1,321	432	1	Wet	-0.02	-26	1,347	0.01	13	1,361	0.01	13	1,361

Table 3

**California American Water Production for Water Years 1996 - 2006
Adjusted for Weather Conditions**

Water Year	Unadjusted Demand	Normal Year Demand	Dry Year Demand	Critical Year Demand
1996	16,020	16,367	16,773	17,183
1997	16,872	16,975	17,419	17,876
1998	14,043	15,021	15,403	15,788
1999	14,366	14,686	15,054	15,425
2000	14,933	15,127	15,507	15,893
2001	14,165	14,226	14,579	14,940
2002	14,280	14,272	14,627	14,982
2003	14,637	15,182	15,550	15,917
2004	15,012	14,884	15,262	15,649
2005	13,678	14,642	15,015	15,397
2006	13,805	14,660	15,022	15,385
Mean:	14,710	15,095	15,474	15,858
Difference:	0.0%	2.6%	5.2%	7.8%

Note:

1. The percent differences are calculated as the difference in the normal, dry, and critically-dry years relative to the reported unadjusted production.

Table 4

**California American Water Annual Production from Seaside Coastal Subareas
Compared to Eventual Allocation Limits Set By March 2006 Adjudication Decision
for Water Years 1996 through 2006**

Water Year	Eventual	Cal-Am	Difference		Water Year Class
	Allocation	Production	(AF)	(%)	
	(AF)	(AF)	(AF)	(%)	
1996	1,494	4,319	2,825	189%	Above Normal
1997	1,494	4,025	2,531	169%	Above Normal
1998	1,494	3,910	2,416	162%	Extremely Wet
1999	1,494	3,982	2,488	167%	Normal
2000	1,494	3,754	2,260	151%	Normal
2001	1,494	3,444	1,950	131%	Normal
2002	1,494	3,521	2,027	136%	Below Normal
2003	1,494	3,507	2,013	135%	Normal
2004	1,494	3,918	2,424	162%	Below Normal
2005	1,494	3,003	1,509	101%	Wet
2006	1,494	3,263	1,769	118%	Wet
Average:		3,695	2,201	147%	

Source: California American Water, Monthly Production Reports

Notes:

1. The "Eventual" production allocation for Cal-Am is based on an assumed Natural Safe Yield for the Basin of 3,000 AFY, minus 608 AFY assigned to the Inland Subareas, minus 743 for pumpers with Alternative Production Allocations in the Coastal Subareas, times Cal-Am's percentage share (90.6%) of the remaining Natural Safe Yield in the Coastal Subareas; $((3,000 - 608) - 743) \times 0.9060 = 1,494$ AFY.

Table 5

**California American Water Annual Production from Laguna Seca Subarea
Compared to Eventual Allocation Limits Set By March 2006 Adjudication Decision
for Reporting Years 1996 -2001 and Water Years 2002 through 2006**

Reporting or Water Years	Eventual Allocation (AF)	Cal-Am Production (AF)	Difference		Water Year Class
			(AF)	(%)	
1996	0	583	583	---	Above Normal
1997	0	364	364	---	Above Normal
1998	0	350	350	---	Extremely Wet
1999	0	331	331	---	Normal
2000	0	400	400	---	Normal
2001	0	414	414	---	Normal
2002	0	487	487	---	Below Normal
2003	0	465	465	---	Normal
2004	0	477	477	---	Below Normal
2005	0	435	435	---	Wet
2006	0	446	446	---	Wet
Average:		432	432	---	

Source: California American Water, Monthly Production Reports

Notes:

1. The "Eventual" production allocation for Cal-Am is based on an assumed Natural Safe Yield for the Laguna Seca Subarea of 608 AFY, minus 644 AFY for pumpers with Alternative Production Allocations in the Laguna Seca Subarea. Because this results in a negative allocation of -36 AFY, Cal-Am's eventual production allocation is set to 0 AFY.
2. As indicated above, pumpers with Alternative Production Allocations in the Laguna Seca Subarea (i.e., Pasadera Country Club, Laguna Seca Golf Course, York School, and Laguna Seca County Park) will eventually need to reduce their production by 36 AFY or find replacement sources of water.

Table 6

**Non California American Water Annual Production from Seaside Coastal Subareas
Compared to Eventual Allocation Limits Set By March 2006 Adjudication Decision
for Reporting Years 1996 -2001 and Water Years 2002 through 2006**

Reporting or Water Years	Eventual Allocation (AF)	Non Cal-Am Production (AF)	Difference		Water Year Class
			(AF)	(%)	
1996	155	318	163	105%	Above Normal
1997	155	357	202	130%	Above Normal
1998	155	251	96	62%	Extremely Wet
1999	155	252	97	63%	Normal
2000	155	311	156	101%	Normal
2001	155	320	165	106%	Normal
2002	155	315	160	103%	Below Normal
2003	155	349	194	125%	Normal
2004	155	356	201	130%	Below Normal
2005	155	333	178	115%	Wet
2006	155	---	---	---	Wet
1996-2005 Average:		316	161	104%	

Source: Monterey Peninsula Water Management District, Well Production Reports.

Notes:

1. The "Eventual" production allocation for non Cal-Am producers is based on an assumed Natural Safe Yield for the Basin of 3,000 AFY, minus 608 AFY assigned to the Laguna Seca Subarea, minus 743 for pumpers with Alternative Production Allocations in the Coastal Subareas, times the non Cal-Am percentage share (9.4%) of the remaining Natural Safe Yield in the Coastal Subareas; $((3,000 - 608) - 743) \times 0.094 = 155$ AFY.
2. The non Cal-Am Standard Producers in the Coastal Subareas include the City of Seaside's Municipal Water Utility, Granite Rock Company, and DBO Development No. 27.
3. The wells for Granite Rock Company and DBO Development No. 27 have been reported as inactive for the last nine years and have not produced any water during this time.

Table 7

**Non California American Water Annual Production from Laguna Seca Subarea
Compared to Eventual Allocation Limits Set By March 2006 Adjudication Decision
for Reporting Years 1996 -2001 and Water Years 2002 through 2006**

Reporting or Water Years	Eventual Allocation (AF)	Non Cal-Am Production (AF)	Difference		Water Year Class
			(AF)	(%)	
1996	608	42	-566	-93%	Above Normal
1997	608	240	-368	-61%	Above Normal
1998	608	147	-461	-76%	Extremely Wet
1999	608	201	-407	-67%	Normal
2000	608	328	-280	-46%	Normal
2001	608	714	106	17%	Normal
2002	608	751	143	24%	Below Normal
2003	608	616	8	1%	Normal
2004	608	671	63	10%	Below Normal
2005	608	468	-140	-23%	Wet
2006	608	---	---	---	Wet
1996-2005 Average:		418	-190	-123%	
2001-2005 Average:		644	36	6%	

Source: Monterey Peninsula Water Management District, Well Production Reports.

Notes:

1. The "Eventual" production allocation for non Cal-Am Alternative producers in the Laguna Seca Subarea is based on the Natural Safe Yield for the basin and was specified as 608 AFY in the final adjudication decision dated March 27, 2006.
2. The non Cal-Am Alternative Producers in the Laguna Seca Subarea include Pasadera Country Club, Laguna Seca Golf Ranch, York School, and Laguna Seca County Park.

Table 8

**Water Supply Replacement Requirements for all Cal-Am Customers within the MPWMD
and for all Non Cal-Am Producers in the Seaside Groundwater Basin
Based on Existing Weather-Adjusted Water Demand Between 1996 and 2006
(All Values in Acre-Feet)**

Existing Water Source	Requirement
<u>Cal-Am</u>	
Carmel River (SWRCB Order 95-10)	8,498
Seaside Coastal Subareas (Case No. M66343)	2,489
Laguna Seca Subarea (Case No. M66343)	466
Los Padres Reservoir (SWRCB Order 95-10)	<u>762</u>
Subtotal:	12,215
<u>Non Cal-Am</u>	
Seaside Coastal Subareas (Case No. M66343)	186
Laguna Seca Subarea (Case No. M66343)	<u>86</u>
Subtotal:	272
Total:	12,487

Notes:

1. Unless noted otherwise, the replacement requirements were calculated as the difference between the weather-adjusted average annual production during the period of analysis and SWRCB recognized rights for Cal-Am in the Carmel River Basin or Court adjudicated rights for Cal-Am and non Cal-Am producers in the Seaside Groundwater Basin.
2. Actual annual production during the period of analysis was increased by 7.8% to account for the wetter-than-normal period and reflect assumed critically-dry conditions.
3. "Order 95-10" refers to the order by the SWRCB that requires Cal-Am to cease its unlawful diversions from the Carmel River and develop replacement supplies to cover its diversions. Order 95-10 also refers to the SWRCB determination of Cal-Am's existing rights to divert water from the Carmel River and included a right to divert to storage 2,179 AFY at Los Padres Reservoir. In Order 95-10, Cal-Am's storage right at Los Padres Reservoir was reduced to reflect reduced storage capacity due to sedimentation. This storage right could be further reduced by the SWRCB and would require additional replacement supplies for the Carmel River.
4. "Case No. M66343" refers to the final decision in the Seaside Groundwater Basin adjudication dated March 27, 2006. In the decision, all producers pumping more than five AFY from the basin were assigned initial production allocations based on the assumed "Operating Safe Yield" for the basin and an eventual production allocation based on the assumed "Natural Safe Yield" for the basin. To reach the Natural Safe Yield of the basin, 3,000 AFY, both Cal-Am and non Cal-Am producers will need to develop replacement supplies.

**MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
TECHNICAL MEMORANDUM 2006-02**

APPENDIX A

**Staff Note from MPWMD Special Meeting/Board Workshop
On March 23, 2006: *Water Needs Analysis: Existing Setting and Demand***

ITEM: SPECIAL MEETING/BOARD WORKSHOP**1. WATER NEEDS ANALYSIS: EXISTING SETTING AND DEMAND**

Meeting Date:	March 23, 2006	Budgeted:	N/A
From:	David A. Berger, General Manager	Program/ Line Item No.:	N/A
Prepared By:	Darby Fuerst	Cost Estimate:	N/A

General Counsel Approval: N/A
Committee Recommendation: N/A
CEQA Compliance: N/A

SUMMARY: At its September 8, 2005 Strategic Planning Session, the Monterey Peninsula Water Management District (District) Board indicated its intent to hold a series of workshops on key topics of Board and community interest. This workshop, the third in a series of five, focuses on the existing water needs of customers in the California American Water (Cal-Am) main distribution system in the Monterey Peninsula area. In the workshop, information on existing Cal-Am water demand will be presented, with an emphasis on Water Year 2005. This information will be compared to existing Cal-Am water supplies, also emphasizing Water Year 2005. Based on this comparison and a discussion of the legal constraints on the physical supplies, estimates of the amount of replacement water that is required to reliably meet Cal-Am's existing water demand will be provided. A fourth workshop, scheduled for May 18, 2006, will provide information on the amount of water needed to meet future water needs in the Monterey Peninsula area.

RECOMMENDATION: The Board should receive the staff presentation, receive public comment, and review and discuss the materials provided for the workshop. No Board action will be made as part of this workshop.

BACKGROUND:**Existing Water Demand (Metered Sales)**

During Water Year 2005 (October 1, 2004 through September 30, 2005), Cal-Am produced 13,678 acre-feet (AF) from its wells in the Carmel Valley and Seaside coastal area to meet customer water demand. Of this total, 11,995 AF were delivered to Cal-Am's 37,374 customers¹. Note that the term "customer" refers to a metered connection and not the number of people served at that connection, e.g., the number of residents in a house. **Exhibit 1-A** shows a breakdown of this demand by jurisdiction. **Exhibit 1-B** shows a breakdown of this demand by customer type, e.g. residential versus commercial. For reference, **Exhibit 1-C** shows average annual Cal-Am water demand by customer over time, i.e., from 1986 through 2005. In Water

¹ This total includes Cal-Am customers in the former Rancho Fiesta (21) and Water West (428) water distribution systems.

Year 2005, the average annual demand by all Cal-Am customers was 0.32 acre-feet per year (AFY) or 287 gallons per day. Average annual demand by Cal-Am's residential customers in Water Year 2005 was 0.21 AFY or 183 gallons per day. Assuming an average of three persons in each single-family residence, this equates to an average annual residential demand of approximately 60 gallons per person per day.

Existing Water Supply (Metered Production)

As indicated above, Cal-Am produced 13,678 AF from wells in the Carmel Valley and Seaside coastal area to meet customer water demand² in Water Year 2005. In addition, Cal-Am produced 351 AF from wells in the Carmel Valley for injection and storage in the Seaside Groundwater Basin via the District's Santa Margarita Test Injection Well and 10 AF for backwash purposes. Therefore, Cal-Am's total production from sources that serve its main system in Water Year 2005 was 14,039 AF. The difference between the sum of metered sales, production for injection, and backwash (12,356 AF) and metered production (14,039 AF) in Water Year 2005 was 1,683 AF and is considered unaccounted-for-water use. In Water Year 2005, unaccounted-for-water use, which includes leakage, fire flows, and meter error, was 12% of Cal-Am's total water production.

Of the 14,039 AF of total production, 11,037 AF were produced from wells in the Carmel Valley and 3,002 AF were produced from wells in the coastal subareas of the Seaside Groundwater Basin. **Exhibit 1-D** shows a breakdown of this production by source, which include surface water diversions from the Carmel River at San Clemente Dam, groundwater extractions from the Upper Carmel Valley Alluvial Aquifer, groundwater extractions from the Lower Carmel Valley Alluvial Aquifer, and groundwater extractions from the coastal subareas of the Seaside Groundwater Basin. For reference, **Exhibit 1-E** shows a breakdown of annual production by Cal-Am or its predecessor companies by source over time, i.e., from 1916 through 2005.

Existing Water Needs

Existing water needs are determined by available water supply and existing water demand. Available water supply depends on the physical and legal availability of water and storage capacity. Existing water demand is controlled by the number and type of customers served and weather conditions. Currently, the key constraints on available water supplies in the Monterey Peninsula are legal and relate to State Water Resources Control Board (SWRCB) Order No. WR 95-10 that limits Cal-Am's production from the Carmel River and underlying alluvial aquifer and the Tentative Decision³ in the Seaside Groundwater Basin adjudication that limits Cal-Am's production from the coastal subareas of the Seaside Basin. Each of these constraints is described below.

² This total includes production for riparian irrigation near selected production wells in the vicinity of the Carmel River (2.7 AF), non-revenue metered use (16 AF), and water provided to Cal-Am's Ryan Ranch Unit (2.4 AF).

³ A Tentative Decision was filed by the Court on January 12, 2006, and several requests for clarification were subsequently submitted by the parties. A Modified Tentative Decision was prepared by Cal-Am and filed on February 15, 2006. On February 16, 2006, the Court indicated that it would rule on any objections during the week of March 20, 2006, or order a hearing regarding the objections, if appropriate.

SWRCB Order 95-10: Order 95-10 was issued in July 1995 in response to four complaints filed against Cal-Am and its diversions from the Carmel River and underlying alluvial aquifer. In Order 95-10, it was determined that the water in the Carmel Valley Alluvial Aquifer is water flowing in a “subterranean stream” and subject to the jurisdiction of the SWRCB. Based on its review of Cal-Am’s water right claims, the SWRCB determined that Cal-Am was diverting 10,730 AFY of water from the Carmel River and underlying alluvial aquifer without a valid basis of right and that these diversions were having an adverse affect on the riparian corridor along the river below San Clemente Dam, wildlife that depend on instream flow and riparian habitat, and steelhead that spawn in the Carmel River. Significantly, Cal-Am was ordered to reduce its average production from the Carmel River and underlying alluvial aquifer by 15% in Water Year 1996 and 20% in each subsequent water year. The “base” for this reduction was set at 14,106 AFY, which represents the average of Cal-Am’s annual diversions from the Carmel River and underlying alluvial aquifer during the ten-year period from 1979 through 1988.

Using this base, Order 95-10 limited Cal-Am’s production from the Carmel River and underlying alluvial aquifer to 11,990 AF in Water Year 1996 ($14,106 \times [1 - 0.15] = 11,990$) and 11,285 AF in each subsequent water year ($14,106 \times [1 - 0.20] = 11,285$). This is the current legal limit on Cal-Am’s annual production from the Carmel River and underlying alluvial aquifer.

The SWRCB also used this base (14,106 AFY) to approximate the extent of Cal-Am’s illegal diversions from the Carmel River. By comparing Cal-Am’s recognized maximum rights to water in the Carmel River and underlying alluvial aquifer (3,376 AFY⁴) with Cal-Am’s average production from the Carmel River and underlying alluvial aquifer during the 1979-1988 period (14,106 AFY), the SWRCB found that Cal-Am was unlawfully diverting 10,730 AFY ($14,106 - 3,376 = 10,730$).

Importantly, the amount Cal-Am diverts in excess of its legal rights varies each year depending on actual production. For example, in Water Year 2005, Cal-Am produced 10,686 AF from the Carmel River and underlying alluvial aquifer for customer use⁵. This quantity was 599 AF or 5.3% below the 11,285 AF production limit set by Order 95-10. More to the point, during Water Year 2005, Cal-Am’s unlawful diversions for customer service totaled 7,310 AF ($10,686 - 3,376 = 7,310$). **Exhibit 1-F** shows a comparison of Cal-Am’s actual production from Carmel River sources for customer service with the diversion limits set by Order 95-10 for Water Years 1996 through 2005. **Exhibit 1-F** also indicates the water year class, e.g.: wet versus normal, and shows the amount of water that Cal-Am actually diverted from its Carmel River sources in excess of its recognized rights. This amount of “unlawful diversions” has averaged 7,690 AFY during the past ten years and ranged from a low of 6,778 AF in Water Year 1998 to a high of 9,471 AF in Water Year 1997. Note that Cal-Am has complied with the Order 95-10 diversion limits in all years, except for Water Year 1997⁶.

⁴ This total includes 1,137 AFY of pre-1914 appropriative rights, 60 AFY of riparian rights, and 2,179 AFY of post-1914 appropriative rights.

⁵ This total does not include the 351 AF that were diverted by Cal-Am for injection into the Seaside Basin.

⁶ Although Water Year 1997 was classified as a “Above Normal” year, it was characterized by an extremely wet period from October 1996 through February 1997 (87,040 AF) and an extremely dry period from March 1997 through September 1997 (11,520 AF).

Seaside Groundwater Basin Adjudication: The judgment in the Seaside Groundwater Basin adjudication is expected to be entered in March or April 2006. Based on the Tentative Decision issued in January 2006, it is anticipated that this judgment will determine that the basin is in a state of overdraft and, as part of a “physical solution” establish an “operating yield” for producers in the coastal subareas of the Seaside Basin. Specifically, it is expected that the Court will set the operating yield for the coastal subareas at 4,611 AFY, with 743 AFY assigned to “Alternative Production Allocations” and 3,868 AFY assigned to “Standard Production Allocations”. Cal-Am, as a “Standard Producer” will be allocated rights to produce up to 3,504 AFY from the coastal subareas. Note that this allocation is 496 AFY less than the annual yield previously assumed for Cal-Am from the coastal subareas (4,000 AFY) and used in recent District planning efforts, e.g., *Quarterly Water Supply Strategy and Budget* and *Expanded Water Conservation and Standby Rationing Plan*.

The judgment will also include several mechanisms that will enable Cal-Am to produce more than 3,504 AF of groundwater from the coastal subareas in a year. For example, Cal-Am could (1) acquire the rights to produce more water from other producers in the basin, (2) produce more than its allocated amount and pay a replenishment assessment, (3) forego pumping in one year to establish “carryover credits” and utilize these credits in a subsequent year, and (4) obtain supplemental sources of water to establish “stored water credits” for use. Each of these mechanisms will be administered by the Seaside Basin Watermaster according to a set of rules and regulations to be developed by the Watermaster.

Lastly, the judgment will require that the operating yield for coastal subareas (4,611 AFY) be decreased by 10% every three years starting in year four, e.g. 10% decrease at the start of the fourth year for years four, five, and six, and an additional 10% decrease at the start of the seventh year for years seven, eight and nine, etc. These decreases will continue until production reaches the “natural safe yield” set by the Court for the coastal subareas (2,392 AFY⁷) unless the Watermaster (1) has secured an equivalent amount of “non-native” replacement water and added it to the basin, or (2) the Watermaster has secured an equivalent amount of recycled water and contracted with one or more of the producers in the basin to use this quantity of recycled water in lieu of their production allocation with the producers agreeing to forego their right to claim a storage credit for their forbearance, or (3) any combination of replacement or recycled water results in the required decrease in production of “native water” in the basin, or (4) water levels in the aquifers are sufficient to ensure a positive offshore gradient to prevent seawater intrusion.

If replacement or recycled water supplies are not obtained or groundwater levels are not sufficient to prevent seawater intrusion, Cal-Am’s production allocation in the coastal subareas could ultimately be reduced to 1,494 AFY. This amount equals the natural safe yield for the coastal subareas (2,392 AFY) minus the sum of the Alternative Production Allocations (743 AFY) times Cal-Am’s share of the remaining Standard Production Allocation (90.6%).

⁷ In the Tentative Decision, the “Natural Safe Yield” for the basin is initially assumed to be 3,000 AFY, with 608 AFY assigned to the inland Laguna Seca subarea. The remainder of the initially assumed natural safe yield is assumed to be assigned to the coastal subareas (3,000 – 608 = 2,392).

Replacement Water Required to Meet Existing Water Needs: The amount of replacement water⁸ required to meet existing water needs depends on a number of assumptions, as described below.

1. As a maximum, if one assumes that Cal-Am must replace 10,730 AFY of its production from Carmel River sources (based on Order 95-10) and must replace 2,506 AFY of its production from sources in the Seaside coastal area (based on the Seaside Basin adjudication⁹), then Cal-Am must develop a total of 13,236 AFY of replacement water to meet “existing” water needs in its main water distribution system in the Monterey Peninsula area.
2. As a minimum, if one assumes that Cal-Am must replace 7,690 AFY of its production from Carmel River sources (based on the difference between average actual annual Cal-Am production during the 1996-2005 period [11,066 AFY] and Cal-Am’s recognized rights to Carmel River sources [3,376 AFY]) and must replace 496 AFY of its production from sources in Seaside coastal area (based on the difference between Cal-Am’s average share of the safe yield of the coastal portion of the Seaside Basin that was previously assumed [4,000 AFY] and Cal-Am’s share of the initially assumed operating yield for the coastal portion of the Seaside Basin [3,504 AFY]), then Cal-Am must develop a total of 8,186 AFY of replacement water to meet “existing” water needs in its main water distribution system in the Monterey Peninsula area.

Different assumptions regarding existing water demand and whether or not existing demand is artificially low because of regulatory constraints and which water replacement efforts will be implemented in the Seaside Basin by which producers will result in different estimates of the amount of water required to reliably and legally meet existing water demand in the main Cal-Am system in the Monterey Peninsula area. In general, this amount will range from approximately 8,200 to 13,200 AFY.

EXHIBITS

- 1-A** Distribution of Cal-Am Water Demand by Jurisdiction in Water Year 2005
- 1-B** Distribution of Cal-Am Water Demand by Customer Type in Water Year 2005
- 1-C** Average Annual Cal-Am Demand by Customer for Water Years 1986 - 2005
- 1-D** Distribution of Cal-Am Water Production by Source in Water Year 2005
- 1-E** Cal-Am Water Production by Source: 1916 - 2005
- 1-F** California American Water Annual Production from Carmel River Sources Compared to Diversion Limits Set by State Water Resources Control Board Order 95-10 for Water Years 1996 through 2005

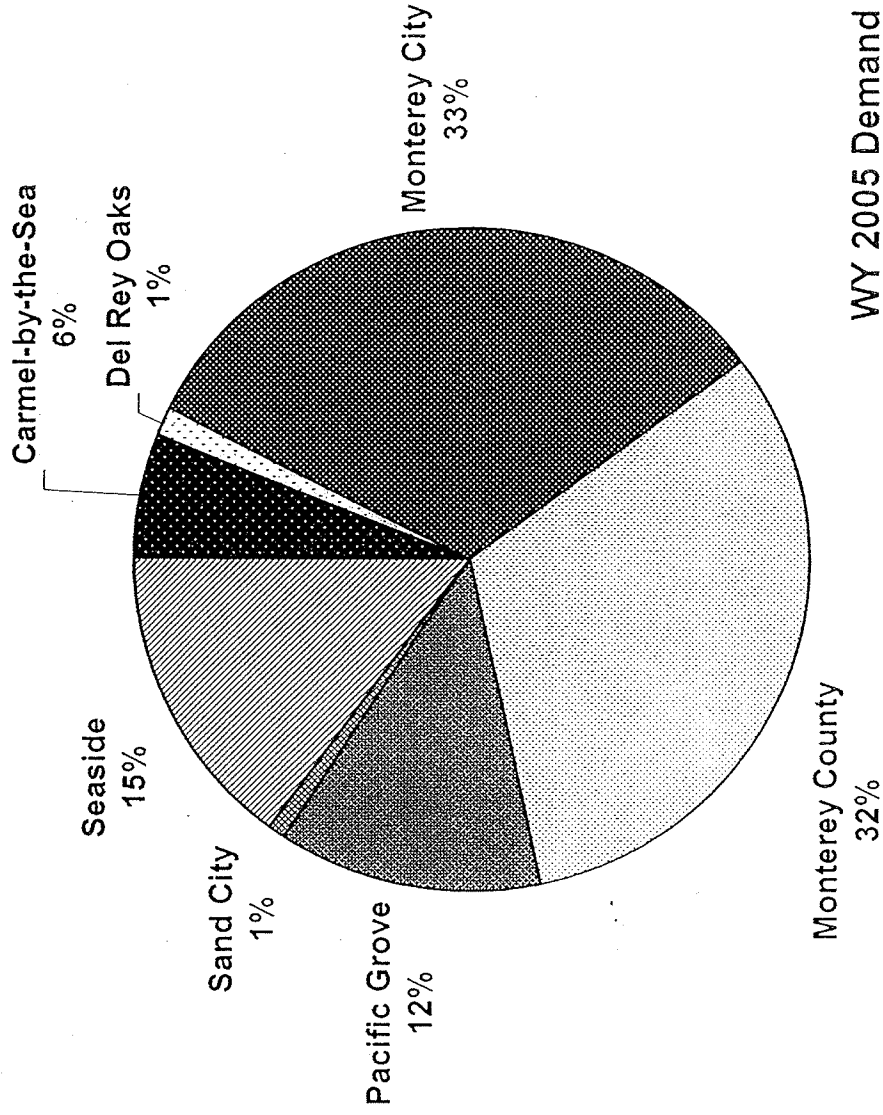
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⁸ In this discussion, “replacement water” includes recycled water and refers to new water supplies that will replace Cal-Am’s existing supplies that are produced without a valid basis of right in the Carmel River Basin or are in excess of Cal-Am’s standard producer’s allocation in the coastal subareas of the Seaside Groundwater Basin.

⁹ This calculation represents the difference between Cal-Am’s share of the safe yield of the coastal portion of the Seaside Basin that was previously assumed (4,000 AFY) and Cal-Am’s share of the natural safe yield indicated in the Tentative Decision (1,494 AFY).

EXHIBIT 1-A

Distribution of Cal-Am Water Demand by Jurisdiction in Water Year 2005
(Values in Acre-Feet)



WY 2005 Demand = 11,995 AF

Distribution of Cal-Am Water Demand by Customer Type in Water Year 2005
(Values in Acre-Feet)

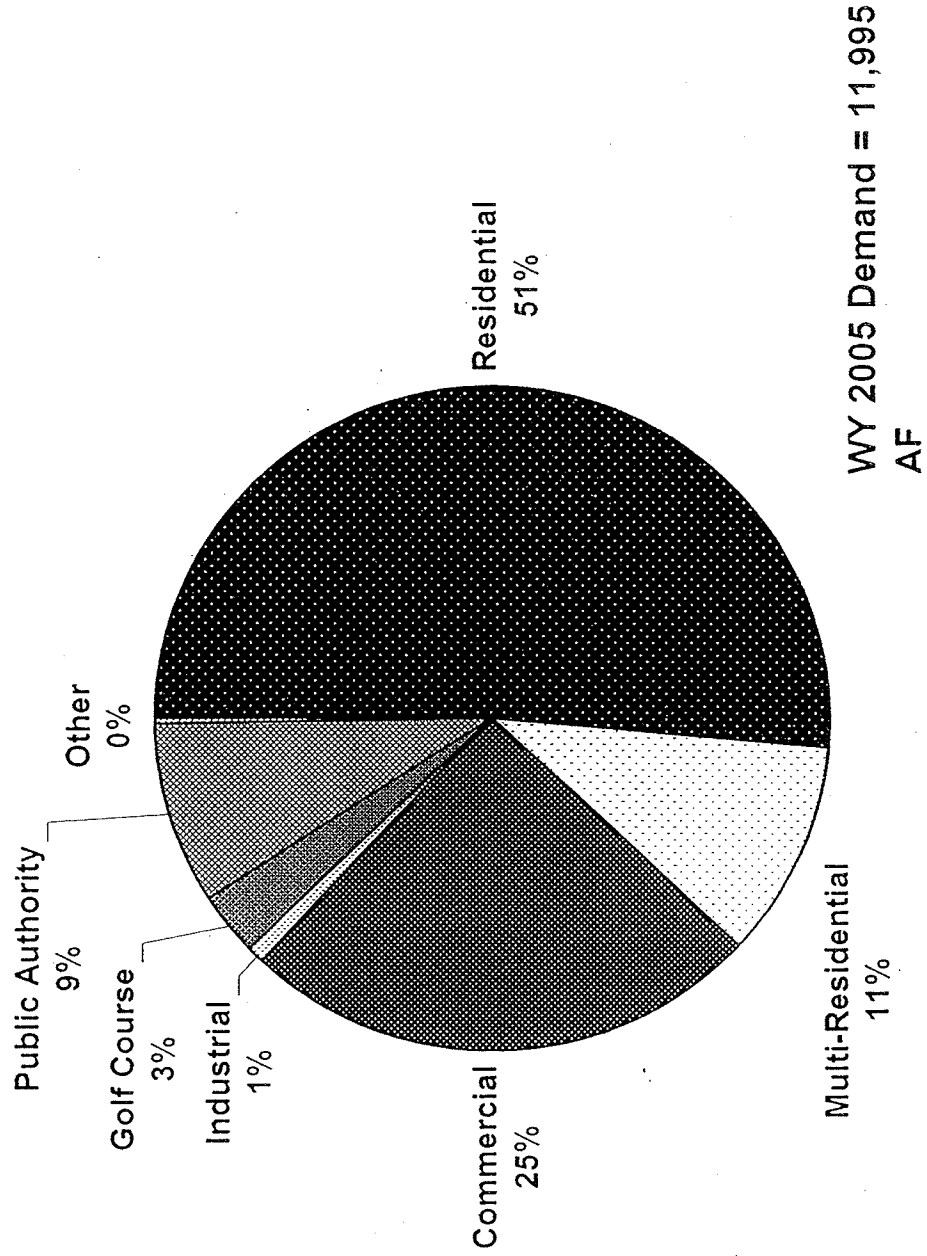


EXHIBIT 1-C

Average Annual Cal-Am Demand by Customer for Water Years 1986 - 2005

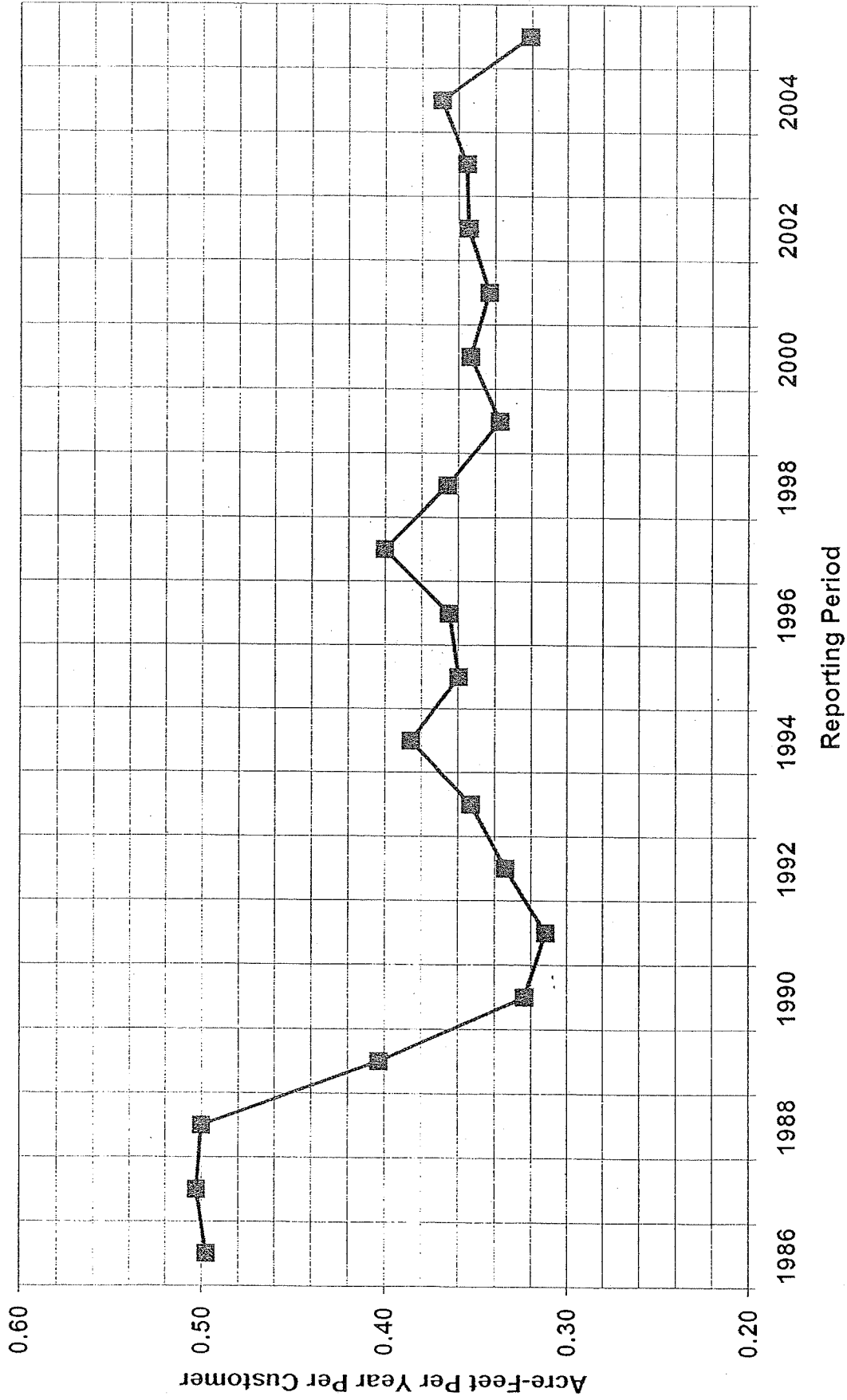
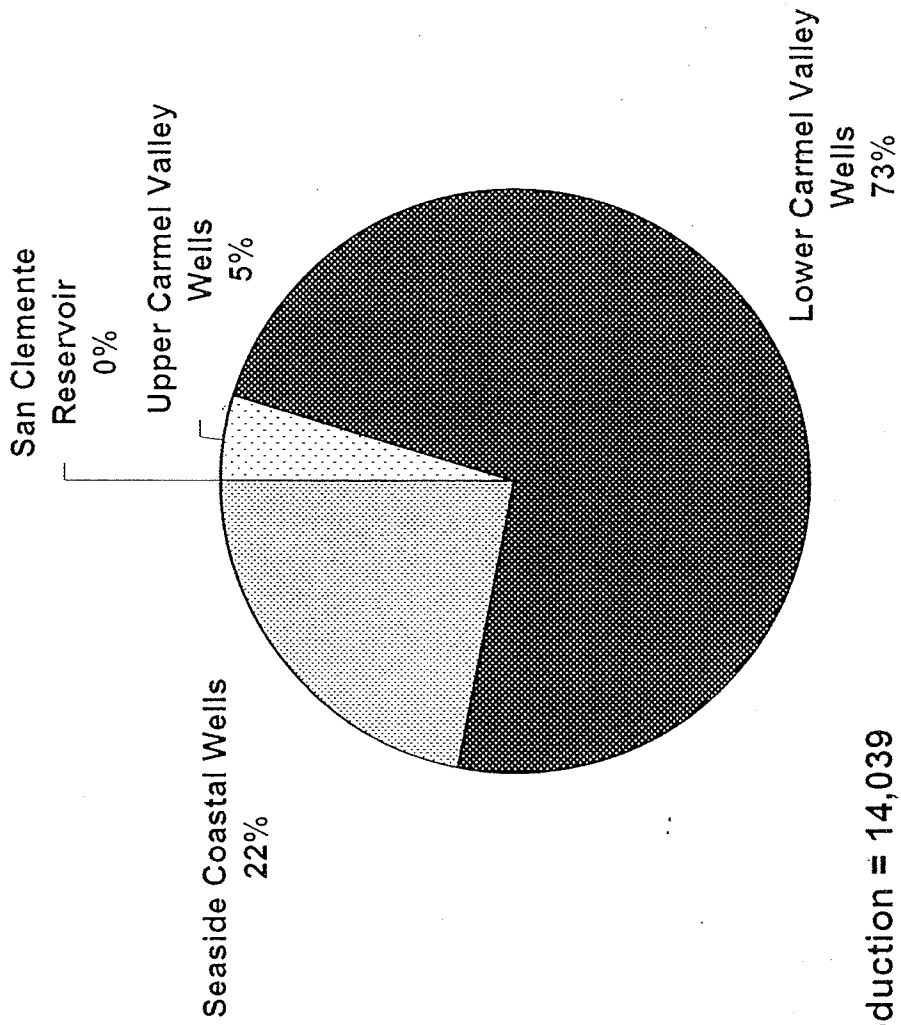


EXHIBIT 1-D

**Distribution of Cal-Am Water Production by Source in Water Year 2005
(Values in Acre-Feet)**



WY 2005 Production = 14,039

EXHIBIT 1-E

Cal-Am Water Production by Source: 1916-2005

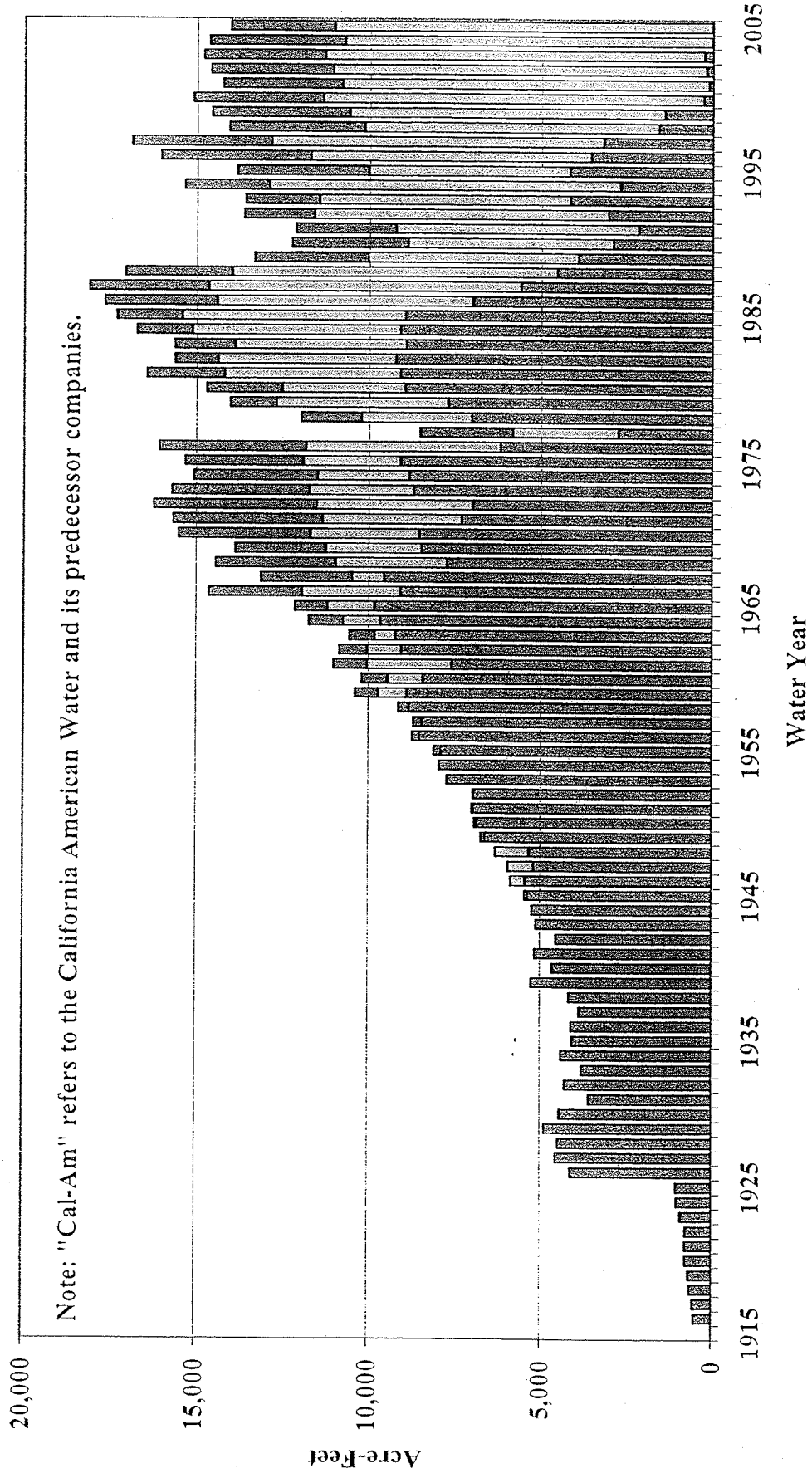
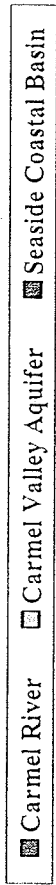


EXHIBIT 1-F

Monterey Peninsula Water Management District

**California American Water Annual Production from Carmel River Sources
Compared to Diversion Limits Set By State Water Resources Control Board
Order 95-10 for Water Years 1996 through 2005**

Water Year	SWRCB Limit (AF)	Cal-Am Production (AF)	Difference		Water Year Class	Unlawful Diversions (AF)
			(AF)	(%)		
1996	11,990	11,701	-289	-2.4%	Above Normal	8,325
1997	11,285	12,847	1,562	13.8%	Above Normal	9,471
1998	11,285	10,154	-1,131	-10.0%	Extremely Wet	6,778
1999	11,285	10,384	-901	-8.0%	Normal	7,008
2000	11,285	11,179	-106	-0.9%	Normal	7,803
2001	11,285	10,721	-564	-5.0%	Normal	7,345
2002	11,285	10,759	-526	-4.7%	Below Normal	7,383
2003	11,285	11,131	-154	-1.4%	Normal	7,755
2004	11,285	11,094	-191	-1.7%	Below Normal	7,718
2005	11,285	10,686	-599	-5.3%	Wet	7,310
Average:		11,066	-290	-2.6%		7,690

Source: California American Water, Monthly Production Reports

Notes:

1. Production values have been adjusted to exclude diversions that were made for injection into the coastal subareas of the Seaside Groundwater Basin.
2. Cal-Am's annual "unlawful diversions" are calculated as Cal-Am's actual annual diversions from Carmel River sources minus Cal-Am's "recognized" rights to divert from the Carmel River system, i.e., 3,376 acre-feet per year.