4.3 Water Supply and Availability

This chapter assesses impacts related to water supply and availability for the September Ranch Project for purposes of CEQA, and, for clarity, also provides additional information related to water rights. In conjunction with the Draft REIR, Kennedy/Jenks Consultants (KJC) prepared a hydrogeologic report for the proposed project. The purpose of the KJC hydrological report was to assess the long-term water supply for the project, to prepare a water balance for the project, to determine where September Ranch's water rights fit in the hierarchy of relevant water rights, and to determine the environmental impact of diversions for September Ranch on nearby water supplies.

For purposes of the CEQA impact analysis, this chapter uses an amount of three (3) acre-feet per year as the environmental baseline. Based on this baseline and the determination that the project will have a water demand of 57.21 AFY, this chapter concludes that the September Ranch Aquifer (SRA), which underlies the project site, will provide an adequate and reliable long-term water supply for the proposed project. This conclusion is based upon a historical record of variable rainfall and on a detailed understanding of the water resources in the SRA and vicinity. Even in the driest years on record, there has been sufficient rainfall and recharge to ensure sufficient water is stored within the SRA to meet long-term project demand. This chapter also evaluates demand on the CVA based on water pumping and water rights data and concludes that the exercise of water rights by September Ranch will not result in injury to water rights that are more senior to, or of the same priority as, September Ranch.

Finally, this chapter concludes that the project will result in a less than significant impact on the water resources of the September Ranch Aquifer (SRA) and the adjacent Carmel Valley Aquifer (CVA).

4.3.1 Interplay of California Water Rights and CEQA Analysis

California administers water rights under a bifurcated system that generally separates water rights associated with surface water from water rights associated with "percolating groundwater." One exception to this separation exists when groundwater is deemed to be underflow or subsurface flow of a surface water system (also called a subterranean stream flowing through a known and definite channel). There is no clear judicial or regulatory test for when groundwater is deemed underflow/subsurface flow of a surface water system versus percolating groundwater, and there is currently an ongoing and extensive debate in the water rights community on this issue. (See, for example, Review of the Laws Establishing the SWRCB's Permitting Authority Over Appropriations of Groundwater Classified as Subterranean Streams and the SWRCB's Implementation of Those Laws, SWRCB No. 0-076-300-0 (January 19, 2002)). The conclusion is drawn from a century of judicial and regulatory opinions that some limited hydrologic connectivity between water under the ground and a surface water system does not automatically mean that the water under the ground is surface water rather than percolating groundwater. Beyond this conclusion, there is no factual bright-line test to determine whether water under the ground is percolating groundwater or a subterranean stream. To address the uncertainty in this area, the courts have developed a presumption that water under the ground is percolating groundwater, and not surface water, unless there is sufficient evidence to the contrary. (*Los Angeles v. Pomeroy* (1899) 124 Cal. 597, 628.) The burden of proof is on the person asserting that groundwater is not percolating but is instead a subterranean stream flowing through a known and definite channel. (*Id.*) The State Water Resources Control Board (SWRCB) has permitting authority over post-1914 appropriative rights to subterranean streams, but does not have jurisdiction over riparian or pre-1914 rights to subterranean streams. The SWRCB likewise does not have jurisdiction over percolating groundwater.

In 1995, the SWRCB evaluated the water rights of the California-American Water Company (Cal-Am) in the Carmel Valley and concluded that the water in the Carmel Valley Aquifer (CVA) below and surrounding the Carmel River was not properly classified as percolating groundwater, but rather was classified as underflow of the Carmel River (*i.e.*, a subterranean stream) and, thus, subject to the surface water rights system (SWRCB Order No. WR 95-10, [July 6, 1995] at 12 ("Cal-Am and other parties did not contest the testimony and evidence which describes the subsurface flow of the Carmel River as a subterranean stream flowing through a known and definite channel.")). Documents from the Monterey Peninsula Water Management District, the SWRCB, and other sources alternately refer to this subsurface flow as the Carmel Valley Aquifer (or CVA), the Carmel Valley Alluvium Aquifer, the underflow of the Carmel River, the subterranean flow of the Carmel River, and underflow of the Carmel River. This Draft REIR uses the term "Carmel Valley Aquifer" or "CVA" to refer to this subsurface flow.

There has been no definitive classification as to whether the September Ranch Aquifer (SRA) adjacent to the CVA is properly classified as "percolating groundwater" or as a subterranean stream which is part of the CVA. As explained herein, the evidence in the record demonstrates that there is a limited and inconsistent hydrologic connection resulting in relatively little exchange of water between the SRA and the CVA. Based upon this evidence, this chapter concludes that the CVA and SRA are separate groundwater basins, that the SRA is percolating groundwater, and that the project would be exercising overlying groundwater rights to the SRA. An overlying right exists by nature of the parcel of land overlying an aquifer of percolating groundwater. Such a right may be exercised anywhere on the parcel. The overlying right is a right to withdraw percolating groundwater from the aquifer in an amount that may be used in a reasonable and beneficial manner on the overlying parcel. The overlying right is a correlative right, meaning that all parcel owners overlying that basin must share the water of the basin according to their reasonable use.

There has been a competing, but less persuasive, suggestion that the CVA and SRA may be a common or single basin, best summarized by a letter from individual staff members at the SWRCB, Division of Water Rights (See analysis of SWRCB staff letter in Appendix to KJA Hydrology Report). As noted above, if this were true then water pumped for the project would be considered surface water, and would be pumped either pursuant to: (1) a riparian or pre-1914 appropriative right to the adjacent CVA; or (2) a post-1914 appropriative right issued by the State Water Resources Control Board. A riparian right is a right that exists by nature of a parcel sitting adjacent to a water course. Because of the proximity of the parcel to the water course, the law imputes to the parcel a right to divert water to the parcel. All owners of riparian parcels may divert the water necessary for use on their parcel, so long as the use is reasonable and beneficial. The right, however, is said to be "correlative" with all other riparian rights.

While these issues of water rights provide useful context for this Draft REIR, CEQA is solely concerned with determining the nature and magnitude of any physical change (*i.e.*, "impact") in the environment that may result from a proposed project. With respect to water supply, CEQA is concerned with whether the proposed supply is physically available, and whether the use of the supply will result in any reasonably foreseeable significant adverse physical changes to other environmental resources such as, for example, the integrity of a groundwater basin, water supply for other users, or impacts to biological resources. Accordingly, this chapter describes the very limited and inconsistent connectivity between the September Ranch Aquifer and the Carmel Valley Aquifer, and the even more tenuous connection between the September Ranch Aquifer and the Carmel River, and assesses the nature and magnitude of any physical change in all three systems associated with pumping water for the project from the September Ranch Aquifer.

In contrast, the purely legal issues of whether the September Ranch Aquifer is properly classified as "percolating groundwater" or "surface water," and whether the September Ranch property holds either an "overlying" (groundwater) or "riparian" (surface water) right do not, by themselves, implicate changes to the physical environment, and therefore are not relevant (except as to context) to the CEQA impact analysis. As an analogy, an EIR on a proposed development project does not analyze whether the applicant is the legal owner of the property with the right to construct/ on that property. Rather, the EIR analyzes the impacts of construction and operation of the project, and leaves the question of ownership and property rights to other regulatory approval processes.

Other than context, there is only one circumstance in which a water right analysis may be relevant to a CEQA analysis, and that is if the exercise of a riparian or overlying right would displace existing water uses by virtue of the "seniority" of the riparian or overlying right, so that the existing uses were required to obtain a water supply elsewhere. For this reason, and in order to respond to specific questions from the Court of Appeal in *Save Our Peninsula Committee v. Monterey County Bd. of Supervisors* (2001) 87 Cal. App. 4th 99, Monterey County has included a water right analysis in this Draft REIR. This Draft REIR thus describes relevant hydrogeologic evidence and assesses water rights, and concludes that: (i) substantial evidence indicates that the September Ranch Aquifer is properly characterized as percolating groundwater, and therefore the relevant right held by the September Ranch property is an overlying right, and not the riparian right which would be relevant if the SRA was classified as surface water; and (ii) under either water right system, the project's use of water from the SRA will not injure any senior water right holders and will not displace junior water users. In this regard, it should be noted that Monterey County is not the final arbiter of whether any particular property has riparian or overlying rights. Such a binding determination may only be made by a court of competent jurisdiction.

In order to determine whether the September Ranch property held riparian rights to the CVA (assuming for purposes of the question that the SRA and CVA had an extensive hydrologic connection and the SRA otherwise qualified as sub-surface "surface water"), in the fall of 2002, the County retained Downey Brand LLP (Sacramento, CA) to perform an independent review of the water rights of September Ranch and to determine what water rights (if any) were associated with that parcel of land. Downey Brand LLP's review was based on public records of the SWRCB and a chain of title of deeds and other conveyance documents for the September Ranch parcel (gathered by an independent researcher) that reviewed every land conveyance document associated with the project lands back to the original patenting of the parcel. In this way Downey Brand could confirm whether previous subdivisions of the September Ranch site had resulted in some parcels losing riparian rights. After reviewing the complete chain of title, in January 2003 Downey Brand LLP issued a legal opinion that (assuming extensive hydrologic connection between the SRA and the CVA) the September Ranch parcel is riparian to the Carmel Valley Aquifer (and hence to Carmel River). Downey Brand also noted that as a result of an agreement that is part of the chain of title (between the predecessors-in-interest of September Ranch Partners and Cal-Am) the riparian right held by September Ranch had been subordinated to the pre-1914 rights held by Cal-Am. In order to effectuate this subordination, for purposes of the water right analysis Downey Brand LLP assigned a priority date to September Ranch which is junior to the priority date of Cal-Am's pre-1914 rights. For purposes of analyzing the relative priority of the water rights, Downey Brand LLP adopted the most conservative assumption—*i.e.*, that September Ranch's riparian right was also subordinated to all other riparian parcels. The results of the water right analysis are presented below.

4.3.2 Analysis of Senior Water Rights

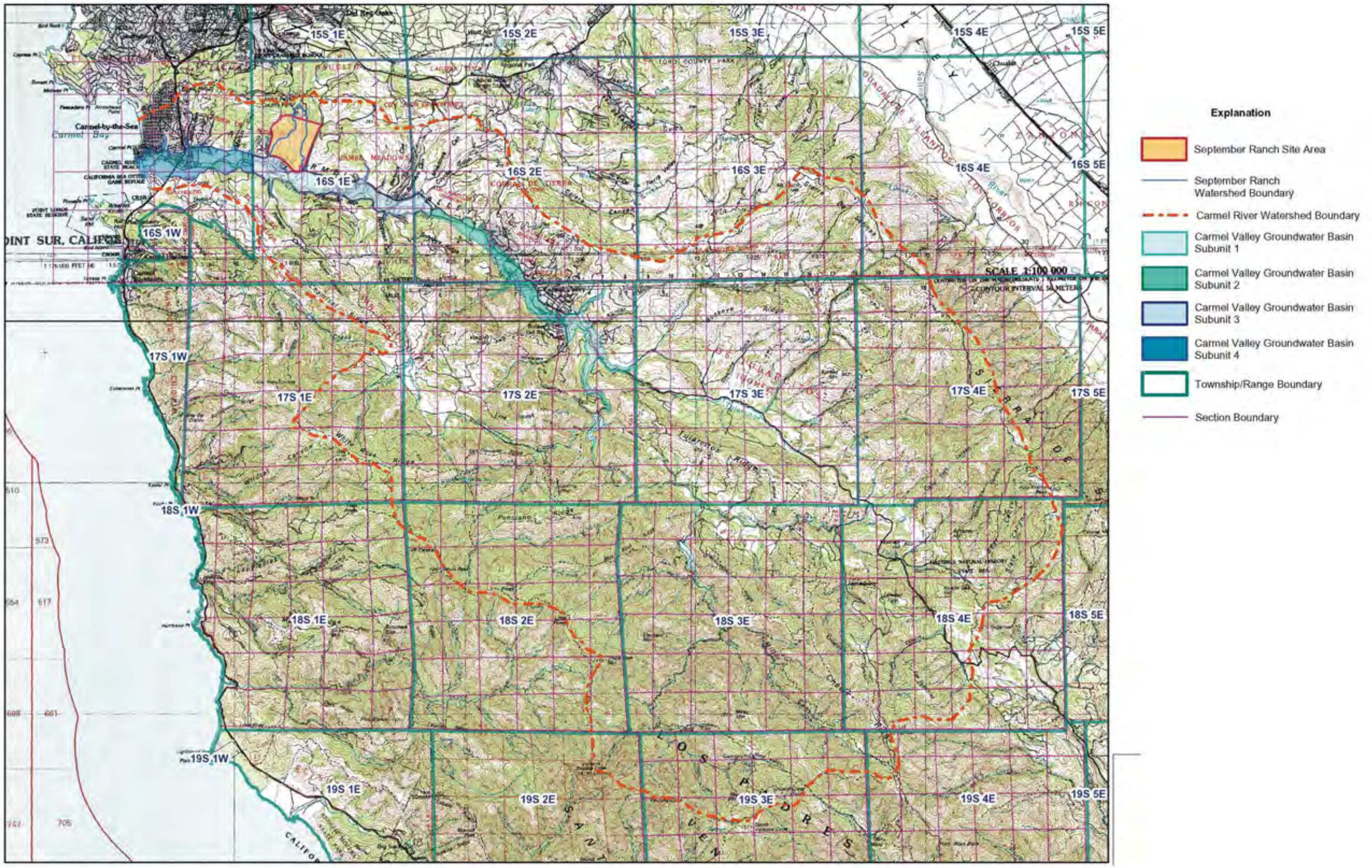
As noted above, this chapter concludes that the SRA and CVA are separate and distinct basins. As a result, the project would exercise an overlying groundwater right. Under this analysis, no consideration is required of the impact of the project on water rights to the CVA. However, due to the inquiries posed by the Court of Appeal, this chapter does include a discussion of the water rights of the CVA, and the extent to which a diversion by September Ranch from the CVA would affect those water rights. This analysis is divided into two inquires:

- Identify the quantities associated with relevant superior (i.e., "senior") water rights to those of September Ranch, if September Ranch was exercising a riparian right to the CVA; and
- Determine whether pumping by September Ranch might negatively affect senior water rights.

Analysis of Relevant Water Rights

The Water Rights Information Management System (WRIMS) database managed by the State Water Resource Control Board was used to collect data for the water rights analysis. Use of the database required substantial preprocessing of data including holder of rights locations. The method used was as follows:

- The rich text format (RTF) file provided by the SWRCB was manually entered into a spreadsheet database because there was no expedient means of converting the file and SWRCB could not provide an electronic file that could be easily converted into a spreadsheet or database format. Duplicate records were eliminated.
- The data that were classified as of type "STATE" (short for Statement) were assembled, since they represent those records that could include riparian water rights and pre-1914 rights, those types of rights for which water users are required to file statements with the SWRCB). All of the other data types were for post-1914 appropriative rights that are therefore subordinate to September Ranch.
- A map that shows the Carmel River Watershed with the township, range, and section delineations consistent with the U.S. Geological Survey topographic mapping was prepared (see Exhibit 4.3-1). It was determined that those water rights found in Aquifer subunits 1 and 2 (AQ 1 and AQ 2) were not considered further for the analysis because the water balance analysis accounts for water rights by only examining that flow of water that exists after diversions in AQ 1 and AQ 2, since the project site is downstream from these subunits. The water balance will be the basis for determining the potential effects of pumping in the SRA on the CVA as discussed in further detail under 4.3.4, Project Impacts.



Source: Kennedy/Jenks Consultants, November 2004.

22641 11320.5 0 22641

SCALE IN FEET

Michael Brandman Associates

Exhibit 4.3-1
Carmel River Watershed

- The records in the WRIMS database that remained after removing all record types except those identified as STATE and removing all record types associated with the point of diversion locations upstream of the project site in AQ 1 and AQ 2, are those potential riparian and appropriative water rights in Aquifer subunits 3 and 4 (AQ 3 and AQ 4), which are relevant for consideration to evaluate the potential effects of pumping in the SRA.

Water Rights Decision 1632 Tables 5, 12, and 13 and WRD 95-10

Since the remaining data in the WRIMS database does not distinguish between riparian and appropriative water rights, Tables 5, 12, and 13 from Water Rights Decision 1632, were reviewed because they contain some limited information on those entities that filed water rights claims and the basis (riparian, pre and post 1914 appropriative, and groundwater) for the claim. Water Rights Decision 1632 - Table 15 is entitled Prior Right Protests, Table 12 is entitled Protests Based Upon Riparian Claims and Table 13 is entitled Carmel River Watershed - SWRCB Determination of Priority and Quantities Obtained from Stipulations, Applications, or Protests (AFA).

Based on the information contained in those tables, the remaining data in the WRIMS database were reviewed to remove those entries that were based on an application number (i.e., post-1914 appropriative). Any record from Table 12 that was based on a tributary to the Carmel River was also removed since it is assumed that most of the tributaries are in AQ 1 and AQ 2. Table 12 does not provide any information on the location of the water diversion. Cal-Am's pre-1914 appropriative rights are set at 1,137 AFA; however, it should be noted that Water Rights Decisions 95-10 requires Cal-Am to cease and desist diversion of any water in excess of 14,106 AFA from the Carmel River "until unlawful diversions from the Carmel River are ended." The analysis in this section relies upon the results of Carmel Valley Simulation model (CVSIM) provided by MPWMD, which accounts for all Cal-Am diversions from the Carmel River, not just those exercising the pre-1914 appropriative rights.

MPWMD Pumping Reports

MPWMD pumping reports for 2002 were reviewed and as previously discussed, pumping in AQ1 and AQ2 were not considered. Those records that remained for AQ3 and AQ4 were compared to the information in the WRIMS database that remained after applying filters. For those entities that remained, the actual 2002 production values were compared with claims made as part of Statements of Diversion submitted to the SWRCB and entered into the WRIMS database. In most cases, the estimated diversions made in the Statements of Diversions were much higher than those reported as actual usage to MPWMD.

Then, those entities in AQ3 and AQ4 that reported pumping to MPWMD but did not report the pumping to the SWRCB were assumed to be riparian users. The actual pumping in 2002 for each of these riparian users was summed to provide a point of reference for the quantities. The information is summarized in Table 4.3-1 below.

Table 4.3-1: MPWMD 2002 Pumping Data in AQ3 and AQ4

Aquifer Subunit	Total Pumped and Reported to MPWMD (AFA)(excludes Cal-Am)	Total Reported as STATE to SWRCB (AFA)	Total Not Reported to SWRCB (AFA)
3	1,161	513	648
4	786	570	216
Source: Kennedy/Jenks Consultants, February 2006.			

Relevant Water Rights

Table 8 of Appendix C of this recirculated REIR, summarizes those water rights that remained after applying the appropriate filters to remove irrelevant records. Under the methodology of the data analysis model used for this report, those records that remain represent riparian rights holders and pre-1914 appropriative Cal-Am rights of 1,136 AFA.

The data from the different sources were reviewed and an estimate created of the maximum annual use that these water rights holders may represent. Where available, the information from Table 13 of WRD 1632 was used, otherwise, the Maximum Annual Use in the WRIMS database was used. In the case where neither of these information sources was available, the maximum direct diversion rate was applied for 365 days per year to estimate a total maximum use.

The 2002 estimated pumping in AQ3 and AQ4 from MPWMD were each increased by 20 percent to represent the inherent variability in pumping as well as under-pumping and unreported pumping by riparian users. It is estimated that 20 percent is appropriate because of the limited potential for additional large development, and hence additional large water demands, in the area of influence of the Carmel River. In addition, in most cases, actual pumping is much lower than the water rights claims that have been documented with the SWRCB.

Some of the WRIMS records that remain are for APPLC, which appears to indicate that even though the entity has a riparian right they have chosen to file for an appropriative right as well, or based on other information, that the entity is a riparian rights holder.

Based on this evaluation, there appears to be a maximum annual use of up to 4,550 AFA for riparian rights and pre-1914 appropriative rights holders in AQ3 and AQ4. Although there is not sufficient information to better allocate these water rights holders to AQ3 and AQ4, an estimate based on pumping reported to MPWMD is that 60 percent of the pumping may occur in AQ3 and 40 percent in AQ4. At these ratios, AQ3 may represent about 2,705 AFA and AQ4 may represent about 1,845 AFA of water use by riparian and pre-1914 appropriators.

This maximum annual use number is conservative in that it assumes that the maximum use cited by an entity is pumped, plus a further 20% increase to address uncertainty. Based on the MPWMD pumping data, actual water use appears to be significantly lower than that which an entity cites.

This evaluation does not include the following:

- Estimates of future demands for riparian water based on changes/maturing of land uses because such estimates would be extremely speculative.

- Conclusive identification of all pre-1914 appropriative rights holders. It appears likely that all of the significant pre-1914 water rights have been identified through the methodology used by KJC. In addition, the conservative factors built into the methodology should cover other unidentified pre-1914 right holders.
- Confirmation of points of diversion in WRIMS database for accuracy and cross-referencing with assessors parcel numbers or other information that could improve the accuracy of locating water rights users. Once again, however, the conservative factors built into the methodology should cover any errors in this area.

Conclusions of Water Rights Evaluation

As may be expected, there is considerable water use in AQ3 and AQ4 that may fall into the category of riparian or pre-1914 water rights holders. In order to evaluate whether pumping by September Ranch (if it were exercising a riparian right to the CVA) could affect these potentially senior water rights that have been identified in the CVA, several things should be considered.

- There is extremely limited hydraulic connectivity between the SRA and the CVA AQ3; and in most cases, it is likely to be flow from the SRA to the CVA AQ3. It is extremely unlikely for the hydraulic gradient to allow flow from the CVA AQ3 to the SRA. Therefore, it is expected that there is almost no effect of pumping in the SRA to the CVA AQ3.
- To evaluate whether the exercising of September Ranch's pumping (if it exercised riparian rights to the CVA) would impact those water rights identified in this report that are (or potentially are) senior within the CVA, one must determine whether there is more water available than is needed, and if so, how much water is available. Analyses of CVSIM water balance simulation model results provided by MPWMD for AQ3 and AQ4 were prepared with results as follows:
    - CVA AQ3 - Based on the 45 year CVSIM simulation results provided, the water balance in AQ3 is such that the average difference between the inflow and the outflow is about 7,500 AFY. During the 1984 - 1991 dry period, the average difference between the inflow and the outflow in AQ3 is about 6,800 AFA. When compared to the approximately 2,705 AFA that is needed to meet the estimated maximum annual use in AQ3 described above, it appears that sufficient groundwater is available in storage in AQ3 on average as well as during a dry period to meet the needs of the riparian and pre-1914 appropriative rights holders with significant water remaining. Therefore, there appears to be sufficient water in AQ3 with excess flow to meet the needs of the riparian and pre-1914 appropriate rights holders.
    - CVA AQ4 - The analogous analysis of the 45-year CVSIM simulation results provided for AQ4 indicates that the average difference between the inflow and the outflow is about 2,500 AFY. During the 1984 - 1991 dry period, the average difference between the inflow and the outflow in AQ4 is about 2,300 AFA. When compared to the approximately 1,845 AFA that is needed to meet the estimated maximum annual use in AQ4, it appears that sufficient groundwater is available in storage in AQ4 on average as well as during a dry period to meet the needs of the riparian and pre-1914 appropriative rights holders with significant water remaining. Therefore, there appears to be sufficient

water in AQ4 with excess flow to meet the needs of the riparian and pre-1914 appropriate rights holders

- Aggregate CVA AQ3 and AQ4 - Since the distribution of riparian and pre-1914 appropriators in AQ3 and AQ4 were estimated and have not been confirmed, it is appropriate to evaluate the water availability in aggregate for AQ3 and AQ4 against the aggregate water rights for AQ3 and AQ4 based on a water balance as summarized below:

  Inflow - Outflow AQ3 for 45 years = 7,500 AFA
  Inflow - Outflow AQ4 for 45 years = 2,500 AFA
  Total Inflow - Outflow for AQ3 and AQ4 for 45 years = 10,000 AFA

  Total Riparian and Pre-1914 Riparian Water Rights for AQ3 and AQ4 = 4,550 AFA which is less than 10,000 AFA available

  Inflow - Outflow AQ3 for 1984 - 1991 dry period = 6,800 AFA
  Inflow - Outflow AQ4 for 1984 - 1991 dry period = 2,300 AFA
  Total Inflow - Outflow for AQ3 and AQ4 for 1984 to 1991 dry period = 9,100 AFA

  Total Riparian and Pre-1914 Riparian Water Rights for AQ3 and AQ4 = 4,550 AFA which is less than 9,100 AFA available

Under existing conditions, there appears to be sufficient water on aggregate in AQ3 and AQ4 to meet the needs of the riparian and pre-1914 appropriate rights holders with significant water remaining. Moreover, potential spillage from the SRA is not needed to meet the maximum use in AQ3 and is likely to be part of excess outflow from AQ3 to AQ4 and AQ4 to the ocean.

4.3.3 Environmental Setting

Baseline Water Usage

Kennedy/Jenks' analysis does not include an independent evaluation of the baseline water usage. During the certification of the 1998 Final EIR the County Supervisors determined that a baseline of 51 acre-feet per year was appropriate. This amount, however, included within the baseline water pumped after the initiation of the EIR process, and also included water pumped as part of an aquifer test. This methodology was found by the Court of Appeal to be flawed based upon the period of the pumping, the inclusion of water pumped for an aquifer test, and the failure to present documented water usage from prior to the initiation of the EIR:

> "… there is no objection to the EIR's methodology of estimating historical water use on property where no documentation is available to verify actual use. But estimating water used for irrigation where there was no substantial evidence to show that the property was in fact irrigated does not accurately reflect existing conditions. Appellant's argument that it was entitled to use this amount of water for irrigation is not the same as actual use. As various courts, including this one, have held, the impact of the project must be measured against 'real conditions on the ground."

Therefore, as previously stated, the hydrogeologic report uses an amount of three (3) acre-feet per year as the environmental baseline for purposes of the CEQA impact analysis. This amount was determined by the County as the relevant condition prior to and at the time of the 1995 project application. The amount is based on water usage for a single residence (0.5 AFY) and the amount of water applied for 50 horses (45 gallons per horse per day for drinking, washing, and related uses for a total of 2.5 AFY). The selected baseline appears to be reasonable and representative of aggregate average water usage of undeveloped nonresidential land-use in the Camel Valley.

In certain places this chapter identifies that, despite the 3 AFY baseline, current pumping at the site is 99 AFY. This information is included to provide full disclosure to the public of current site conditions. However, the 99 AFY figure is not used as the environmental baseline. The reader should note that all impact analyses are prepared using a baseline of 3 AFY.

Hydrologic Setting

Physiography

The northern portion of the project site consists essentially of north-south trending ridges and three canyons (September Ranch, Roach, and Canada de la Segunda) sloping southward to the Carmel River Valley. The drainages are generally deeply incised and have steep canyon walls. The ridges are locally modified by side canyons, erosional gullies, landslides, colluvial wedges, and old river terraces. The southern portion of the project site is a flat to gently sloping, east-west trending, elongated terrace bounded on the north by the sharp slope break with the ridges and on the south by a low knoll. The knoll separates the terrace from the Carmel River channel; the top of the knoll is approximately 60 feet above the lowest elevation of the terrace surface and 100 feet above the elevation of the Carmel River (Kleinfelder 2003).

The project site lies adjacent to CVA subunit 3 (AQ3), which is the third of four groundwater aquifers underneath the Carmel River along the floor of the Carmel Valley. The location of limited connectivity between the CVA and SRA is subsequently described in this section. The four aquifer subunits are shown on Exhibit 4-3-1. As discussed earlier, and in the Hydrogeologic Report, AQ3 lies downstream of Aquifer Subunit 2 (AQ2) and Aquifer Subunit 1 (AQ1) and upstream of Aquifer Subunit 4 (AQ4). The CVA has been extensively studied as described in the USGS Water Investigations Report 83-4280 that is described and cited in SWRCB Order WR No. 95-10 and Decision 1632.

Hydrometeorologic Setting

Since the lands overlying the SRA are relatively isolated from adjacent watersheds, the main source of recharge is from precipitation. The September Ranch Subdivision Project is about 3¼ miles from the Pacific Ocean in the Carmel Valley and its climate is influenced by fog from the west. The Mediterranean climate of Carmel Valley is typically wet in winter and dry in summer. The rainfall at the September Ranch site is considered to be approximately 18.17 inches in average rainfall years

The rainfall data was recorded at the San Clemente Dam, which is located approximately 17 miles upstream from the proposed project site, is calculated to be 21.4 inches in average rainfall years according to Monterey Peninsula Water Management District (MPWMD). As discussed in Todd (1992), the average rainfall at the September Ranch site is assumed to be 15.1 percent less than that recorded at the San Clemente Dam based on the California Department of Forestry Fire and Resource Assessment Program contour map. Based on precipitation data from the San Clemente Dam, total precipitation for representative average water years 1996 and 1997 was 19.02 and 18.40 inches, respectively. Average precipitation for representative drought water years 1987 through 1991 was 11.0 inches. This data was used by KJC to assess potential recharge to the September Ranch Aquifer.

Soils

Soils present on the September Ranch terrace include Lockwood series shaly loam (LeC), Chualar loam (CbB), xerorthents dissected (Xd), and Arroyo Seco gravelly sandy loam (AsB) (Kleinfelder 2003).

LeC soils are black, slightly acid, shaly and very shaly loams that are underlain by brown very gravelly sandy loam. They contain 45 to 50 percent gravel and 10 to 20 percent cobbles. The CbB has a surface layer of loam to light sandy clay loam that is commonly 10 to 20 inches thick. The substratum varies considerably over short distances and in places is underlain by gravel, cobbles, or clay deposits. The Xd soils consist mainly of unconsolidated or weakly consolidated alluvium that commonly contains pebbles, and cobbles. AsB soils are gently sloping soils on alluvial fans and plains. The soils are grayish brown, neutral to mildly alkaline, gravelly sandy loam.

Geology

The following is a summary of the site geology and a more detailed discussion is included within Section 4.2, Geology and Soils and within Appendix B of this recirculated REIR. The basal geologic unit within the proposed project site area is the Aguajito Shale member of the Miocene Monterey Formation (Tm), consisting generally of thin-bedded siliceous shale (Kleinfelder 2003; Geoconsultants 1995; Todd 1992). The Tm is exposed in the hills in the northern portion of the project site, on the Knoll in the southeast portion of the project site, and has been encountered in water wells and detected in vertical electric sounding (VES) probes conducted at the site (Todd 1997).

The Tm is overlain by several unconsolidated clastic sedimentary deposits. The oldest unit present in the southern part of the proposed project site is older alluvium terrace deposits that have been divided by Todd (1992) into units, dating from the youngest:

- Alluvium (Qg and Qa) and colluvium (Qcol) landslide deposits that occur in the northern and southern parts of the site (Geoconsultants 1995; Kleinfelder 2003; Todd 1992);
- Younger, primary water bearing unit Qoa1 shown as Qt1 in Kleinfelder (2003); and
- Older low-permeability Qoa2 that is classified as an aquitard separating Qoa1 and the underlying Tm. This unit impedes groundwater flow between the SRA and CVA at certain locations.

The Hatton Canyon Fault

A trace of the Hatton Canyon Fault (the name of a group of northwest-trending, steeply-dipping reverse faults) (Rosenberg and Clark 1994), traverses the project site from the northwest to the southeast, slightly southwest of the slope break dividing the flatter southern portion of the site from the hilly northern portion of the site (Kleinfelder 2003). Trenches excavated by Terratech in December 2002 show landslide deposits offset along this trace, suggesting that the fault is active.

Based on the mapped location of the Hatton Canyon fault and the best available well locations at September Ranch, the September Ranch wells may all be southwest of the Hatton Canyon fault (see 24.3-1, Well Locations). The wells are not located in a portion of the aquifer that would be confined by the fault. It is not currently known if the Hatton Canyon fault offsets alluvial material within the September Ranch terrace. If the fault extends upward to near the terrace surface, it could form a full or partial (leaky) barrier to groundwater flow.

Based on Kleinfelder's 2003 findings, there is no evidence currently known to suggest that the Hatton Canyon fault serves as a hydraulic barrier or conduit of groundwater to influence water resources in the SRA or influence the SRA's hydraulic connection with the CVA.

Surface Water Resources and Drainage

The drainages dissecting the northern portion of the project area generally flow only during precipitation events. The Carmel River flows generally parallel to the southern boundary of the site and is located approximately 800 feet to the south at the closest approach. Stream flow in the Carmel River can vary greatly over the year, with the greatest stream flow in the winter and the lowest in the summer.

As described in Kleinfelder (2003), drainage courses at the proposed project site are the result of surface-water erosion controlled by relatively uniform bedrock. The central September Ranch Canyon is incised in a typical dendritic drainage pattern. Generally, drainage courses at the site are irregular only where they have been interrupted by local deep-seated landslides such as in the northwest and northeast property corners.

Observed channel bottoms of the drainage courses are composed of sandy or clayey soil with little gravelly surface material. Surface water generally flows relatively unimpeded to the terrace deposit lying adjacent to the base of the ridges. Drainages do not dissect the terrace, suggesting that the surface water infiltrates the terrace and recharges the groundwater (Todd 1992).

The central watershed was estimated at approximately 561 acres, adjusting for elevations, based on a "summed-element" method of calculation performed in a geographic information system.

Current Water Usage

Current groundwater usage at the Site (which is not considered baseline for purposes of CEQA and which is provided here for informational purposes only) is primarily for pasture irrigation. The current pumping from the single production well located at the Site is approximately 99 acre feet per year (AFY) (Todd, 2002). More pumping occurs in the six summer months from June to December than during the remaining six months of the year, with the summer extractions totaling approximately 59 acre feet (AF). Water pumping is also somewhat heavy in the spring of each year resulting in the extraction of 38 AF on average.

Water levels at the closest non-September Ranch well, the Brookdale Well, exhibited drops in water levels on the order of 5 to 7 feet corresponding to the usage months of the September Ranch well.

However, water levels in this well have consistently recovered later in the year to about 40 feet mean sea level (MSL) as indicated by available water level data collected since 1996.

September Ranch Groundwater Basin/Aquifer

The September Ranch Groundwater Basin, also referred to as the September Ranch Basin (basin) or September Ranch Aquifer (SRA) (Exhibit 4.3-3) is a small and nearly closed basin bound almost entirely by Monterey Shale (Tm). In this independent evaluation of hydrogeologic evidence collected by others, Kennedy/Jenks concludes that the September Ranch basin is bounded on the north by the hills, on the south by the Knoll, on the east by exposed Tm east of the Knoll, and on the southwest it contacts the CVA across a subsurface ridge of Qoa_2 (see Cross-section M-M’ on Exhibits 4.3-4a through 4.3-4c).

The surface area of the SRA, as defined by the lateral reach of the water table, changes with seasonal variations of the water table and with yearly variations in rainfall. The basin area is relatively larger during average rainfall years and smaller during below average rainfall periods. The saturated surface area is about 51.8 acres in average rainfall periods (e.g., water year 1997) and about 49.2 acres in below average periods (e.g., water years 1998, 1999, and 2000).

The fluctuations in basin size between average and drought periods affect the storage volumes estimates calculated from wells and VES data for the three aquifer boundaries and properties (Qoa_1, Qoa_2, and Tm). Details of groundwater storage are discussed in further detail below.

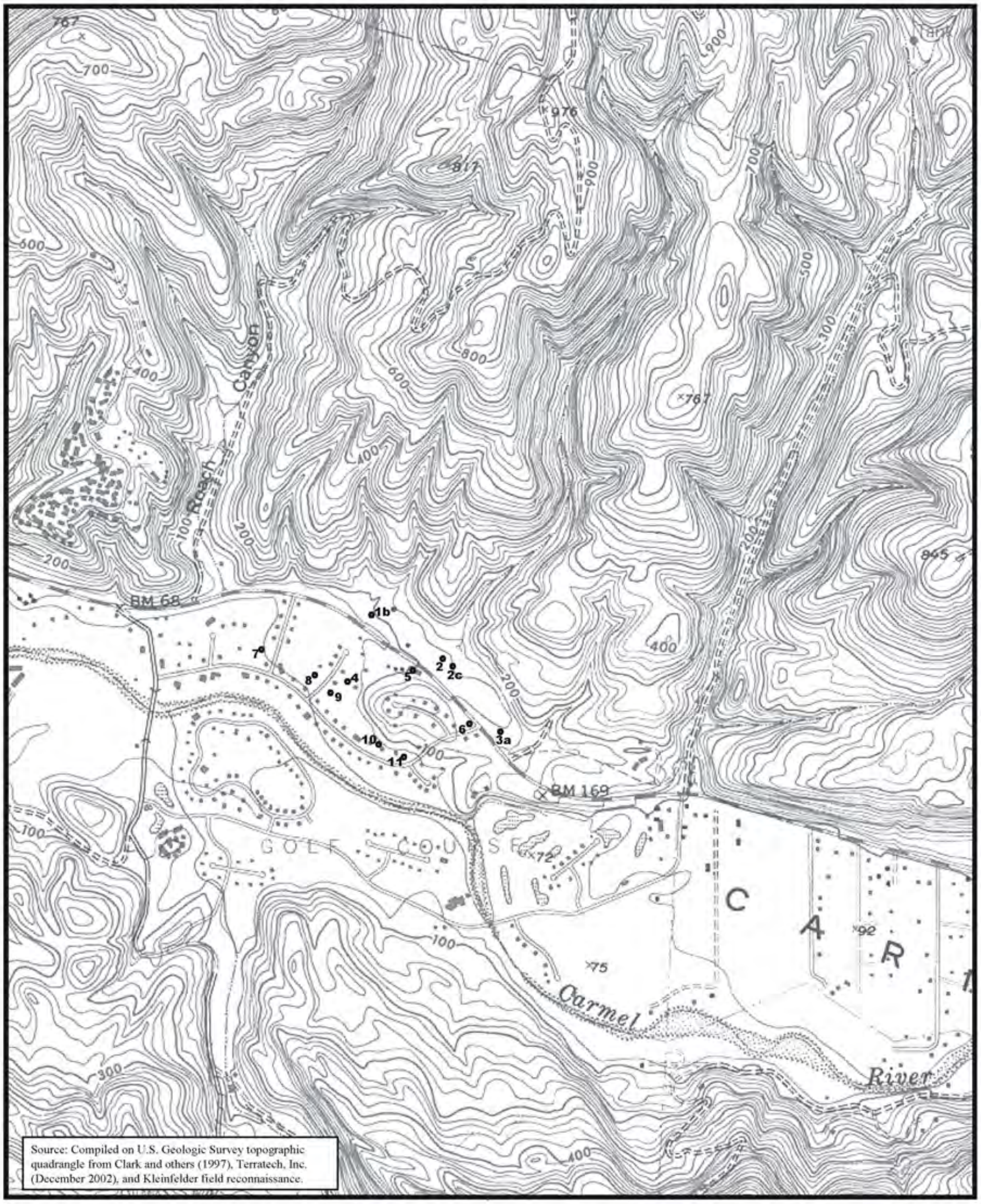
Water Bearing Units in the SRA

There are two main water bearing units that collectively are referred to as the SRA. The main water-bearing unit in the SRA is the Qoa_1, although some water is stored in the Qoa_2 and Tm (Todd 1997). To assess groundwater storage, the shape of the basin boundaries has to be understood. The shape of the basin is shown in Exhibit 4.3-5 and Exhibit 4.3-6. Additionally, Exhibit 4.3-5 depicts the elevation of the top of Tm. As identified in Exhibit 4.3-5, to the east the Tm is shallow and deepens to the west, forming a depression, or trough in the west and southwest portions of the basin. Exhibit 4.3-6 gives the elevation of the top of the Qoa_2 which shows that it is deepest in the central part of the basin and shallow in the southwest part of the basin. This indicates that the Qoa_1, the more transmissive unit and the main portion of the aquifer at the site, is thickest in the central to west part of the basin.

In addition, Exhibit 4.3-6 in conjunction with Exhibit 4.3-4b and Exhibit 4.3-4c illustrate the ridge of Qoa_2 , which borders the southwest side of the basin. The length of this boundary is about 1,620 feet or approximately 20 percent of the basin boundary. Contours of equal elevations on the top of Qoa_2 and depiction of the ridge-like feature (elevation 60 feet above mean sea level [AMSL]) of the aquitard are illustrated in Exhibit 4.3-5 and Exhibit 4.3-6.

Exhibit 4.3-4c shows the only portion of the SRA in hydraulic contact with the CVA. Evidence of this connectivity was first interpreted from borings, water well logs, and a VES survey conducted by Todd (1992 and 1997). The KJC study provides an independent assessment of the shape of the SRA and degree of connectivity between the SRA and the CVA. KJC independently constructed a three-dimensional (3-D) model of the physical boundaries of the basin (See Exhibit 4.3-4b) using existing data, including that presented in Todd (1997) and Kleinfelder (2003).

In the previous Final EIR (1998), the SRA was treated as an aquifer with a finite storage and in limited communication with the adjacent CVA. KJC concurs with this conclusion and notes that recent evidence does not suggest otherwise.



• Well Id. Nos

- **1b** Well B (Todd, May 1993)
- **2** Old Hatton well (Todd, May 1993)
- **2c** Unnamed well (Todd, May 1993)
- **3a** Well A (Todd, May 1993)
- **4** Stein well
- **5** Tarantino well
- **6** Campisi well
- **7** Hahs well
- **8** Chaplin well
- **9** Ask well
- **10** Avila well
- **11** Stewart well

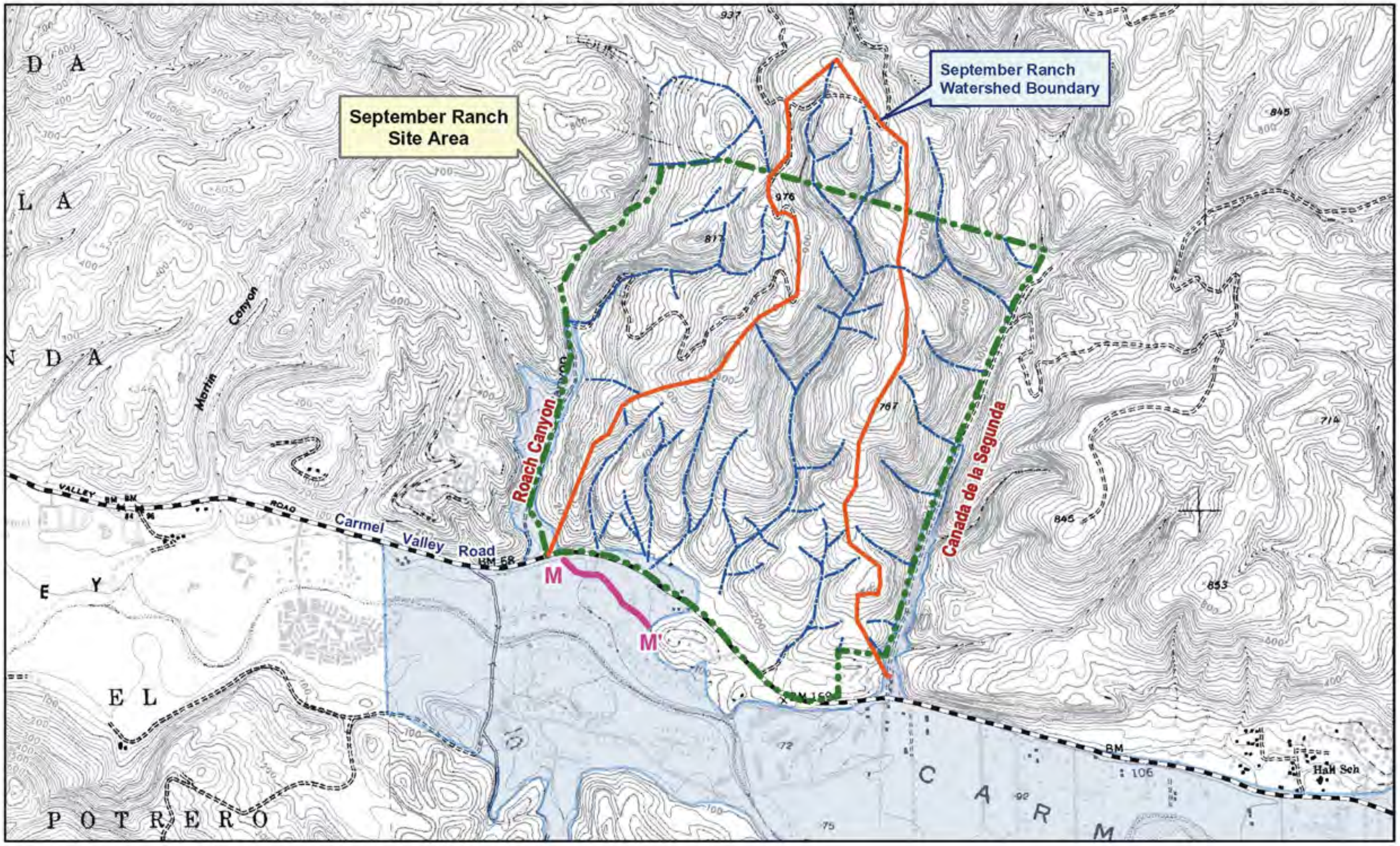
Source: Kleinfelder, Inc., November 2004.

NORTH

1777 888.5 0 1777
SCALE IN FEET

Michael Brandman Associates

Exhibit 4.3-2
Well Locations Map



Base Map: U.S. Geological Survey, Monterey and Seaside 7.5-minute quadrangles.

Explanation

- September Ranch drainage system
- Cross-section trace M-M'
- Carmel Valley Aquifer Subunit 3

Source: Kennedy/Jenks Consultants, November 2004.

2461 1230.5 0 2461
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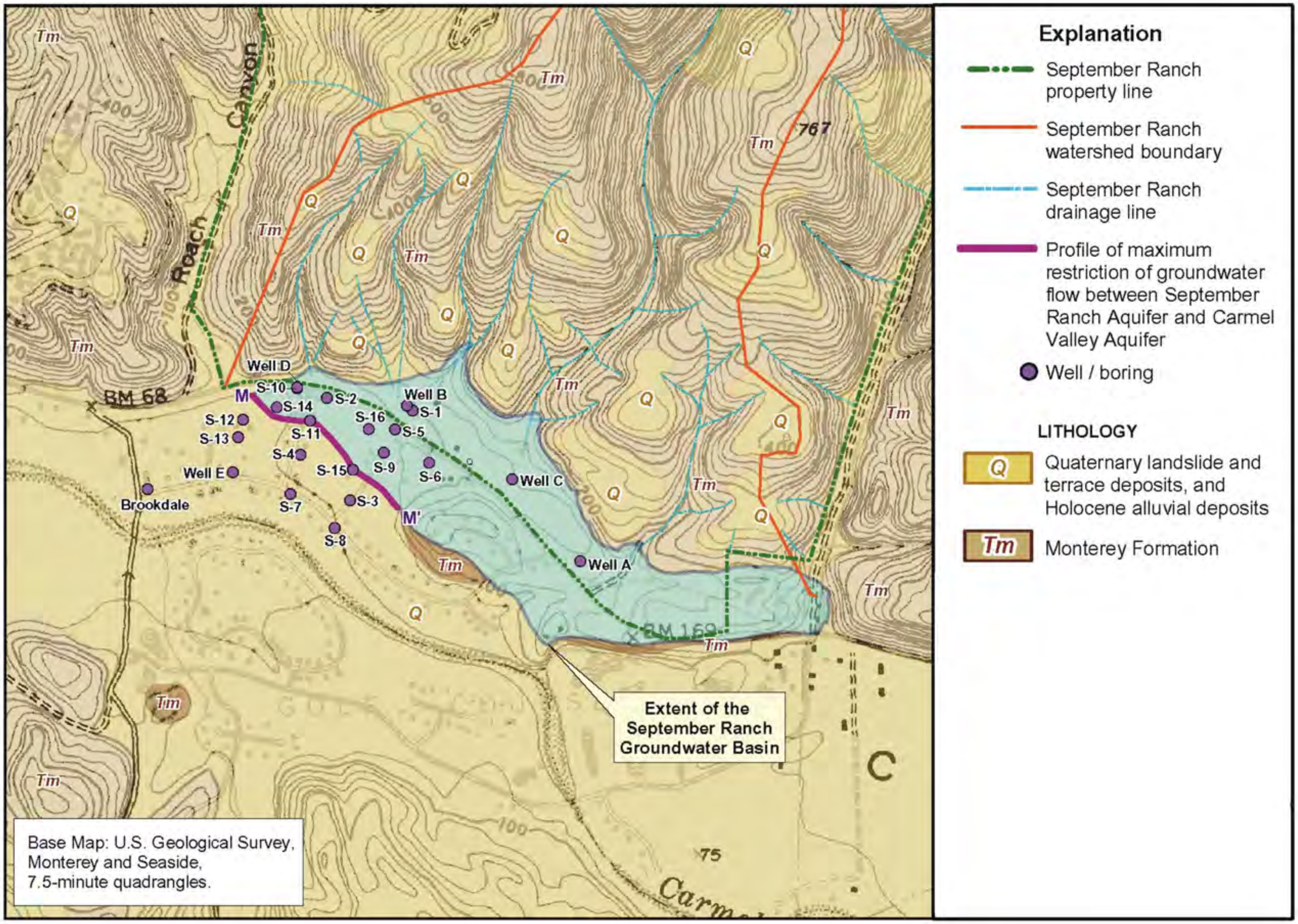
Michael Brandman Associates

21370002 • 02/2006 | 4.3-3_hydrologic site setting map.cdr

Exhibit 4.3-3
Hydrologic Site Setting Map



Source: Kennedy/Jenks Consultants, November 2004.

Michael Brandman Associates

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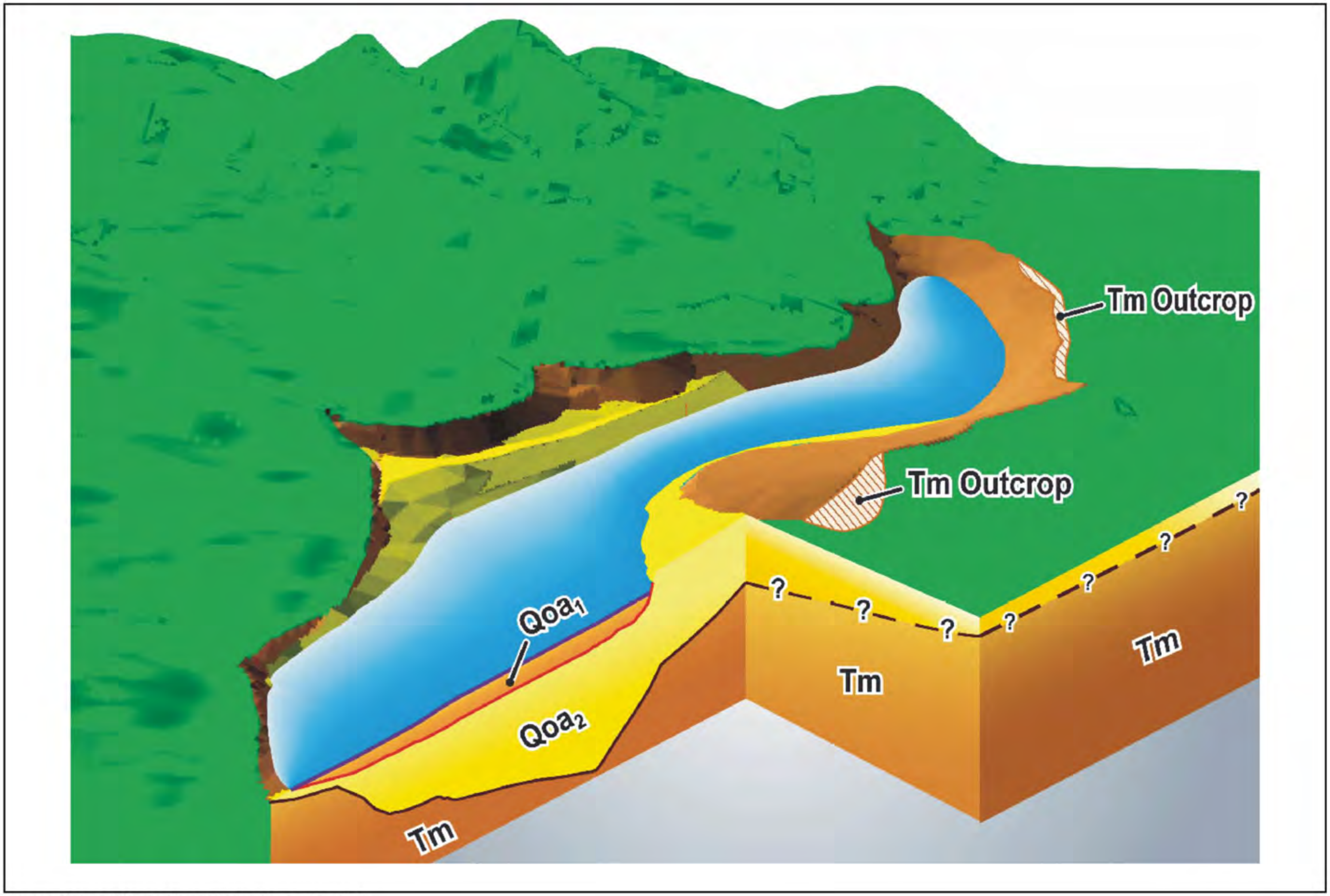
Exhibit 4.3-4a
Cross-Sections and Conceptual Modeling



Source: Kennedy/Jenks Consultants, November 2004.

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Michael Brandman Associates

Exhibit 4.3-4b
Cross-Sections and Conceptual Modeling

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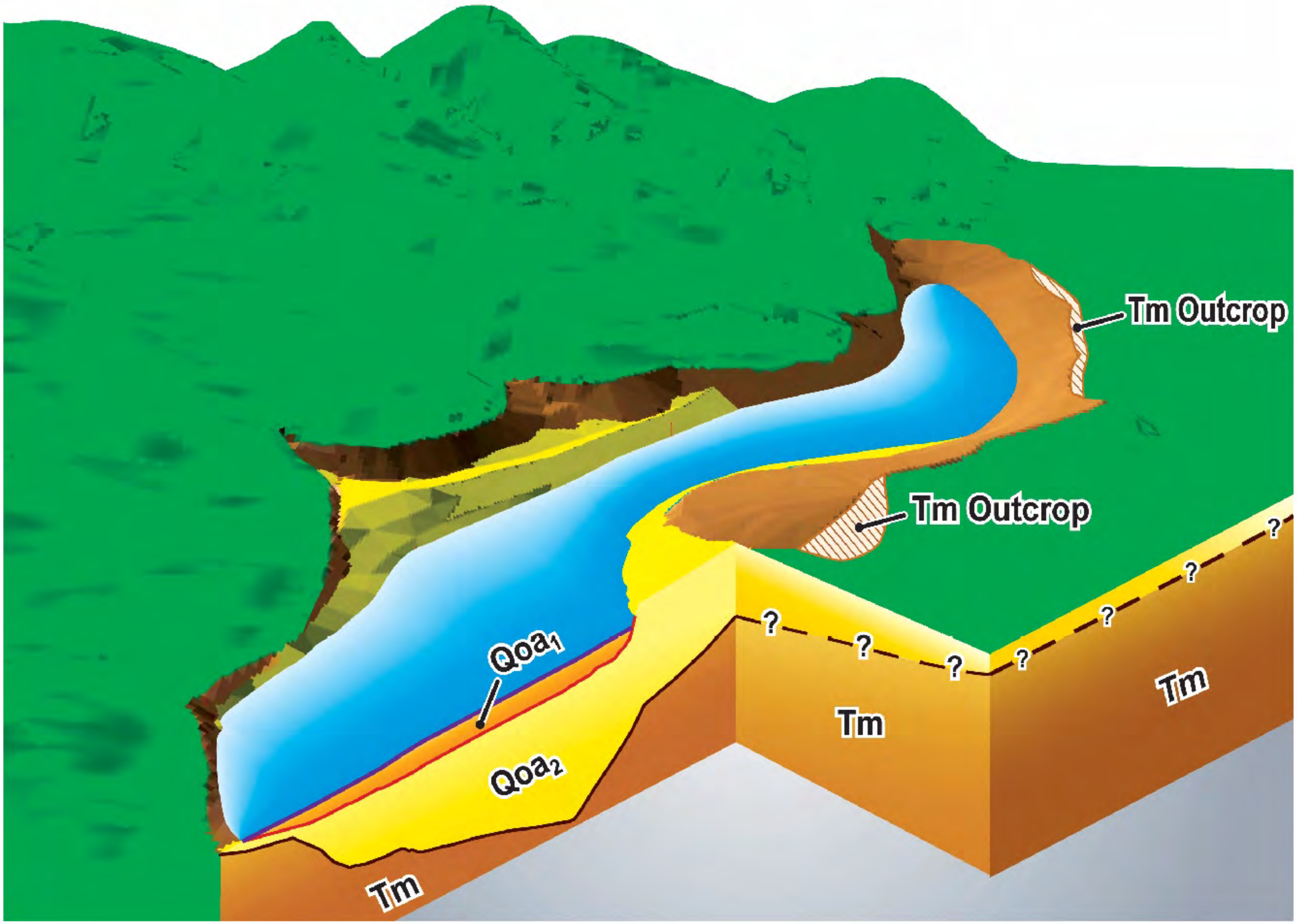
SEPTEMBER RANCH SUBDIVISION PROJECT • RECIRCULATED REIR



Source: Kennedy/Jenks Consultants, November 2004.

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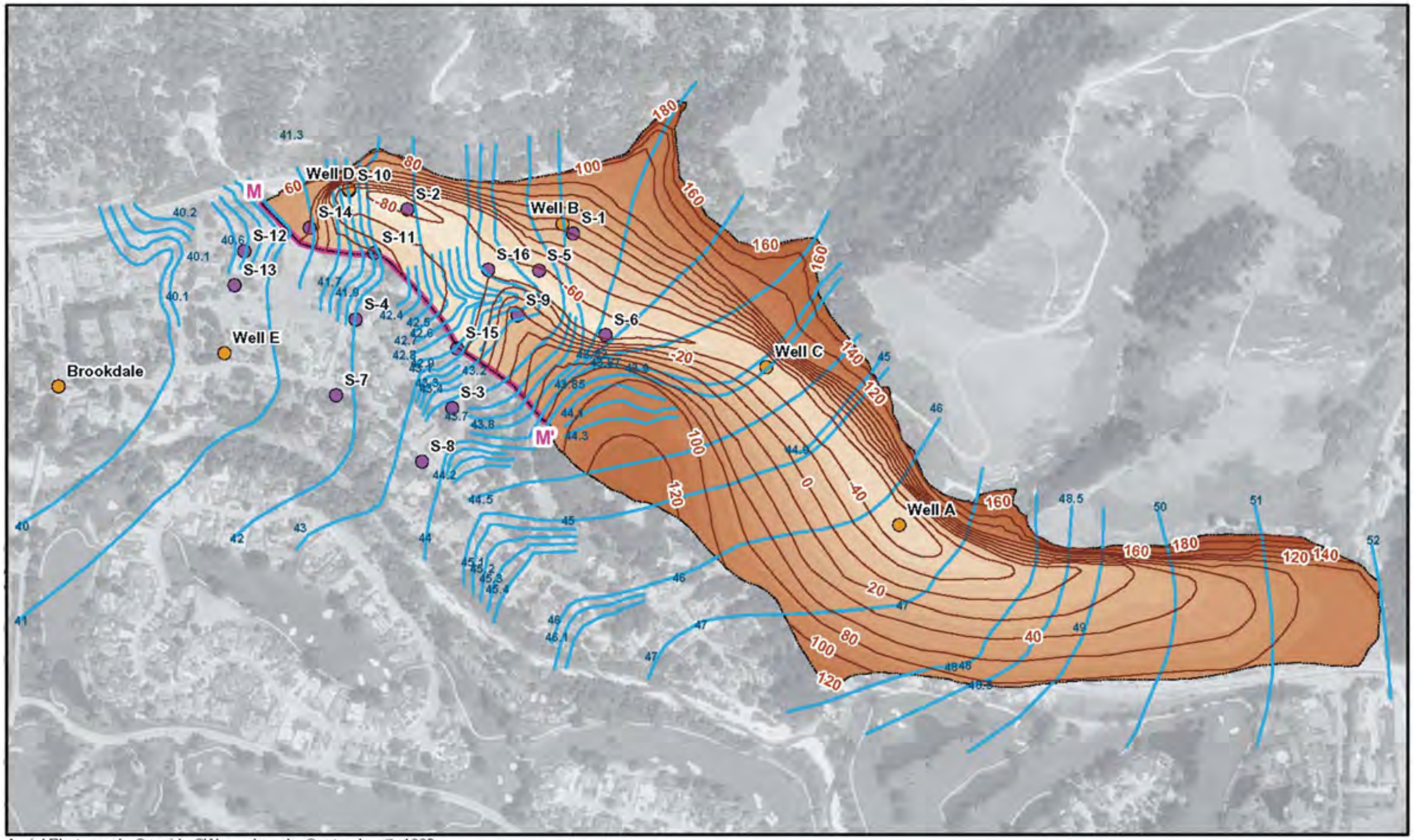
Michael Brandman Associates

Exhibit 4.3-4b
Cross-Sections and Conceptual Modeling



Aerial Photograph: Seaside SW quadrangle, September 7, 1998.

Explanation

- Top of Monterey Formation, 20-foot contour interval (feet, MSL)
- Groundwater level contours (feet, MSL), November 21, 1996
- September Ranch Aquifer boundary
- Monterey Formation (Tm)
- Cross-section trace M-M'
- Well
- Boring

Source: Kennedy/Jenks Consultants, November 2004.

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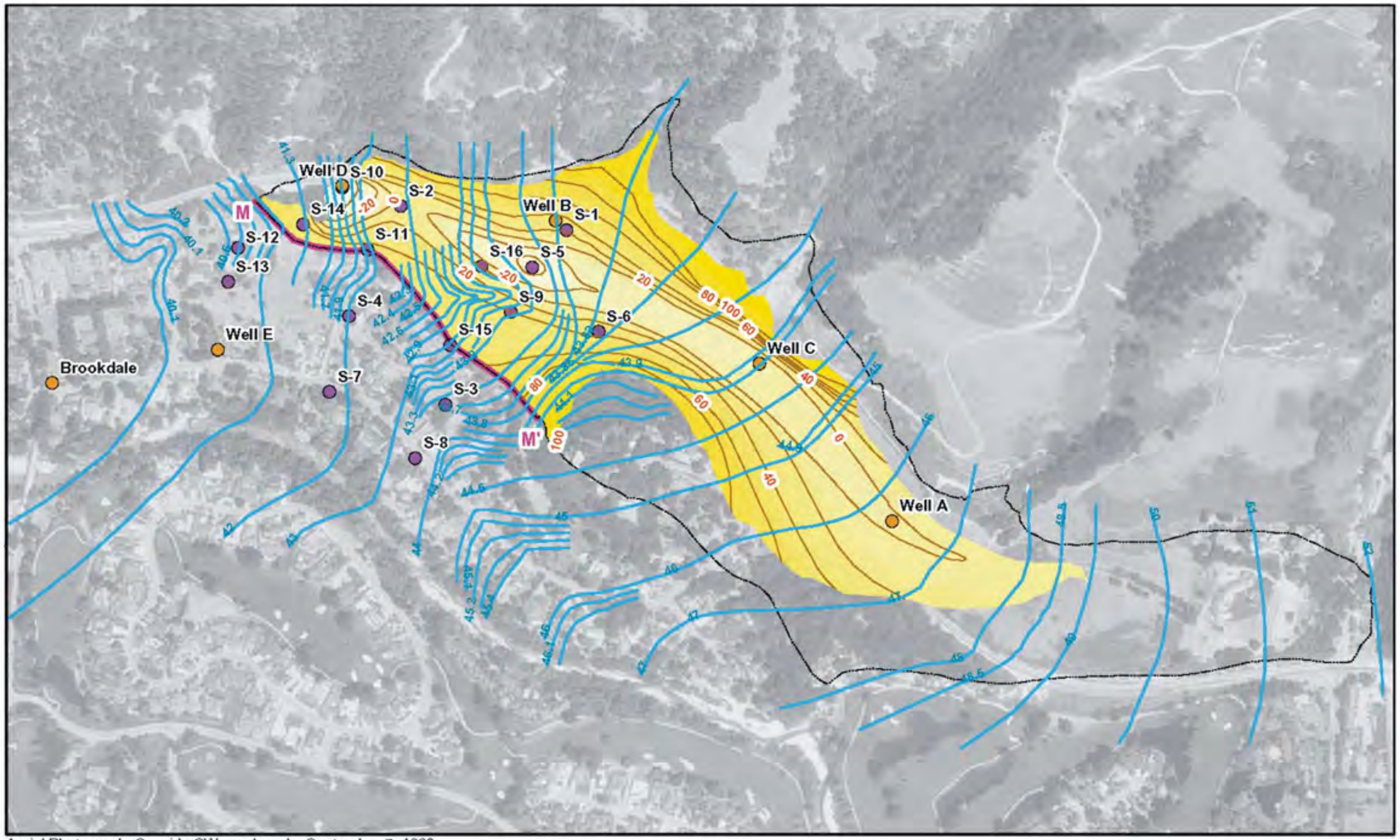
Michael Brandman Associates

Exhibit 4.3-5
Top of Monterey Formation and Groundwater Levels



Aerial Photograph: Seaside SW quadrangle, September 7, 1998.

Explanation

- Top of Qoa2, 20-foot contour interval (feet, MSL)
- Groundwater level contours (feet, MSL), November 21, 1996
- September Ranch Aquifer boundary
- Qoa2
- Cross-section trace M-M'
- Well
- Boring

Source: Kennedy/Jenks Consultants, November 2004.

NORTH

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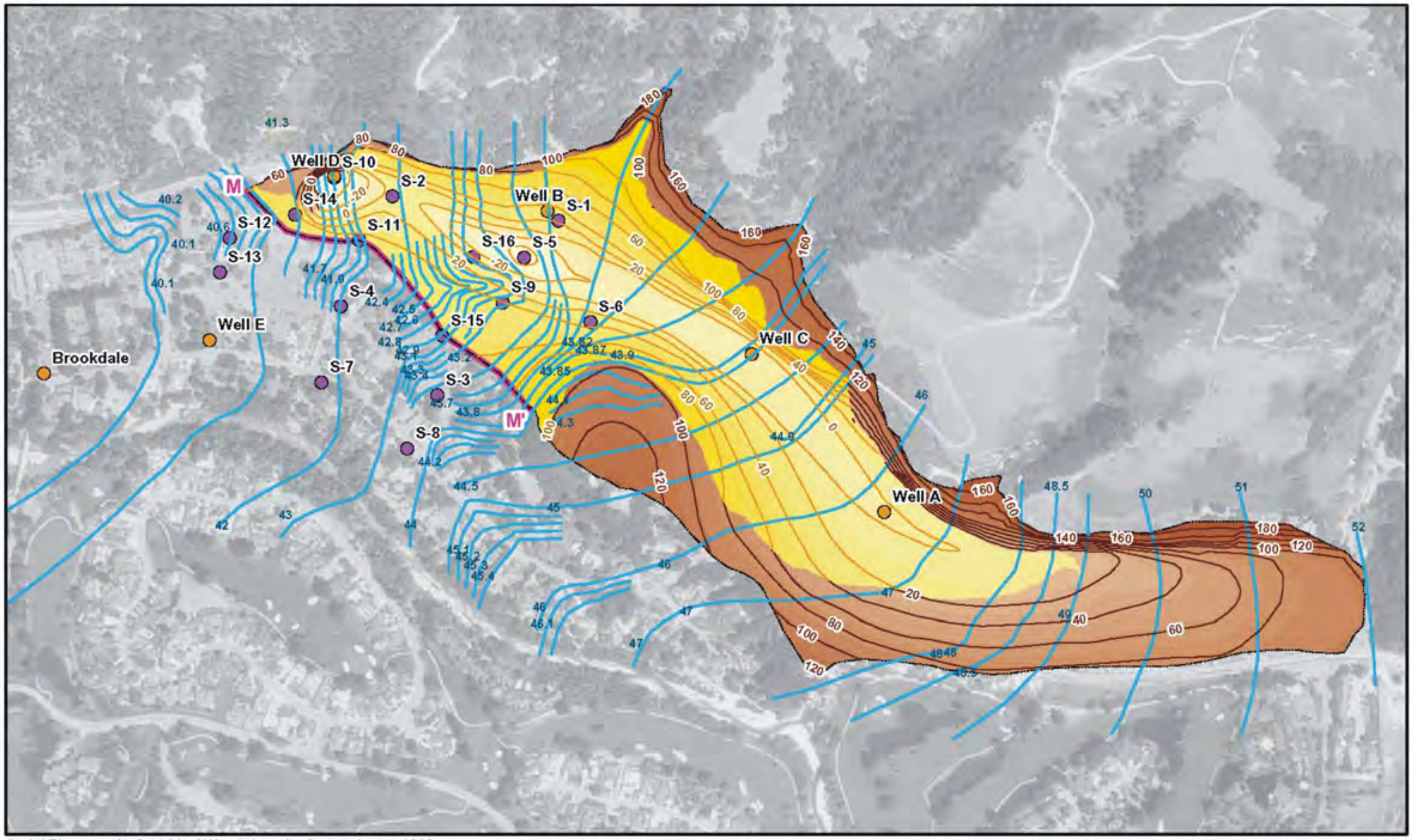
SCALE IN FEET

Michael Brandman Associates

Exhibit 4.3-6
Top of Older Alluvium - Qoa_2 and Groundwater Levels



Aerial Photograph: Seaside SW quadrangle, September 7, 1998.

Explanation

- Top of Monterey Formation 20-foot contour interval (feet, MSL)
- Top of Qoa2 20-foot contour interval (feet, MSL)
- Groundwater level contours (feet, MSL), November 21, 1996
- September Ranch Aquifer boundary
- Monterey Formation (Tm)
- Qoa2
- Cross-section trace M-M'
- Well
- Boring

Source: Kennedy/Jenks Consultants, November 2004.

Michael Brandman Associates

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Exhibit 4.3-7
Combined Top of Monterey Formation and Older Alluvium - Qoa_2

Groundwater Storage

The analysis included an independent estimate of groundwater storage by using existing data as presented in Todd 1992 and 1997. KJC refined Todd's estimates by constructing more detailed elevation contours of the three hydrologic formations $Qoa_{1,}$ $Qoa_{2,}$ and the Monterey Shale. A 3-D GIS was used to calculate volumes from the aquifer units.

Groundwater stored beneath the September Ranch project site is entirely within the nearly closed basin bounded almost entirely by Monterey Shale (see Exhibit 4.3-4a). The limited hydraulic connectivity with the CVA occurs only when groundwater levels in the SRA are higher than the top of the Monterey Shale bedrock so that seasonally excess groundwater from the SRA spills over and serves as recharge to the CVA. This is known as "rejected recharge" in that the spilling water cannot recharge the SRA (as the SRA is full), and so the water is rejected from the SRA and instead goes into the CVA.

The available groundwater storage was calculated by plotting the elevations of the top of the Qoa_2 aquitard and the top of the Tm from well logs, soil borings, and VES data from the September Ranch site and from neighboring domestic wells in the CVA immediately south of the September Ranch project area into a 3-D GIS program (Exhibit 4.3-4a). The data was presented in Todd (1992 and 1997).

The top-of-formation elevations of the Tm and Qoa_2 are combined in Exhibit 4.3-7 to show the extent of the functional bottom of the September Ranch basin. Groundwater elevation contours for November 1996 (water levels recorded prior to the major aquifer test of late 1996) are also shown on Exhibit 4.3-7. The thickness of the saturated Qoa_1, and therefore the functional thickness of the available storage in the entire September Ranch basin, can be estimated using Exhibit 4.3-7 by subtracting the top of formation elevation from the water table elevation.

Data for Calculating Storage for Normal Rainfall Years

It is important to note that a conservative calculation of aquifer storage is primarily a function of the actual recorded water levels, which are themselves entirely dependent on surface recharge. Hence, in selecting yearly water level data for calculating storage for normal and below average rainfall periods, average and below normal surface recharge values are used (instead of using total annual rainfall amounts) as indicators of normal and below average groundwater recharge periods.

The groundwater elevations for the water years 1997 (October through December) and 1998 (January through September) were used to represent average rainfall years in calculating storage. Estimates for pumping at the project site are based on available pumping data from Todd 2002 and PG&E electrical consumption billings from 1996. KJC used the data from the CVSIM for water year 1997 to represent average conditions. Surface recharge in the CVSIM model represents the amount of surface recharge that is available to recharge groundwater on a monthly basis. According to the CVSIM model, a total of 7,085 AF of surface recharge was recorded to the CVA in 1997 and 7,664 AF in 1998. According to KJC, these are fairly average recharge values (see Table 3, Appendix B of Appendix C of this REIR).

Data for Calculating Storage for Below Average Rainfall Years

The water year 1999 was used to represent a water year that received markedly below average surface recharge, with a total recharge of 5,091 AF (Table 3, Appendix B of Appendix C of this REIR). This value is the second lowest surface recharge value calculated by the MPWMD since 1981; the lowest groundwater recharge occurred in 1994, with only 4,720 AF of groundwater recharge. Hence, a conservative aquifer storage value is attained by using water levels recorded in the 1999 low surface recharge year. It is important to note that data from 1999 was used instead of water levels from drought years 1987 - 1991 because water levels were not available for these years since the September Ranch wells were installed after the 1991 drought.

Results of Analysis of Seasonal Storage

Table 4.3-2 below, is a summary of the results of the seasonal storage analysis.

Table 4.3-2: Seasonal Storage Analysis Results

Average Rainfall Seasons	Qoa_1 (AF)	Qoa_2 (AF)	Total (AF)	Below Average Rainfall Seasons	Qoa_1 (AF)	Qoa_2 (AF)	Total (AF)
12/1997 Fall	167	102	269	12/1998 Fall	183	104	287
3/1998 Winter	217	106	323	3/1999 Winter	193	105	297
6/1998 Spring	220	106	327	6/1999 Spring	185	104	289
9/1998 Summer	192	105	297	9/1999 Summer	170	102	273
Yearly Average	199	105	304		183	104	287
Source: Kennedy/Jenks Consultants, February 2006.							

The groundwater storage in the September Ranch basin was previously estimated by Todd (1992) at 261 AF for Qoa_1, and 121 AF in the lower permeability Qoa_2, giving an average total estimated storage of about 382 AF. Todd (1992) developed the storage estimates by using an average thickness and depth of the Qoa_1 and Qoa_2 units. But despite Todd's use of an average thickness, the base of each aquifer unit is actually irregular in elevation and the groundwater surface elevation is dependent on seasonal rainfall. Thus, we believe that Todd's methodology unduly inflates the estimated quantity of groundwater storage in the SRA. KJC also notes that on August 23, 1994 the MPWMD entered in a Memorandum of Understanding with the September Ranch Partners, which used the value of 261 AF as estimated storage.

KJC's independent analysis of seasonal storage presents a refinement of the original Todd estimates. KJC's analysis estimates that about 304 AF is available in storage in average rainfall years and about 286 AF in a below average year. The 304 AF amount for average rainfall years falls between the original Todd estimate of 382 AF and the number used in the MOU with the MPWMD.

Groundwater Recharge

Groundwater recharge in the September Ranch basin is primarily through infiltration of precipitation. The September Ranch terrace is largely recharged by streams originating in the uplands of the ranch that discharge (drain) water to the alluvium and Qoa_1 that make up the primary water-bearing zone of the terrace (Kleinfelder 2003). Drainage within the September Ranch watershed is fairly efficient because of the well-defined (high relief) ridges (see the red line marking the watershed boundary in Exhibit 4.3-3) that influence the convergence drainage pattern within the watershed. Surface water generally flows relatively unimpeded to the terrace deposit lying adjacent to the base of the ridges.

The amount of monthly and seasonal recharge for the site was developed by utilizing rainfall data collected at the San Clemente Dam, approximately 17 miles upstream of the site (see Table 4.3-2). As discussed previously in this section (see Hydrometeorlogic Setting), a 15.1 percent reduction factor was used to calculate monthly rainfall at the September Ranch site. Monthly rainfall values were applied to the watershed area of 561 acres with an evapotranspiration (ET) loss-factor of 70 percent and an infiltration based on Soil Conservation Service method TR-55. These factors were also presented in Todd (1992) with concurrence by the MPWMD. Recharge estimates were established by subtracting surface runoffs from precipitation on a monthly basis. Resultant monthly recharge values are listed in Appendix C of this REIR and the annual cumulative recharges are summarized in Table 4.3-3.

Table 4.3-3: Annual Cumulative Recharge Values

Average Water Year	San Clemente Dam Rainfall (in)	September Ranch Site Precipitation Over 561 Acres (AF)	Net Recharge with ET-loss of 70% Adjusted for Infiltration (AF)	Below Average Water Years	San Clemente Dam Rainfall (in)	September Ranch Site Precipitation Over 561 Acres (AF)	Net Recharge with ET-Loss of 70% Adjusted for Infiltration (AF)	Net Recharge with ET-Loss of 85% (AF)[1]
1996	22.4	889.1	262.0	1987	11.02	437.4	131.2	65.6
1997	21.7	860.1	244.0	1988	11.07	439.4	131.8	65.9
—	—	—	—	1989	12.80	508.0	152.4	76.2
—	—	—	—	1990	13.09	519.6	155.9	77.9
—	—	—	—	1991	16.87	669.9	182.2	81.7
Yearly Average			**253**	**—**	**—**	**—**	**151**	**73**

Note: estimated runoffs were subtracted from ET-loss corrected recharges rates
[1] Adjusted for infiltration
Source: Kennedy/Jenks Consultants, February 2006.

The 1998 Final EIR invalidated by the Court of Appeal utilized a factor of 242 AFY of recharge for average years and zero recharge for drought years. The analysis above indicates that range from 244 to 262 AF of potential recharge is available to the September Ranch terrace during an average rainfall year. The MPWMD and the Monterey County Health Department take the position that during severe droughts all infiltrated moisture is taken up by vegetation and other losses resulting in zero recharge being available to the groundwater basin. It is KJC's opinion that for below average rainfall years a zero recharge is unrealistic given the Mediterranean climate. Thus, KJC maintains that an ET loss-factor of 70 percent is realistic for both average and below average precipitation years. However, to address this difference in opinion and for comparative analysis, a conservative 85 percent ET loss-factor is used for this Draft REIR for below average rainfall years. As shown in Table 4.3-3, the 85 percent ET results in lower recharge values for this conservative recharge scenario with estimates ranging from 65.6 AFY to 81.7 AFY and an average of 73 AFY. Additionally, as identified in Table 4.3-3, the analysis conducted by KJC indicates that a range of 244 to 262 AF of potential recharge is available to the September Ranch terrace during an average rainfall year.

Groundwater Gradient

The typical groundwater flow pattern in the SRA and the CVA is illustrated in Exhibits 4.3-5 and 4.3—6. The groundwater elevations of these figures were recorded on November 21, 1996, prior to a large-scale aquifer test. The groundwater on this date flowed from the east end of the September Ranch basin, from Canada de le Segunda, where groundwater is at 52 feet above mean seal level (AMSL), towards Roach Canyon in the west, where groundwater is at 41 feet AMSL (Well D). The groundwater gradient magnitude shown in these exhibits is approximately 0.0025 feet per foot (ft/ft) in the eastern half of the basin and about 0.0022 ft/ft in the western half of the basin where the SRA meets the CVA. This is a relatively shallow gradient that indicates a low velocity. The northwest to west gradient direction is generally parallel to the Carmel River flow direction.

The KJC study also focused on the difference in groundwater gradients between:

- Four quarters or seasons in a year; and
- Average rainfall periods and below average years.

The objective of this more detailed analysis of groundwater gradient was to quantify the volume of groundwater exchange between the SRA and CVA across the ridge of Qoa_2 (see Exhibit 4.3-4c), given that KJC established only an extremely low level of connectivity between the two water resources. The approach is to examine the direction of groundwater gradient based on water levels in the SRA and those in the CVA. The most suitable and available data to support this analysis are the water levels measured in Wells B and D located in the September Ranch basin, and Well E and the Brookdale well, located in the CVA. These wells are located in a roughly linear fashion, across Cross-Section M-M'.

In this analysis, it is not enough to base the use of data and seasonal gradient characterizations on rainfall amounts generally; the corresponding surface recharge rates in normal and below average precipitation periods must be assessed as well.

The reason for the focus on surface recharge rates (rather than total rainfall) is that the cumulative volume of surface recharge directly influences groundwater level. In contrast, a certain quantity of the total rainfall at the site is eventually discharged by surface runoff into the Carmel River and, hence, does not influence groundwater levels. A good example of this is the intense rainfall month of February in 1998 (18.24 inches), which largely did not influence groundwater levels because the majority of the intense rains became runoff into the Carmel River. For this reason, KJC chose data sets of groundwater levels with equal emphasis on surface recharge rates as represented in the CVSIM subunit 3 results (see Table 3, Appendix B of Appendix C of this REIR).

Normal Rainfall and Surface Recharge Years for the September Ranch Area

KJC considered that the most representative period of normal rainfall and surface recharge to characterize groundwater gradients are the years 1996 (8,090 AF), 1997 (7,085 AF), and 1998 (7,664 AF) (see Appendix A of the hydrogeologic report in Appendix C of the Draft REIR). Since there was a 270 gallons per minute (gpm) 47-day aquifer test conducted during late 1996 through February 1997, water levels measured in late 1997 through the first three quarters of 1998 were used to calculate gradients and thus to avoid the post aquifer testing recovery period of lower than normal water levels.

Below Normal Rainfall and Surface Recharge Years for the September Ranch Area

KJC considers that the most representative below average rainfall and surface recharge years are 1987 through 1991. Since water level data for the SRA are not available for these years, KJC chose a comparable period of low rainfall in water year 1999 (5091 AF of recharge and 17.41 inches of rainfall) to serve as surrogate data set for this analysis.

Exhibit 4.3-8 graphically illustrates data from these wells for an average rainfall and surface recharge water year of 1997, a below average rainfall water year of 1999, and the record drought period of 1989 and 1990. Additionally, the data is presented by quarters or by seasons in the year. The boundary between the SRA and the CVA is depicted in Exhibit 4.3-8, which illustrates groundwater flow direction between the two systems. Table 4.3-4 is a summary of groundwater gradients calculated between Wells D, E, and the Brookdale wells.

Table 4.3-4: Calculated Well Groundwater Gradients

Average Rainfall Water Year 1997	Gradient Between Well D and Brookdale Well	Below Average Rainfall Water Year 1999	Gradient Between Well D and Brookdale Well	Below Average Rainfall Water Year 1989	Gradient Between Well E and Brookdale Well
12/1997 Fall	-0.0014	12/1998 Fall	-0.0016	9/1989 Fall	-0.013
3/1998 Winter	-0.0059	3/1999 Winter	-0.0022	—	—
6/1998 Spring	-0.0030	6/1999 Spring	-0.0020	—	—
9/1998 Summer	-0.0021	9/1999 Summer	-0.0042	—	—
Average	-0.0031	Average	-0.0025	—	—
Note: negative sign indicates groundwater flow from the SRA to the CVA. Source: Kennedy/Jenks Consultants, February 2006.					

Water level data from several seasons were compared to assess gradient direction and magnitude. Within the September Ranch basin, groundwater typically flows toward Well C (located near the pumping well SR 1). Near the SRA-CVA contact at the southwest part of the SRA, flow is generally southerly from the SRA to the CVA.

Groundwater Gradient in Aquifer Tests

The groundwater gradient before and during an extensive 47-day aquifer test concluded in the winter of 1996/1997 as shown in Todd (1997). The direction of the groundwater gradient prior to the aquifer test in the September Ranch basin and the adjoining CVA was northwest to west, as depicted in Exhibits 4.3-5 and 4.3-6.

The groundwater elevations contoured during the aquifer test suggest a greater influence on water levels in the September Ranch basin compared to water levels in the CVA, although it appears the aquifer test did have some influence on the CVA. The 270 gpm pumping rate almost instantly created a groundwater divide at the hydraulic contact between the two systems and at Well D. The divide shifted further southwest to Well E on day 19 of the test. The groundwater divide shifted back towards Well D in January 1997 near the end of the test. The occurrence and shifting of the groundwater divide is indicative of impeded or constricted flow due to the ridge-like feature made up of mainly Qoa_2 aquitard material at the location of M-M’ or between Wells D and E (see Exhibit 4.3-6). It is likely that the movement of groundwater in this area is both impeded by the less-permeable material and constricted above the ridge-like structure in the Qoa_1 material, the path of less resistance.

KJC agrees with the comments by the MPWMD that results and interpretation of the 1996 47-day aquifer test are debatable, and that the response in wells closer to the Carmel River is less than expected, probably due to the suspected effect that concurrent rainfall and high river flows had on water levels during the aquifer test.

However, water levels in Well D in both the 1992 and 1996 aquifer tests recovered at slow rates after the pumping tests. Based on its location, KJC believes that water levels in Well D are responding first to recharge in the SRA and secondarily to recharge from the CVA. In the CVA, the large volume of river recharge along the Carmel River after rainfall sends rejected outflow towards, but not necessarily into, the SRA. KJC concludes that the rise in water levels after the test in Well D is in response to the rise in water levels within the SRA due to groundwater recharge from infiltration and drainage of the September Ranch uplands. Records show that overall water levels rose slowly and stayed depressed in the summer and fall of 1997.

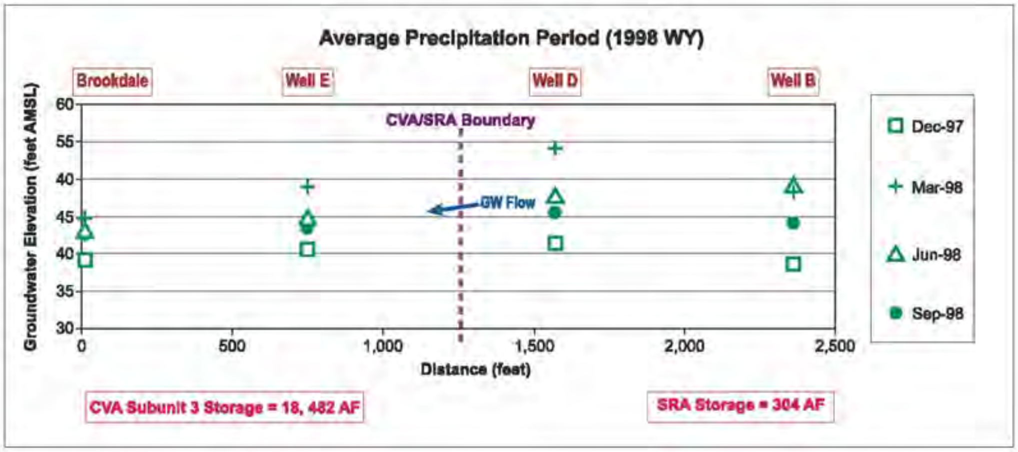
KJC also suggests that it required unique conditions, with multiple stimuli, including a concurrent 47-day aquifer test with a pumping rate of 270 gpm and a large rain event, to produce an appreciable exchange of groundwater from the CVA to the SRA. Specifically, the drawdown during the pumping test created a significant gradient towards the SRA at the location of the groundwater divide (apparent in the pumping test groundwater level contours). The gradient towards the SRA was further enhanced by an excess water level rise in the CVA due to excess recharge in the Carmel River Basin, sending appreciable rejected underflow towards the SRA. This interpretation is supported by the rapid rise in water levels after rainfall in the CVA, which KJC believes is due to the increase in river stage and the rise in groundwater levels in the CVA. The overall water level rise in the CVA is consistent with those in wells closer to the Carmel River. These unique conditions are not expected to be replicated with the lower and slower pumping rates projected for the project because the total extractions during the 47 day test would roughly equal the total extractions expected during one year of project operations.

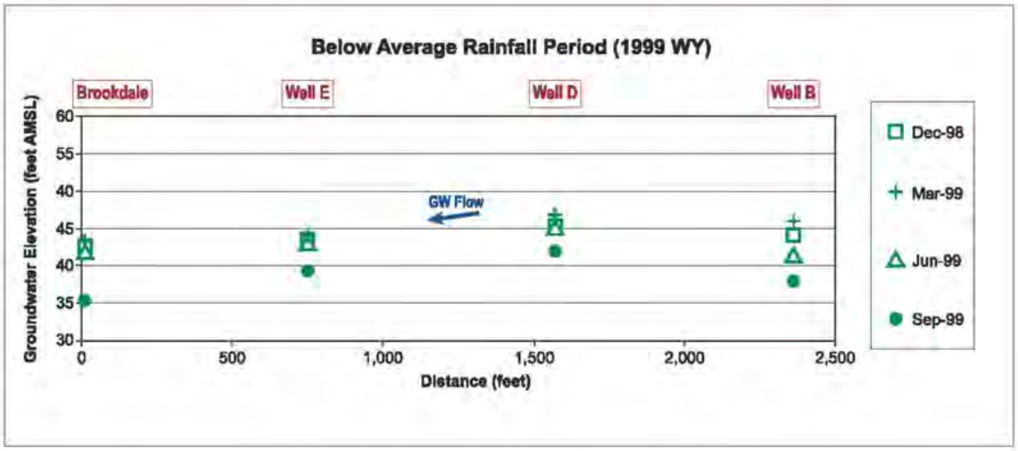
4.3.4 Project Impacts

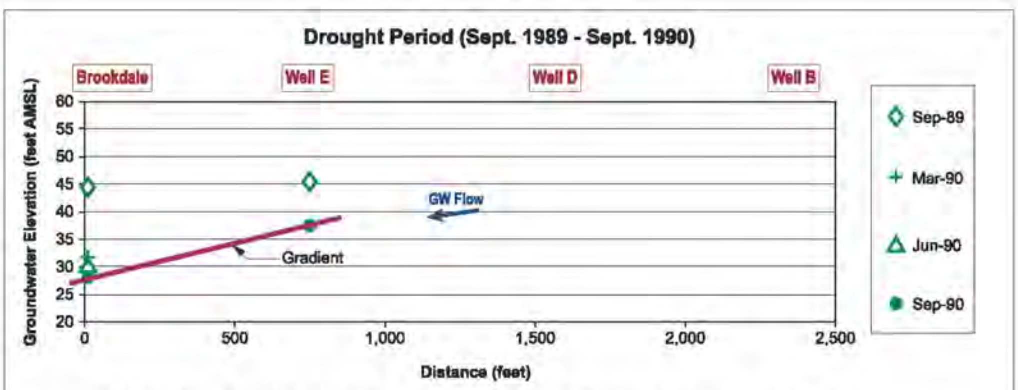
Standards of Significance

The project will have a significant water supply and availability impact if it will:

- Substantially degrade or deplete groundwater resources in the SRA or the CVA;
- Interfere with groundwater recharge;
- Use water in a wasteful manner.







1986-1990 Groundwater elevations for Well E are theoreticl constructions based on drawdown data from 1986-1990 for nearby Well 16S/1E-25B2, provided by the Monterey County Water Resources Agency.

Explanation

CVA Carmel Valley Aquifer

SRA September Ranch Aquifer

GW Groundwater

Source: Kennedy/Jenks Consultants, November 2004.

Michael Brandman Associates

Exhibit 4.3-8

Groundwater Gradients Across Cross-Section M-M

Similarly, in accordance with local and regional mandates for water resources management, the project will have a significant water supply and availability impact if it will:

- Increase pumping or demand on the SRA or CVA so as to:
  - require persons who divert from the SRA or CVA to decrease water use or find substitute supplies in order to compensate for reduced water availability from the SRA or CVA; or impair the health of the CVA itself by permanently affecting the ability of the CVA to recharge.
- Result in a yield from the groundwater system that is not sufficient to provide the project water demand on a long-term average basis and during droughts.

As noted above the SWRCB has issued an order (SWRCB Order No. 95-10) that identifies unlawful pumping from the CVA and requires gradual reductions in that unlawful pumping from the date of the Order. In response to this Order, major water users who pump from the CVA have been developing a more diverse portfolio of additional water supplies from other sources, and so are not wholly reliant on the CVA for their water supplies. There is also no evidence in the record suggesting that any additional increment, no matter how small, of "withdrawal" from the CVA (here, by means of an essentially imperceptible amount of reduced recharge to the CVA from the SRA) should be considered a significant impact for purposes of water users who rely, in part, on CVA supplies.

The significance thresholds and impact analysis assessing any potential reduction in availability of water from the CVA, thence Carmel River, for water-dependent biological resources is discussed in Section 4.9, Biological Resources.

Impact Analysis and Mitigation Measures

Less than Significant Impact - Substantially Degrade or Deplete Groundwater or Interfere with Groundwater Recharge: Table 4.3-5 provides a comparison of the baseline water demand and the projected water demand in relation to the findings of the 1998 Final EIR. As shown in Table 4.3-5, the water demand of the September Ranch Subdivision project at build-out is expected to be 57.21 AFY. This is based upon interior and exterior water use at homes, use at the equestrian center, and system losses.

Table 4.3-5: Baseline and Projected Water Demand at Build-out

	Proposed Project	1998 Final EIR
Baseline Use	3 AFY	45 AFY
Current Use	99 AFY	99.39 AFY
Projected September Ranch Water Demand	57.21* AFY	61.15 AFY
Difference between Baseline and Project Use	54.21 AFY	16.15 AFY
* Todd (1997) assumed a demand of 66.7 AFY, based upon consumption of 55.6 AFY and a 20% sustainability margin. Source: Kennedy/Jenks Consultants, February 2006.		

The estimates of annual water demand for the proposed project are based on average water use of 0.50 AFY for single-family residences and 0.231 AFY per unit for multi-family areas. The total housing demand, including landscaping, is 50.5 AFY, with 3 AFY for the equestrian center and 3.74 AFY for system losses. The total demand excludes water needed to irrigate the pastures since pasture irrigation is expected to cease upon completion of the project.

The 1998 Final EIR estimates that about two-thirds of the production would occur between June and November and correspondingly one-third of the production would occur between December and May. The metered pumping rate currently at the site is approximately 99 to 110 AFY. According to Todd (2002), an average of 99.39 AF per water year was pumped from September Ranch wells between October 1998 and September 2001. From June 1998 to September 1998, 40.41 AF was pumped and 67.72 AF was pumped between October 2001 and July 2002. The average weekly pumping rate between June 1998 and July 2002 was 2.23 AF and the median was 2.49 AF. As a result, there would be a reduction of demand from the current pump rate of 99 AFY to an estimated proposed pump rate of 57.21 AFY at build-out (a reduction in water demand of 41.79 AFY in relation to the current pumping rate). However, project implementation will result in an increased demand of 54.21 AFY from the established baseline usage of 3 AFY. This increase is the relevant consideration for project impact purposes.

In addition to assessing the project's water demands, to fully address the issue of the depletion or degradation of groundwater resources or the project's interference with groundwater recharge (in the form of a reduction in rejected recharge to the CVA), KJC examined the groundwater exchange between the SRA and the CVA.

Groundwater Exchange Between the SRA and the CVA

The following focuses on the hydraulic exchange of groundwater between the SRA and the CVA. As previously discussed, flow of groundwater (rejected recharge) is typically from the SRA towards the CVA for both average and below average rainfall periods. Groundwater flow from the CVA to the SRA is rare and would require specific combined conditions such as an aquifer test where a well in the SRA is pumped at a high flow rate aquifer test and a concurrent rainfall event on the CVA (conditions met during the 1996/1997 aquifer test).

Based on available hydrogeologic data and the results of groundwater storage and recharge estimates presented by KJC and previously discussed within this section, the method of water balance presented below presents the most conservative approach (i.e., the largest possible impact) in estimating the degree of connectivity or groundwater exchange between the two aquifers. However, to provide further analysis and verification, a second evaluation of connectivity between the SRA and the CVA, the Darcy flux method, is also presented.

Water Balance

A water balance is the net groundwater storage resulting from the difference between recharge into the September Ranch basin and the expected water production and outflow or rejected groundwater from the September Ranch basin to the CVA. More specifically, a change in groundwater storage equals the inflow minus the outflow; thus the change in groundwater storage in the basin equals recharge to the September Ranch basin minus usage and runoff within that basin. Under this analysis, KJA assumes that where water neither recharges the SRA nor is consumed for the September Ranch project, it must flow to the CVA, whether or not this can be demonstrated. In other words, this analysis assumes the largest possible impact on the CVA by posting that all water not consumed or stored would normally (absent the project) benefit the CVA, even though the Darcy Flux analysis below would suggest that not all of this water is normally available to the CVA. This analysis was prepared as a the most conservative analysis possible, and the results of this analysis are used for when applying the significance criteria.

KJC performed an independent analysis of site-specific recharge based on rainfall data collected at the San Clemente Dam, as discussed previously within this section (see Table 4.3-2). The water balance analysis was performed for the extended drought years of 1988 through 1991 and for the average rainfall water years of 1996 and 1997. KJC notes that water balance calculations are based on recharge and outflow data and do not require actual water levels in the analysis. Yearly total inflow or recharge is distributed into four quarters or seasons and as discussed previously, it has been reduced to account for runoffs. The yearly outflow is the project demand of 57.21 AFY. Total flow then represents available groundwater in storage and flow between the SRA and the CVA given the right conditions.

As previously discussed, recharge to the basin is reduced to account for runoffs. Table 4.3-6 provides a summary of yearly total flow or change in storage in acre feet. The cumulative drawdowns are calculated as fall or rise of the water table per unit change in aquifer storage; values are carried over from one season to another in the course of a water year. The drawdown (negative signs) or water level rise (positive values) are based on a specific yield (S_y) of 0.33, derived from a Neumann solution of the 1992 Well C aquifer test data. The Neumann solution is used in unconfined aquifers (Kruseman and de Ridder 2000). Predicted changes for water levels are summarized Table 4.3-6.

Table 4.3-6: Predicted Water Level Changes in the September Ranch Aquifer

Average Rainfall Years	Inflow (AF)	Outflow (AF)	Total Flow (AF)	Cumulative Drawdown (ft)	Below Average Rainfall	Inflow (AF)	Projected Usage	Total Flow (AF)	Cumulative Drawdown (ft)
1996	262.1	-57.21	204.9	13.73	1987	65.5	-57.21	8.3	0.56
1997	244.0	-57.21	186.8	26.32	1988	65.9	-57.21	8.7	0.59
—	—	—	—	—	1989	76.4	-57.21	19.2	1.29
—	—	—	—	—	1990	78.0	-57.21	20.8	1.40
—	—	—	—	—	1991	81.9	-57.21	24.7	1.66
Source: Kennedy/Jenks Consultants, February 2006.									

In either the average water year or below-average water years, the exceedance of natural recharge over use can have two effects: 1) potentially generates a net gain in storage or 2) excess groundwater as rejected flow into the CVA. The calculated cumulative water level increase suggests that groundwater storage will not be depleted even in drought years. These estimates of water level increases are generally consistent with groundwater measurements taken in the field, meaning even in below average rainfall periods the water levels have not been observed to fall significantly. Therefore KJC suggests that the estimated water level increases and their consistency with field data serve as ground-truthing parameters for a water balance.

The total flow or net gain in storage in water years with average rainfall suggests that there is between 187 and 205 AFY of water that is available for exchange between the SRA and CVA (that is, to flow from the SRA to the CVA). In extended drought periods, there is approximately 8 to 25 AFY of available rejected flow for exchange. These two sets of storage results demonstrate that in both normal and drought precipitation periods, pumping from the SRA for the proposed project will not result in a direct withdrawal of water from the CVA.

KJC concurs with the analysis presented in Todd (1992) and Todd (1997), that in average rainfall years and above average rainfall years the CVA and SRA would be in equilibrium, meaning that both aquifers would have insignificant net flow between them (Todd 1997). This is because the independent sources of recharge to both aquifers meeting or exceeding the water demand in both systems. KJC believes based on current calculations that this is valid for the project pumping scenario of 57.21 AFY where the amount of recharge is estimated to be between 244 and 262 AFY in average rainfall years and 65 to 81 AFY in below average years (see Table 1 in Appendix C of this Draft REIR), which still exceeds the project's estimated demand of 57.21 AFY and, as discussed below, the total demand of the SRA (57.90 AFY). Therefore, the effect of pumping in the September Ranch basin in average rainfall years does not impact the CVA significantly because recharge to the SRA exceeds groundwater usage in the September Ranch basin. The effect of pumping in the September Ranch on the CVA basin in drought years is also not considered to have a significant impact because recharge to the SRA is likely to remain an average of 73 AFY, well in excess of planned total usage of 57.90 AFY by all wells within the SRA.

Darcy Flux

Kennedy/Jenks has performed a second evaluation of connectivity between the CVA and SRA based on the Darcy equation. The results are discussed in the Hydrogeologic report in Appendix D. Due to the uncertainty in the hydraulic conductivity values for the aquitard Qoa2, Kennedy/Jenks cannot precisely establish the actual limited volume of groundwater exchange between the SRA and CVA based on calculations of Darcy flux. However, as indicated in Appendix D, it is believed that the level of exchange between the SRA and the CVA is one of one or two orders of magnitude less than under the water balance approach as a result of known geologic formations which impede the flow of water between the aquifers.

Thus, under either the water balance or Darcy Flux approach, there is a less than significant impact because the project will not substantially degrade or deplete groundwater or interfere with groundwater recharge.

Less than Significant Impact - Use of Water in a Wasteful Manner: As identified in the thresholds of significance, the project is considered to have a significant impact if it is considered to use water in a useful manner. While this is not a CEQA standard identified in Appendix G of the CEQA Guidelines, the 1998 Final EIR addressed this issue; thus it will be addressed within this REIR.

The proposed project will result in the development of 94 market rate residential units and 15 inclusionary housing units that will utilize approximately 57.21 AFY of water. This use of water is comparable to the typical use of water in the geographic region but incorporates an increase in total demand due to relatively larger lot sizes in the proposed project**.**

In addition, as discussed in Section 4.5 of this REIR, wastewater will be conveyed to the Carmel Area Water District's (CAWD) water recycling plant for eventual release into the Carmel Valley Lagoon. Presently, during the summer and fall months the lagoon waters are at critically low levels, which jeopardize the lagoon's steelhead populations. With additional wastewater flows, such as those from the project, CAWD will have a greater opportunity to release more wastewater. Therefore, the project provides greater opportunity to allow for beneficial reuse. Therefore, the proposed project is not considered to use water in a wasteful manner.

Less Than Significant Impact - Result in a Yield from the Groundwater System that is not Sufficient to Provide the Project Water Demand on a Long-Term Basis or During Droughts or Substantially Decreases the Availability of Groundwater to Existing Users of the SRA or the CVA: The project's sustainable yield is the amount of water that can be extracted from storage in the September Ranch Aquifer without affecting other users with senior water rights on a long-term basis. KJC concludes, based on the estimated amount of yearly recharge, that a conservative estimate of groundwater available long term from the SRA during normal rainfall periods is about 244 to 262 AFY for all users within the SRA. These values (244 and 262) are primarily calculated based on the 70 percent ET loss over a 561-acre watershed for average rainfall periods. KJC also estimates that a conservative amount of 65 AFY to 81 AFY of groundwater is available for all wells within the SRA based on an 85 percent ET loss for extended below average rainfall periods. With the exception of SR1, wells within the SRA with production records are listed in Table 4.3-7.

Table 4.3-7: SRA Wells Production Levels

Other Production Wells Within the SRA	Production Rate (AFY)
Tarantino (Todd, 1997)	0.35
Campisi (Todd, 1997)	1.3
Spicher (Todd, 1997)	0.5
Steine (Todd, 1997)	0.5
Total Production Four Wells (MPWMD, 1993)	0.88
Total Production Four Wells (MPWMD, 1995)	0.79
Total Production Four Wells (MPWMD, 1996)	0.62
Average Total Usage	**0.76**
Source: Kennedy/Jenks Consultants, February 2006.	

The sustainable yield for the project is then the available amount of groundwater minus the usage of these four known domestic wells. The sustainable yield calculations are summarized in Table 4.3-8. below.

Table 4.3-8: Sustainable Yield Summary

	Available Groundwater in the SRA[1] (AFY)	Average Usage of Other SRA Users (AFY)	Project Sustainable Yield[2] (AFY)
Average Precipitation Period	244 - 262	0.76	243 - 261
Below Average Precipitation	65 - 81	0.76	64 - 80

Notes:
1 Based on total recharge within the September Ranch watershed;
2 Project sustainable yield is the amount of naturally available groundwater in SRA minus the current total usage by other SRA users.
Source: Kennedy/Jenks Consultants, February 2006.

As shown in Table 4.3-8, the estimated average amount for other SRA users is 0.76 AFY; with the inclusion of the project's demand of 57.21 AFY, the total groundwater demand for the SRA is 57.90 AFY. The estimated annual recharge in average rainfall years ranges from 244 to 262 AFY and in drought years ranges from 65 to 81 AFY. Subtracting the average use of other wells in the SRA from the recharge indicates the sustainable yield for the project in average rainfall years is 243 to 261 AFY and in drought years is 64 to 80 AFY. The estimated water use for the project at build-out is 57.21 AFY, and therefore, the project's water use is within the sustainable yield for the SRA including the project and other users.

The effect of pumping in the September Ranch basin in average rainfall years does not impact the CVA significantly because recharge to the SRA exceeds groundwater usage in the September Ranch basin. The effect of pumping in the September Ranch on the CVA basin in drought years is also not considered to have a significant impact because recharge to the SRA is likely to remain an average of 73 AFY, well in excess of planned total usage of 57.90 AFY by all wells within the SRA.

As discussed under 4.3.2, Analysis of Senior Water Rights, based on the 45 year CVSIM simulation results provided, the water balance in AQ3 is such that the average difference between the inflow and the outflow is about 7,500 AFY. During the 1984 - 1991 dry period, the average difference between the inflow and the outflow in AQ3 is about 6,800 AFA. When compared to the approximately 2,705 AFA that is needed to meet the estimated maximum annual use in AQ3 described above, it appears that sufficient groundwater is available in storage in AQ3 on average as well as during a dry period to meet the needs of the riparian and pre-1914 appropriative rights holders in addition to the 57.21 AFY required to support the September Ranch project. Therefore, since there appears to be sufficient water in AQ3 with excess flow to meet the needs of the riparian and pre-1914 appropriate rights holders, pumping in the SRA will not have significant effect on water rights holders in AQ3. Moreover, the analogous analysis of the 45-year CVSIM simulation results provided for AQ4 indicates that the average difference between the inflow and the outflow is about 2,500 AFY. During the 1984 - 1991 dry period, the average difference between the inflow and the outflow in AQ4 is about 2,300 AFA. When compared to the approximately 1,845 AFA that is needed to meet the estimated maximum annual use in AQ4, it appears that sufficient groundwater is available in storage in AQ4 on average as well as during a dry period to meet the needs of the riparian and pre-1914 appropriative rights holders. Therefore, since there appears to be sufficient water in AQ4 with excess flow to meet the needs of the riparian and pre-1914 appropriate rights holders and there is sufficient supplies to meet the project's demands of 57.21 AFY, pumping in the SRA will not have significant effect on water rights holders in AQ4.

Hence, since there appears to be sufficient water on aggregate in AQ3 and AQ4 to meet the needs of the riparian and pre-1914 appropriate rights holders with and excess to meet the additional water demands of the SRA, the project will not have an effect on those water rights users. Moreover, potential spillage from the SRA is not needed to meet the maximum use in AQ3 and is likely to be part of excess outflow from AQ3 to AQ4. KJC concludes then any reduction in rejected flow (spillage) from the SRA will not have significant affect on the Carmel River and its underlying aquifer. This conclusion is further supported by the fact that actual use is often much lower than that cited for submittal to the SWRCB.

Less than Significant Impact - Increase pumping or demand on the CVA so as to impair the health of the CVA: The above conclusions regarding sustainable yield centers of the finding that the

September Ranch basin is fairly isolated in terms of hydrogeology with limited exchange of groundwater between the SRA and CVA largely because of the approximate neutral gradient between them and the high ridge of relatively impermeable material. KJC has taken into consideration that the CVA AQ 3 collocates with the westernmost portion of the SRA west of the knoll. This portion of the CVA occupies about 35 percent of the total SRA aquifer and is the most productive portion of the SRA. Additional pumping wells would most likely be proposed in this area due to the presence of the relatively thick Qoa_1 water bearing unit, as compared to water bearing zones encountered elsewhere in the September Ranch basin.

Even with planned future additions of pumping wells in this portion of the SRA, and given that the project usage limit is 57.21 AFY, it is likely that the groundwater in the SRA and CVA would maintain similar water levels—i.e. near neutral gradient. There are two contributing factors to the sustained neutral gradient with project demand: 1) groundwater levels have always been slightly higher in the SRA than the downgradient CVA due to the SRA watershed's higher topography and hence flow towards the CVA; and 2) the relatively small usage in the SRA compared to the large amount of storage in AQ3 of the CVA.

The groundwater gradient between Well E in the SRA and the Brookdale Well in the CVA is typically around 0.0020 ft/ft, with flow towards the CVA. KJC concludes, based on the water balance, that it is unlikely that the proposed usage of groundwater in the SRA would induce further declines in water levels in neighboring wells.

The effect on the CVA water resources is also assessed in terms of overall surface-water outflow from the CVA; accordingly, this Draft REIR examines the amount of water coming out of AQ3 and AQ4. The amount of annual outflow as reported in the CVSIM model is an indicator of the Carmel River baseflow. The CVSIM model calculates baseflow whenever the storage capacities in AQ1 through AQ4 are exceeded. In the CVA, groundwater storage is normally exceeded during peak flow months from December through May. The baseflow then determines the amount of surface-water and groundwater (subsurface) outflows on a monthly basis in each of the CVA aquifer units.

The average surface outflows in normal precipitation years (e.g. 1996 and 1997) are 91,849 AF in AQ3 and 90,830 AF in AQ4 (CVSIM data). Surface outflows during below normal rainfall years (e.g. 1987 through 1991) are 7,530 AF in AQ3 and 6,149 AF in AQ4. The years 1987 through 1991 are considered as critically dry years when the groundwater storage in the CVA was recorded at its lowest volume since 1981 (see Table 3 in Appendix B of Appendix C of this Draft REIR). The driest year was 1990 with surface flows declining to 2,554 AF in AQ3 and 1,315 AF in AQ4. CVSIM data indicate that outflows in the CVA during the summer months of June through November 1990 are mostly of subsurface nature (i.e. groundwater) and which notably did not diminish as compared to normal rainfall years. Surface-water flow in 1990 did decline and its occurrence was restricted to the winter months from December through May, similar to normal rainfall periods.

Monthly Analysis of Potential Flow Reduction to the Carmel River

This chapter also provides monthly calculations of reduced flow to the Carmel River Subunit 3 to demonstrate the less than significant impact on the CVA and the Carmel River. The analyses were done for below normal rainfall (Case 1) and normal rainfall periods (Case 2).

Using the more conservative values of 8 to 205 AFY of maximum potential Spill Over to the CVA from the original Water Balance Method, a monthly analysis was prepared for both dry year (WY 1987 - Case 1) and normal year (WY 1996 - Case 2). Maximum Potential Spill Over from SRA to CVA was then compared to the actual mean monthly flow in the Carmel River at US Geological Survey (USGS) stream flow gage No. 11143250 immediately downstream of the September Ranch development. When the gage flow = 0; it is assumed that the Carmel River is a losing stream (i.e. the water table is below the channel bottom) and therefore the reduced potential spill over from the SRA to the CVA results only in a reduced water table. The results of the monthly analysis are summarized in Table 4.3-9 as follows.

As described in Table 4.3-9 the range of potential maximum monthly spill over reduction of -0.022 to -0.033 cfs in Case 1 to -0.002 to -0.034 cfs in Case 2 can be considered as potential recharge to the CVA and thence to the Carmel River. Any reduction in recharge to the Carmel River can only happen within the hydrogeologically feasible flow from the SRA to the CVA. The reduction is difficult to estimate since the gradients are fairly neutral at any given time in a year and the resulting flow is less than -0.034 cfs. In a conservative scenario, any reduction of flows from the SRA into the CVA will likely occur during summer months of peak water usage. However, the reduced exchange from SRA to CVA will likely have limited impact on water levels in the Carmel River since there are generally no flows during the summer in the river based on a review of a USGS stream flow gage No. 11143250 immediately downstream of the September Ranch development.

USGS provides information on each gage regarding the degree of accuracy of the records provided by any given station. Gage No. 11143250 is characterized as having “fair” records which means that 95 percent of the daily discharges are within 15 percent of the true value. Furthermore, the values of the mean daily discharge recorded are shown to a number of significant figures based solely on the magnitude of the discharge value. For example, for discharges less than 1 cfs, the values are recorded to the nearest 0.01 cfs; for discharges between 1.0 and 10 cfs, the values are recorded to the nearest 0.1 cfs; to whole numbers between 10 and 1,000 cfs; and to 3 significant figures above 1,000 cfs. USGS further caveats the gage information by indicating that the accuracy of the streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretations of record.

In addition to gage No. 11143250 (Downstream Gage), USGS maintains gage No. 11143200 (Upstream Gage) - both of these gage locations are shown relative to each other, the September Ranch Development, and the aquifer subunit delineations on Figure 7 in the February 2006 Hydrogeological Report, Appendix C. The Upstream Gage is sufficiently upstream of both September Ranch and the Downstream Gage that it does not represent Carmel River flows in the vicinity of September Ranch. In addition, significant aquifer recharge occurs in the area downstream of the Upstream Gage. In the location of the Downstream Gage, flows are typically high, sometimes in excess of 500 cubic feet per second (224,000 gpm) in the wintertime and then taper to zero flow in the summer months. Zero flows can occur as early as May in a relatively dry year to as late as July in a relatively wet year as shown in Figure 8 of the February 2006 Hydrogeologic Report (Appendix H). Therefore, during the wet season, the reduction of flow of up to 0.034 cfs to the CVA and potentially to the Carmel River cannot be discerned in the flow of the Carmel River because the river flows are so high. When the Carmel River is dry, the water table is below the channel bottom and the reduction of flow of up to 0.034 cfs also cannot be discerned in the Carmel River. Flow reductions to the CVA and thence to the Carmel River during the spring months when the flows are tapering are also likely to be indiscernible.

Based on the annual project demand of 57.21 AFY, it is anticipated that there will be minimal to no decline in the water table in the SRA over the long-term as a result of annual pumping (drawdowns) in the September Ranch aquifer. Estimates of potential drawdown show no appreciable cumulative annual drawdown. In fact, annual water levels are increasing even in below average precipitation years (i.e. cumulative drawdown is positive). On a quarterly basis, during a below average rainfall year, there could be close to a foot (-0.96 foot) of decline in the water table in the SRA in the summer months (July to September). However, the rise in the water table in the SRA in the winter months (January to March) of two to three feet (2.6 to 3.2 feet) then balances the declines during the dry months over a year.

Because of the minimal change in the water table as a result of project usage, the resultant impact of reduced flow from the SRA to the Carmel River is then also very small. The maximum potential reduction in flow of-0.033 cfs in Case 1 and -0.034 cfs in Case 2 ranges from 0.01% to 0.05% of the monthly flows in the Carmel River for the appropriate month.

It should be noted that the pumping in the CVA by many users further complicates the analysis of the impact on the Carmel River. The CVA acts as a buffer zone of groundwater flow between the river and the SRA. What limited groundwater flow occurs from the SRA to the CVA then has to travel a distance of 850 feet to the Carmel River due south of the September Ranch watershed. Potential effects on the Carmel River baseflow as a result of up to 0.034 cfs of possible reduced groundwater resources from the SRA cannot be accurately quantified because of this additional pumping in the CVA between sources and receiving waters. Currently, there are six known supply wells in the CVA of which four are active with an average combined usage of 0.8 AFY (Section 7.0 in Report).

Lastly, it is estimated that the adjacent watersheds namely the Canada De La Segunda in the east and the Roach Canyon in the west have four to five times the drainage and recharge capacities to the CVA (Kleinfelder, 2004). The Canada De La Segunda is technically an upgradient source water of the CVA relative to the September Ranch Project. Its direct contribution to the CVA and then to the Carmel River may eclipse the minor contribution of recharge from the SRA.

Table 4.3-9: Maximum Potential Spill Over of Water from SRA to CVA for Below Normal and Normal Precipitation

Case 1: Maximum Potential Spill Over of Water from SRA to CVA (cfs) for Below Normal Precipitation (WY 1987)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Case 1a: Below Normal Precipitation WITH September Ranch	0.00	-0.019	-0.061	-0.178	-0.359	-0.224	-0.0009	0.0000	0.0000	0.0000	0.0000	0.0000
Case 1b: Below Normal Precipitation WITHOUT September Ranch	0.00	-0.052	-0.094	-0.211	-0.392	-0.257	-0.034	-0.024	0.00	0.00	0.00	0.00
Difference (Case 1a minus Case 1b)	**0.00**	**-0.033**	**-0.033**	**-0.033**	**-0.033**	**-0.033**	**-0.033**	**-0.024**	0.00	0.00	0.00	0.00
WY 1987 Monthly Mean Flow in the Carmel River (cfs)	0	0	0	0	0	36.11	60.88	18.42	0	0	0	0
Case 2: Maximum Potential Spill Over of Water from SRA to CVA (cfs) for Normal Precipitation WY 1996												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Case 2a: Normal Precipitation WITH September Ranch	0.00	0.00	-0.910	-0.790	-1.434	-0.365	-0.214	-0.323	0.00	0.00	0.00	0.00
Case 2b: Normal Precipitation WITHOUT September Ranch	0.00	-0.018	-0.943	-0.823	-1.465	-0.399	-0.247	-0.356	0.00	0.00	0.00	-0.002
Difference (Case 2a minus Case 2b)	**0.00**	**-0.018**	**-0.033**	**-0.033**	**-0.031**	**-0.034**	**-0.033**	**-0.033**	**-0.0033**	**0.00**	**0.00**	**-0.002**
WY 1996 Monthly Mean Flow in the Carmel River (cfs)	3.698	5.81	24.74	87.06	569.31	345.45	135.40	58.32	17.08	6.50	0.05	0.00
Source: Kennedy/Jenks Consultants, February 2006.												

The Hydrogeologic Report examines the connection between the SRA and the CVA and concludes that in its natural state, and under proposed project conditions, rainfall available for recharge within the September Ranch basin that exceeds the storage capacity of the SRA will be "rejected" (because of lack of storage space) and instead will be stored within the CVA. Historically, recharge of both the SRA and CVA has been sufficient to consistently refill both aquifers under both normal rainfall years and as efficiently after extended drought periods. It is expected that even with project pumping of 57.21 AFY, recharge will continue to refill the SRA and the CVA.

In addition, project design features are included in the project to ensure that any future pumping wells in the September Ranch basin should be located based on long-term pumping tests designed and executed appropriately to yield information on the radius of influence of potential multiple pumping wells. In addition, the project applicant will ensure that representative transmissivities for the three aquifer units (Qoa_1, Qoa_2, and Tm) will be made available for informed decisions on placement of future wells so as to minimize their effects on neighboring wells (particularly in the westernmost project area where the two aquifers are in direct hydraulic contact). Moreover, prior to the issuance of permits for future groundwater pumping wells, as required, the County of Monterey will review and approve well site plans to ensure the insertion of new wells will not have an impact on nearby wells.

Thus, a long term demand of 57.21 AFY from the SRA would not have a significant effect on the much larger volume of surface-water outflows in the CVA during normal and below average rainfall years.

Consistency with Relevant Plans and Polices

The following policies of the Carmel_Valley Master Plan (CVMP) are applicable to the proposed project:

CVMP Policy 6.1.3: All beneficial uses of total water resources of Carmel Valley and its tributaries shall be considered and provided for in future planning decisions.

CVMP Policy 6.1.4: Pumping from the Carmel River aquifer shall be managed consistently with the Carmel River Management Program. Any drawdown of the aquifer, which threatens natural vegetation in the judgment of the Monterey Peninsula Water Management District or its successors, must be accompanied by a program of irrigation with the affected area.

CVMP Policy 26.1.22: Developed areas should be evaluated in light of resource constraints especially the water supply constraint addressed in Policy 54.17 (CV) and the character of each area. No further development in such areas shall be considered until a need is demonstrated through public hearings.

CVMP Policy 54.1.7: The County of Monterey supports the new San Clemente dam project or some other water project as a means of assuring an adequate supply of water for future growth in the Carmel Valley. Without additional supplies, development will be limited to vacant lots of record and approved projects. All development, which requires a water supply shall be subject to County adopted water allocation and/or ordinances applicable to the lands in the Carmel Valley Master Plan area. This is the Low Growth Alternative addressed in the Final SEIR 85-002.

Consistency Analysis: Consistent with the CVMP, the hydrogeologic reports prepared by KJC, considered the effects on the Carmel River surface and groundwater system and has included design features to insure impacts remain less than significant. The proposed project does not require a water authorization from the County of Monterey and no water is available for this project in the County's allocation. Rather, consistent with the CVMP, the proposed project will pump groundwater from the SRA for potable water needs. The September Ranch basin is isolated in terms of hydrogeology with limited exchange of groundwater between the SRA and CVA largely because of the approximate neutral gradient between the two systems. Even with planned future additions of pumping wells in this portion of the SRA and the project usage limit of 57.21 AFY, it is likely that the groundwater gradient between the SRA and CVA will maintain its near neutrality because of the relatively small usage in the SRA and the large amount of storage in the CVA available for underflow into the SRA. The effect of pumping in the September Ranch basin in average years will not affect the CVA significantly because recharge most likely exceeds usage. The effect of pumping in the September Ranch basin in drought years on the CVA is also minimal because recharge will most likely exceed the planned usage of 57.21 AFY. Therefore, no impacts on natural vegetation would occur.

In accordance with the CVMP, the project will be the subject of public hearings by the Monterey County Subdivision Review Committee, the County Planning Commission, and the County Board of Supervisors.