Appendix A: Water System Considerations - Background Technical Documents

Questa: September Ranch Water Plan Summary

QUESTA

Civil, Environmental & Water Resources

September Ranch
Water Plan Summary

April 3, 2006

This report provides a summary of the planned domestic water supply facilities for the September Ranch project, incorporating the results of extensive groundwater studies by the applicant's consultant (Todd Engineers) as well as independent environmental analysis contained in the 1998 EIR and the 2006 Recirculated Draft EIR (RDEIR).

Project Water Demand

The September Ranch project will include 94 market rate homes, 15 inclusionary housing units, and continuation of the existing equestrian center. The estimated annual water demand for the project, including system losses, is 57.21 acre-feet per year (AFY), or roughly 0.156 acre-feet per day. The EIR estimated that about two-thirds of the water use will occur during the dry season (June-November) and the remaining one-third during the other half of the year (December-May). Accordingly, these water demand estimates equate, respectively, to average daily water use of 0.208 acre-feet per day during June-November and 0.104 acre-feet per day during the rest of the year. Thus, during the period of greatest water demand, the sustained water use will amount to about 68,000 gallons per day, or approximately 47 gallons per minute (gpm). Peak single day production during the period of maximum use may be as much as twice the average rate, or roughly 95gpm.

New Water Supply Wells

The water for the project will be supplied from two new production wells that will draw from the September Ranch Aquifer (SRA). The wells will be installed in the same general vicinity and with the same approximate depth (150 to 200 feet deep) as the existing agricultural supply well (SR1) which is located in the front pasture area, approximately 500 feet east of the existing equestrian center (**Figure 1**). The two new wells will be located approximately 500 feet apart as indicated in **Figure 1** – one to the east and one to the west of SR1. Existing well SR1 will remain available for use as an emergency backup supply well. The recommended location for the new wells is based on the following considerations:

- **Verified Water Availability.** The use of the SR1 well, which has been operated at an average annual production rate of approximately 99 AFY as identified in the Brandman Revised EIR; i.e., at nearly 175% of the projected pumping rate for the project demonstrates a sufficient supply of groundwater at the recommended locations.
- **Completed Pumping Tests.** Extensive pumping tests of SR1 (at rates of 205 and 250 gpm) have been completed to determine the aquifer characteristics (e.g., transmissivity, storavity and specific capacity) in the vicinity of SR1 as well as

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the hydraulic relationship between the September Ranch Aquifer and the Carmel Valley Aquifer. This information can be used as a reliable basis for the design and operation of new production wells located in the area of SR1.

- **Groundwater Impact Analysis.** The impacts on groundwater flow patterns and drawdown influence on other neighboring wells from groundwater extraction in the area of SR1 has been evaluated as part of the environmental review process. The long-term pumping tests for SR1 as well as the sustained use of the well over many years has provided a firm basis for concluding that the continued extraction of groundwater from this location at the planned production rates for the project will have a negligible effect on other neighboring water supply wells.

- **Documented Water Quality.** The water quality of the September Ranch Aquifer in the area of SR1 has been documented through sampling and analytical testing, including several samples obtained in 1992 as well as a recent (March 2006) comprehensive analysis for compliance with drinking water standards (see **Attachment A** for laboratory report). With the exception of mineral content (TDS, iron and manganese), the analyses show the groundwater quality to be in compliance with all drinking water standards. As discussed below, water treatment facilities will be included at September Ranch to bring the mineral content into compliance with secondary (consumer acceptance) standards.

- **Contributing Watershed Recharge Area.** According to the RDEIR the total watershed area estimated to contribute to recharge of the September Ranch Aquifer is 561 acres; and this results in an average annual recharge volume of approximately 244 to 262 AFY. Nearly 75% of the contributing recharge area lies upgradient of SR1 where the new production wells are proposed. As compared with other possible well locations farther to the east or to the west, this proposed location will afford the wells the greatest opportunity for annual replenishment at rates that substantially exceed the projected annual water demands for the project.

- **Minimize Well Interference.** The separation distance of 500 feet between the two wells will greatly minimize the potential for any drawdown influence or interference between the two wells.

Water Well Design and Operation

The design, construction and operation of the new water wells will be in accordance with recommendations provided by Todd Engineers (1992), including the following:

- Steel well casing;
- Stainless steel or low carbon steel wire wrap screen;
- Proper aperture size selection sized for the correct aquifer or sand pack dimensions;

- Thorough well development;
- Short-term pumping test to verify aquifer conditions are similar to SR1; and
- Utilization of only two-thirds of the available drawdown for 12-hour pumping cycles.

Through pumping tests, Todd Engineers determined the September Ranch Aquifer to have a transmissivity of 50,000 gpd/ft in the vicinity of SR1 and an estimated storativity of 30 percent. They also documented SR1 to have specific capacity of approximately 5.2 gpm per foot of drawdown, and a well efficiency of 20 percent, which is unusually low. Todd Engineers estimated that the low specific capacity for SR1 may be due to improper well development and/or misplaced well screen locations. Properly designed and operated wells should have substantially higher efficiencies, in the range of 70 to 80 percent. For the September Ranch Aquifer, this would result in specific capacities on the order of nearly 20 gpm/ft of drawdown. Accordingly, the expected water level drawdown caused by sustained pumping of 47 gpm by one of the new production wells would be on the order of approximately 2.5 feet at the well location. For short-term peak daily production of 95 gpm, the maximum drawdown could be twice this amount, or 5 feet. These are insignificant drawdown levels that will result in a very limited zone of influence around the pumping well. For the above cited transmissivity and storativity values (per Todd), operation of one of the new wells at a sustained pumping rate of 47 gpm for 180 days would result in an estimated water table drawdown of approximately 0.5 feet at a distance of 300 feet from the pumping well (see **Attachment B** for calculations).

Water Treatment Facilities

A reverse osmosis (RO) water treatment system will be required for the September Ranch domestic water supply to reduce the concentration of iron, manganese and total dissolved solids for compliance with drinking water standards. The water treatment plant will be located in the vicinity of the former quarry, in the approximate location shown in **Figure 1**. Permit issuance for the water treatment plant will be subject to review and approval by the County of Monterey.

Waste by-products (reject) from the RO treatment process will be disposed by one or a combination of the following: (1) sanitary sewer discharge to the Carmel Area Wastewater District (CAWD) facilities; and (2) hauling and disposal to an approved wastewater treatment plant ocean outfall system.

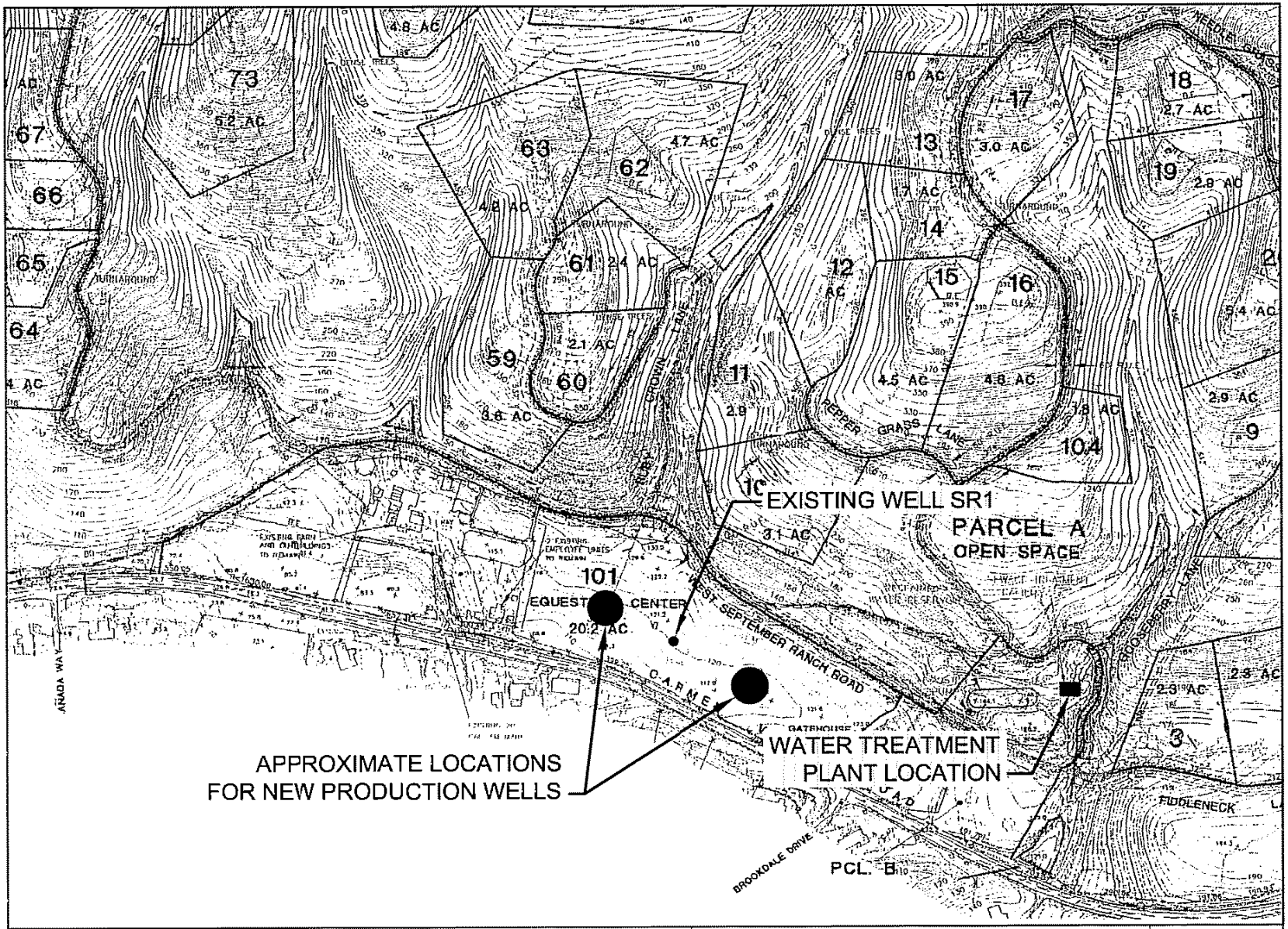
Based on discussions with CAWD District Manager Ray von Doren, the CAWD will permit discharge of the RO reject water to be commingled with the sanitary sewer flow from September Ranch, subject to certain monitoring requirements and concentration limits, including most critically a sodium limit of approximately 140 to 150 mg/L. Preliminary calculations indicate that this will allow up to approximately half of the RO reject water to be discharged directly to the sanitary sewer (see **Attachment C**).

Any remaining RO reject will be hauled to the Monterey Regional Water Pollution Control Plant for metered discharge into their ocean outfall. According to one of the plant engineers (Greg Antosz), the Monterey facility currently receives similar RO reject water from the Monterra Ranch Mutual Water Company and Culligan, and would have capacity and provisions to take similar waste from September Ranch. The City of Watsonville Treatment Plant also currently receives and discharges RO reject water through their ocean outfall.

Water System Operations

The September Ranch water system will be operated under contract with a properly qualified and licensed water treatment operator. Provided in **Attachment D** is a letter from Carmel-Lahaina Utility Services, Inc., indicating their interest and availability to provide contract water system operation for September Ranch. Among their activities, Carmel-Lahaina currently operates the water system for Monterra Ranch Mutual Water Company, a nearby system similar in size and facilities as that planned for September Ranch.

Norman N. Hantzsche, PE
Principal/Managing Engineer



Date:	3/30/06
Drawn:	C.H.
Appr'd:	N.H.
Dwg. No:	220019_.dwg

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WATER WELL & TREATMENT PLANT LOCATIONS

SEPTEMBER RANCH

FIGURE

1

P:\2002\220019_Sept Ranch 2002\Working\220019_Wells & Recharge Area.dwg, 3/31/2006 4:50:39 PM, CutePDF Writer, C.H.

Sample Progress Report

Monterey County Chemistry Laboratory
User: Krasa, Amanda
Date: 03-28-2006 Time: 16:09:54

Sample ID: AA86969
Status: In validation queue
Purchase order number:
Other identification:
Client Code: OTHER
Sample Collector:
Sampler: GARNEAU G

Date collected: 03/20/06 11:40
Date submitted: 03/20/06 14:29
Due date: 04/03/06 00:00
Specification checking: on
sample site: SEPTEMBER RANCH - MAIN WELL
Login record file: 86969
Pscode:

Analysis	Viol	Result	Unit	Finished	Anl
Total Alkalinity (as CaCO3)		346	mg/L	03/20/06	TL
Cl (Chloride)		161	mg/L	03/22/06	TL
Color Determination		14	Color Units	03/21/06	AK
F (Fluoride)		0.59	mg/L	03/22/06	TL
Nitrite as nitrogen		ND	ug/L	03/20/06	AK
NO3 (Nitrate)		ND	mg/L	03/22/06	TL
Threshold odor number		2	TON	03/21/06	AK
pH (Laboratory)		6.9	Std Units	03/20/06	TL
Conductivity		1700	umho/cm	03/21/06	TL
SO4 (Sulfate)		250	mg/L	03/22/06	TL
Total Dissolved Solids (TDS)		992	mg/L	03/24/06	AK
Turbidity (Laboratory)		3.8	NTU	03/21/06	AK
Cyanide		Completed	Attached	03/28/06	BSK
MBAS surfactants		Completed	Attached	03/28/06	BSK
Carbonate Alkalinity (as CO3)		ND	mg/l	03/20/06	TL
Hardness		512	mg/l	03/27/06	TL
Bicarbonate Alkalinity (as HCO3)		422.1	mg/L	03/20/06	AK
Calculated Langelier		0.56	CaCO3	03/27/06	TL
Hydroxide Alkalinity (as OH)		ND	mg/l	03/20/06	TL
Title 22 (GM,GP,IO)		Completed		03/28/06	AK
Silver (Ag)		ND	ug/L	03/21/06	TL
Aluminum (Al)		ND	ug/L	03/21/06	TL
Arsenic (As)		ND	ug/L	03/21/06	TL
Barium (Ba)		ND	ug/L	03/21/06	TL
Beryllium (Be)		ND	ug/L	03/21/06	TL
Cadmium (Cd)		ND	ug/L	03/21/06	TL
Chromium (Cr)		18	ug/L	03/21/06	TL
Copper (Cu)		ND	ug/L	03/21/06	TL
Mercury (Hg)		ND	ug/L	03/21/06	TL
Manganese (Mn)		229	ug/L	03/21/06	TL
Nickel (Ni)		ND	ug/L	03/21/06	TL
Lead (Pb)		6	ug/L	03/21/06	TL
Antimony (Sb)		ND	ug/L	03/21/06	TL
Selenium (Se)		12	ug/L	03/21/06	TL
Thallium (Tl)		ND	ug/L	03/21/06	TL
Zinc (Zn)		ND	ug/L	03/27/06	TL
Iron		480	ug/L	03/27/06	TL
Sodium		121	mg/L	03/27/06	TL
Calcium		139	mg/L	03/27/06	TL
Potassium		3.6	mg/L	03/27/06	TL
Magnesium		40	mg/L	03/27/06	TL
Coliforms; total		PRESENT	#/100ML	03/21/06	AK
Coliforms; E. coli		ABSENT	#/100ML	03/21/06	AK
502.2, Volatile Organic Compound		Completed	Attached	03/28/06	BSK
EPA515.1		Completed	Attached	03/28/06	BSK
EPA525		Completed	Attached	03/28/06	BSK

Sample AA86969 Progress Report (continued):

Analysis	Vial	Result	Unit	Finished	Anl
EPA549		Completed	Attached	03/28/06	BSK
Gross Alpha Radiation		Completed	Attached	03/28/06	BSK

End of progress report on sample: **AA86969**

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

NELAP Certificate #04227CA
ELAP Certificate #1180

Gerry Guibert
Monterey CHD
1270 Natividad Rd. Rm A15
Salinas, CA 93906

Report Issue Date: 03/28/2006

BSK Submission #: 2006031512
BSK Sample ID #: 701556
Project ID: Project Desc: September Ranch
Submission Comments:
Sample Type: Liquid
Sample Description: September Ranch Main Well
Sample Comments: AA86969

Date Sampled: 03/20/2006
Time Sampled: 1140
Date Received: 03/21/2006

Inorganics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
Cyanide (CN)	SM 4500-CN-F	ND	µg/L	20	1	20	03/24/06	03/24/06
MBAS Calculated as LAS mol wt 340	SM 5540 C	ND	mg/L	0.05	1	0.05	03/22/06 07:15	03/22/06 07:15

Organics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
1,1,1,2-Tetrachloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,1,1-Trichloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,1,2,2-Tetrachloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 502.2	ND	µg/L	10.0	1	10	03/22/06	03/22/06
1,1,2-Trichloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,1-Dichloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,1-Dichloroethene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,1-Dichloropropene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2,3-Trichlorobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2,3-Trichloropropane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2,4-Trichlorobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2,4-Trimethylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2-Dichlorobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2-Dichloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,2-Dichloropropane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,3,5-Trimethylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,3-Dichlorobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,3-Dichloropropane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
1,4-Dichlorobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
2,2-Dichloropropane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
2-Chlorotoluene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
4-Chlorotoluene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Benzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Bromobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06

mg/L: Milligrams/Liter (ppm)
mg/Kg: Milligrams/Kilogram (ppm)
µg/L: Micrograms/Liter (ppb)
µg/Kg: Micrograms/Kilogram (ppb)
%Rec: Percent Recovered (surrogates)
Report Authentication Code: *701556-303 0000*

PQL: Practical Quantitation Limit
DLR: Detection Limit for Reporting : PQL x Dilution
ND: None Detected at DLR
pCi/L: Picocurie per Liter

H: Analyzed outside of hold time
P: Preliminary result
S: Suspect result. See Case Narrative for comments.
E: Analysis performed by External laboratory. See External Laboratory Report attachments.

1414 Stanislaus Street Fresno CA 93706-1623 Phone 559-497-2888, In CA 800-877-8310 Fax 559-485-6935

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

NELAP Certificate #04227CA
ELAP Certificate #1180

Gerry Guibert
Monterey CHD
1270 Natividad Rd. Rm A15
Salinas, CA 93906

Report Issue Date: 03/28/2006

BSK Submission #: 2006031512
BSK Sample ID #: 701556

Project ID:
Project Desc: September Ranch
Submission Comment:
Sample Type: Liquid
Sample Description: September Ranch Main Well
Sample Comments: AA86069

Date Sampled: 03/20/2006
Time Sampled: 1140
Date Received: 03/21/2006

Organics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
Bromochloromethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Bromodichloromethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Bromoform	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Bromomethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Carbon tetrachloride	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Chlorobenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Chloroethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Chloroform	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Chloromethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
cis-1,2-Dichloroethene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
cis-1,3-Dichloropropene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Dibromochloromethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Dibromomethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Dichlorodifluoromethane	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Ethyl t-Butyl Ether	EPA 502.2	ND	µg/L	3.0	1	3.0	03/22/06	03/22/06
Ethylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Hexachlorobutadiene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Isopropylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
m,p-Xylenes	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Methylene chloride	EPA 502.2	ND	µg/L	3.0	1	3.0	03/22/06	03/22/06
Methyl-t-Butyl Ether	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Naphthalene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
n-Butylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
n-Propylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
o-Xylene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
p-Isopropyltoluene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
sec-Butylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Styrene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
t-Amyl Methyl Ether	EPA 502.2	ND	µg/L	3.0	1	3.0	03/22/06	03/22/06

mg/L: Milligrams/Liter (ppm)
mg/Kg: Milligrams/Kilogram (ppm)
µg/L: Micrograms/Liter (ppb)
µg/Kg: Micrograms/Kilogram (ppb)
%Rec: Percent Recovered (surrogates)

PQL: Practical Quantitation Limit
DLR: Detection Limit for Reporting : PQL x Dilution
ND: None Detected at DLR
pCi/L: Picocuries per Liter

H: Analyzed outside of hold time
P: Preliminary result
S: Suspect result. See Case Narrative for comments
E: Analysis performed by External laboratory. See External Laboratory Report attachments

Report Authentication Code: *701556-303.0000*

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BSK ANALYTICAL LABORATORIES

Certificate of Analysis

NELAP Certificate #04227CA
ELAP Certificate #1180

Gerry Guibert
Monterey CHD
1270 Natividad Rd. Rm A15
Salinas, CA 93906

Report Issue Date: 03/28/2006

BSK Submission #: 2006031512
BSK Sample ID #: 701556

Project ID: Project Desc: September Ranch
Submission Comments:
Sample Type: Liquid
Sample Description: September Ranch Main Well
Sample Comments: AA#6969

Date Sampled: 03/20/2006
Time Sampled: 1140
Date Received: 03/21/2006

Organics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
tert-Butylbenzene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Tetrachloroethene (PCE)	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Toluene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Total 1,3-Dichloropropene	EPA 502.2	ND	µg/L	0.5	1	0.5		
Total Trihalomethanes	EPA 502.2	ND	µg/L	0.5	1	0.5		
Total Xylene Isomers	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
trans-1,2-Dichloroethene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
trans-1,3-Dichloropropene	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Trichloroethene (TCE)	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
Trichlorofluoromethane	EPA 502.2	ND	µg/L	5.0	1	5.0	03/22/06	03/22/06
Vinyl chloride	EPA 502.2	ND	µg/L	0.5	1	0.5	03/22/06	03/22/06
2,4,5-T	EPA 515.3	ND	µg/L	1.0	1	1.0	03/22/06	03/22/06
2,4,5-TP (Silvex)	EPA 515.3	ND	µg/L	1.0	1	1.0	03/22/06	03/22/06
2,4-D	EPA 515.3	ND	µg/L	10	1	10	03/22/06	03/22/06
Benzoan (Bentogran)	EPA 515.3	ND	µg/L	2.0	1	2.0	03/22/06	03/22/06
Dalapon	EPA 515.3	ND	µg/L	10	1	10	03/22/06	03/22/06
Dicamba (Banvel)	EPA 515.3	ND	µg/L	1.5	1	1.5	03/22/06	03/22/06
Dinoseb (DNBP)	EPA 515.3	ND	µg/L	2.0	1	2.0	03/22/06	03/22/06
Pentachlorophenol (PCP)	EPA 515.3	ND	µg/L	0.2	1	0.2	03/22/06	03/22/06
Picloram	EPA 515.3	ND	µg/L	1.0	1	1.0	03/22/06	03/22/06
Alachlor (Alanex)	EPA 525.2	ND	µg/L	1.0	1	1.0	03/23/06	03/26/06
Atrazine (Aatrex)	EPA 525.2	ND	µg/L	0.5	1	0.5	03/23/06	03/26/06
Benzo(a)pyrene	EPA 525.2	ND	µg/L	0.1	1	0.1	03/23/06	03/26/06
bis(2-ethylhexyl) adipate	EPA 525.2	ND	µg/L	3.0	1	3.0	03/23/06	03/26/06
bis(2-ethylhexyl) phthalate	EPA 525.2	ND	µg/L	3.0	1	3.0	03/23/06	03/26/06
Bromacil (Hyvar)	EPA 525.2	ND	µg/L	10	1	10	03/23/06	03/26/06
Butachlor	EPA 525.2	ND	µg/L	0.38	1	0.38	03/23/06	03/26/06
Diazinon	EPA 525.2	ND	µg/L	0.25	1	0.25	03/23/06	03/26/06
Dimethoate (Cygon)	EPA 525.2	ND	µg/L	10	1	10	03/23/06	03/26/06

mg/L: Milligrams/Liter (ppm)
mg/Kg: Milligrams/Kilogram (ppm)
µg/L: Micrograms/Liter (ppb)
µg/Kg: Micrograms/Kilogram (ppb)
%Rec: Percent Recovered (surrogates)
Report Authentication Code:

PQL: Practical Quantitation Limit
DLR: Detection Limit for Reporting : PQL x Dilution
ND: None Detected at DLR
pCi/L: Picocurie per Liter

H: Analyzed outside of hold time
P: Preliminary result
S: Suspect result. See Case Narrative for comments.
E: Analysis performed by External laboratory. See External Laboratory Report attachments.

701556-303.0000

1414 Stanislaus Street Fresno, CA 93706-1623 Phone 559-497-2888, In CA 800-877-8310 Fax 559-485-6935

BSK ANALYTICAL LABORATORIES

Certificate of Analysis

NELAP Certificate #04227CA
ELAP Certificate #1180

Gerry Guibert
Monterey CHD
1270 Natividad Rd. Rm A15
Salinas, CA 93906

Report Issue Date: 03/28/2006

BSK Submission #: 2006031512
BSK Sample ID #: 701556

Project ID:
Project Desc: September Ranch
Submission Comments:
Sample Type: Liquid
Sample Description: September Ranch Main Well
Sample Comments: AA86949

Date Sampled: 03/20/2006
Time Sampled: 1140
Date Received: 03/21/2006

Organics

Analyte	Method	Result	Units	PQL	Dilution	DLR	Prep Date/Time	Analysis Date/Time
Metolachlor	EPA 525.2	ND	µg/L	0.5	1	0.5	03/23/06	03/26/06
Metribuzin	EPA 525.2	ND	µg/L	0.5	1	0.5	03/23/06	03/26/06
Molinate (Ordram)	EPA 525.2	ND	µg/L	2.0	1	2.0	03/23/06	03/26/06
Prometryn (Caparol)	EPA 525.2	ND	µg/L	2.0	1	2.0	03/23/06	03/26/06
Propachlor	EPA 525.2	ND	µg/L	0.5	1	0.5	03/23/06	03/26/06
Simazine (Princep)	EPA 525.2	ND	µg/L	1.0	1	1.0	03/23/06	03/26/06
Thiobencarb (Bolero)	EPA 525.2	ND	µg/L	1.0	1	1.0	03/23/06	03/26/06
Diquat	EPA 549.2	ND	µg/L	4	1	4	03/23/06	03/24/06
Surrogate								
1-Chloro-2-fluorobenzene	EPA 502.2	93	% Rec		1	N/A	03/22/06	03/22/06
DCPAA	EPA 515.3	100	% Rec		1	N/A	03/22/06	03/22/06
1,3-Dimethyl-2-nitrobenzene	EPA 525.2	110	%Rec		1	N/A	03/23/06	03/26/06

mg/L: Milligrams/Liter (ppm)
mg/Kg: Milligrams/Kilogram (ppm)
µg/L: Micrograms/Liter (ppb)
µg/Kg: Micrograms/Kilogram (ppb)
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PQL: Practical Quantitation Limit
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TRUESDAIL LABORATORIES, INC.

INDEPENDENT TESTING. FORENSIC SCIENCE, AND ENVIRONMENTAL ANALYSES

Established 1931

14201 FRANKLIN AVENUE
TUSTIN, CALIFORNIA 92780-7008
(714) 730-6239 FAX (714) 730-6462
www.truesdail.com

REPORT

Client: **BSK Laboratories**
1414 Stanislaus Street
Fresno, CA 93706
Attention: John Poelen

Report Date: March 27, 2006
Date Received: March 23, 2006
Laboratory No: 953054

Sample: Water
BSK Project No: 2006031512

Investigation: Gross Alpha Activity

Analytical Results

Sample ID	Analysis	Method	Activity pCi/L	Two Sigma Error	MDA	Date Analyzed
1. 701555	Alpha	SM7110C	3.10	+/- 1.07	1.49	03/24/06
2. 701556	Alpha	SM7110C	3.10	+/- 1.07	1.49	03/24/06

Gross Alpha results are based on a Uranium calibration curve.

Respectfully submitted,
TRUESDAIL LABORATORIES, INC

Rossina Tomova, Project Manager
Radiochemistry Group

September Ranch

Projected Drawdown Calculation at 300 feet from Pumping Well

Assumptions: 47 gpm for 180 days and aquifer characteristics per Todd (1992).

T (gpd/ft)	=	50,000
Q (gpm)	=	47
t (days)	=	180
r (ft.)	=	300.00
S	=	0.300

Applying Theis non-equilibrium equation:

$$u = \frac{(1.87)(r^2)(S)}{(T)(t)} = 5.61E\text{-}03$$

$W_{(u)}$ = 4.6134 per Table A

Specific Capacity (Theoretical):

$$Q/s = \frac{T}{(114.6)(W_{(u)})} = 94.57$$

Solve for drawdown at average pumping rate of **47** ***gpm***

s (ft.) = 47 / Q/s = 0.50

Table A

W(u) function values

	N x 10^{-15}	N x 10^{-14}	N x 10^{-13}	N x 10^{-12}	N x 10^{-11}	N x 10^{-10}	N x 10^{-9}	N x 10^{-8}	N x 10^{-7}	N x 10^{-6}	N x 10^{-5}	N x 10^{-4}	N x 10^{-3}	N x 10^{-2}	N x 10^{-1}	N
1.0	33.9616	31.6590	29.3564	27.0538	24.7512	22.4486	20.1460	17.8435	15.5409	13.2383	10.9357	8.6332	6.3315	4.0379	1.8229	0.2194
1.1	33.8662	31.5637	29.2611	26.9585	24.6559	22.3533	20.0507	17.7482	15.4456	13.1430	10.8404	8.5379	6.2363	3.9436	1.7371	0.1860
1.2	33.7792	31.4767	29.1741	26.8715	24.5689	22.2663	19.9637	17.6611	15.3586	13.0560	10.7534	8.4509	6.1494	3.8576	1.6595	0.1584
1.3	33.6992	31.3966	29.0940	26.7914	24.4889	22.1863	19.8837	17.5811	15.2785	12.9759	10.6734	8.3709	6.0695	3.7785	1.5889	0.1355
1.4	33.6251	31.3225	29.0199	26.7173	24.4147	22.1122	19.8096	17.5070	15.2044	12.9018	10.5993	8.2968	5.9955	3.7054	1.5241	0.1162
1.5	33.5561	31.2535	28.9509	26.6483	24.3458	22.0432	19.7406	17.4380	15.1354	12.8328	10.5303	8.2278	5.9266	3.6374	1.4645	0.1000
1.6	33.4916	31.1890	28.8864	26.5838	24.2812	21.9786	19.6760	17.3735	15.0709	12.7683	10.4657	8.1634	5.8621	3.5739	1.4092	0.0863
1.7	33.4309	31.1283	28.8258	26.5232	24.2206	21.9180	19.6154	17.3182	15.0103	12.7077	10.4051	8.1027	5.8016	3.5143	1.3578	0.0747
1.8	33.3738	31.0712	28.7686	26.4660	24.1634	21.8608	19.5583	17.2557	14.9531	12.6505	10.3479	8.0455	5.7446	3.4581	1.3098	0.0647
1.9	33.3197	31.0171	28.7145	26.4119	24.1094	21.8068	19.5042	17.2016	14.8990	12.5964	10.2939	7.9915	5.6906	3.4050	1.2649	0.0562
2.0	33.2684	30.9658	28.6632	26.3607	24.0581	21.7555	19.4529	17.1503	14.8477	12.5451	10.2426	7.9402	5.6394	3.3547	1.2227	0.0489
2.1	33.2196	30.9170	28.6145	26.3119	24.0093	21.7067	19.4041	17.1015	14.7989	12.4964	10.1938	7.8914	5.5907	3.3069	1.1829	0.0426
2.2	33.1731	30.8705	28.5679	26.2653	23.9628	21.6602	19.3576	17.0550	14.7524	12.4498	10.1473	7.8449	5.5443	3.2614	1.1454	0.0372
2.3	33.1286	30.8261	28.5235	26.2209	23.9183	21.6157	19.3131	17.0106	14.7080	12.4054	10.1028	7.8004	5.4999	3.2179	1.1099	0.0325
2.4	33.0861	30.7835	28.4809	26.1783	23.8758	21.5732	19.2706	16.9680	14.6654	12.3628	10.0603	7.7579	5.4575	3.1763	1.0762	0.0284
2.5	33.0453	30.7427	28.4401	26.1375	23.8349	21.5323	19.2298	16.9272	14.6246	12.3220	10.0194	7.7172	5.4167	3.1365	1.0443	0.0249
2.6	33.0060	30.7035	28.4009	26.0983	23.7957	21.4931	19.1905	16.8880	14.5854	12.2828	9.9802	7.6779	5.3776	3.0983	1.0139	0.0219
2.7	32.9683	30.6657	28.3631	26.0606	23.7580	21.4554	19.1528	16.8502	14.5476	12.2450	9.9425	7.6401	5.3400	3.0615	0.9849	0.0192
2.8	32.9319	30.6294	28.3268	26.0242	23.7216	21.4190	19.1164	16.8138	14.5113	12.2087	9.9061	7.6038	5.3037	3.0261	0.9573	0.0169
2.9	32.8968	30.5943	28.2917	25.9891	23.6865	21.3839	19.0813	16.7788	14.4762	12.1736	9.8710	7.5687	5.2687	2.9920	0.9309	0.0148
3.0	32.8629	30.5604	28.2578	25.9552	23.6526	21.3500	19.0474	16.7449	14.4423	12.1397	9.8371	7.5648	5.2349	2.9591	0.9057	0.0131
3.1	32.8302	30.5276	28.2250	25.9224	23.6198	21.3172	19.0146	16.7121	14.4095	12.1069	9.8043	7.5020	5.2022	2.9273	0.8815	0.0115
3.2	32.7984	30.4958	28.1932	25.8907	23.5881	21.2855	18.9829	16.6803	14.3777	12.0751	9.7726	7.4703	5.1706	2.8965	0.8583	0.0101
3.3	32.7676	30.4651	28.1625	25.8599	23.5573	21.2547	18.9521	16.6495	14.3470	12.0444	9.7418	7.4395	5.1399	2.8668	0.8361	0.0089
3.4	32.7378	30.4352	28.1326	25.8300	23.5274	21.2249	18.9223	16.6197	14.3171	12.0145	9.7120	7.4097	5.1102	2.8379	0.8147	0.0079
3.5	32.7088	30.4062	28.1036	25.8010	23.4985	21.1959	18.8933	16.5907	14.2881	11.9855	9.6830	7.3807	5.0813	2.8099	0.7942	0.0070
3.6	32.6806	30.3780	28.0755	25.7729	23.4703	21.1677	18.8651	16.5625	14.2599	11.9574	9.6548	7.3526	5.0532	2.7827	0.7745	0.0062
3.7	32.6532	30.3506	28.0481	25.7455	23.4429	21.1403	18.8377	16.5351	14.2325	11.9300	9.6274	7.3252	5.0259	2.7563	0.7554	0.0054
3.8	32.6266	30.3240	28.0214	25.7188	23.4162	21.1136	18.8110	16.5085	14.2059	11.9033	9.6007	7.2985	4.9993	2.7306	0.7371	0.0048
3.9	32.6006	30.2980	27.9954	25.6928	23.3902	21.0877	18.7851	16.4825	14.1799	11.8773	9.5748	7.2725	4.9735	2.7056	0.7194	0.0043
4.0	32.5753	30.2727	27.9701	25.6675	23.3649	21.0623	18.7598	16.4572	14.1546	11.8520	9.5495	7.2572	4.9482	2.6813	0.7024	0.0038
4.1	32.5506	30.2480	27.9454	25.6428	23.3402	21.0376	18.7351	16.4325	14.1299	11.8273	9.5248	7.2225	4.9236	2.6576	0.6859	0.0033
4.2	32.5265	30.2239	27.9213	25.6187	23.3161	21.0136	18.7110	16.4084	14.1058	11.8032	9.5007	7.1985	4.8997	2.6344	0.6700	0.0030
4.3	32.5029	30.2004	27.8978	25.5952	23.2926	20.9900	18.6874	16.3848	14.0823	11.7797	9.4771	7.1749	4.8762	2.6119	0.6546	0.0026
4.4	32.4800	30.1774	27.8748	25.5722	23.2696	20.9670	18.6644	16.3619	14.0593	11.7567	9.4541	7.1520	4.8533	2.5899	0.6397	0.0023
4.5	32.4575	30.1549	27.8523	25.5497	23.2471	20.9446	18.6420	16.3394	14.0368	11.7342	9.4317	7.1295	4.8310	2.5684	0.6253	0.0021
4.6	32.4355	30.1329	27.8303	25.5277	23.2252	20.9226	18.6200	16.3174	14.0148	11.7122	9.4097	7.1075	4.8091	2.5474	0.6114	0.0018
4.7	32.4140	30.1114	27.8088	25.5062	23.2037	20.9011	18.5985	16.2959	13.9933	11.6907	9.3882	7.0860	4.7877	2.5268	0.5979	0.0016
4.8	32.3929	30.0904	27.7878	25.4852	23.1826	20.8800	18.5774	16.2748	13.9723	11.6697	9.3671	7.0650	4.7667	2.5068	0.5848	0.0011
4.9	32.3723	30.0697	27.7672	25.4646	23.1620	20.8594	18.5568	16.2542	13.9516	11.6491	9.3465	7.0444	4.7462	2.4871	0.5721	0.0013
5.0	32.3521	30.0495	27.7470	25.4444	23.1418	20.8392	18.5366	16.2340	13.9314	11.6289	9.3263	7.0242	4.7261	2.4679	0.5598	0.0011
5.1	32.3323	30.0297	27.7271	25.4246	23.1220	20.8194	18.5168	16.2142	13.9116	11.6091	9.3065	7.0044	4.7064	2.4491	0.5478	0.0010
5.2	32.3129	30.0103	27.7077	25.4051	23.1026	20.8000	18.4974	16.1948	13.8922	11.5896	9.2871	6.9840	4.6871	2.4306	0.5362	0.0009
5.3	32.2939	29.9913	27.6887	25.3861	23.0835	20.7809	18.4783	16.1758	13.8732	11.5706	9.2681	6.9659	4.6681	2.4126	0.5250	0.0008

	N x 10^{-15}	N x 10^{-14}	N x 10^{-13}	N x 10^{-12}	N x 10^{-11}	N x 10^{-10}	N x 10^{-9}	N x 10^{-8}	N x 10^{-7}	N x 10^{-6}	N x 10^{-5}	N x 10^{-4}	N x 10^{-3}	N x 10^{-2}	N x 10^{-1}	N
5.4	32.2752	29.9726	27.6700	25.3674	23.0648	20.7622	18.4596	16.1571	13.8545	11.5519	9.2494	6.9473	4.6495	2.3948	0.5140	0.0007
5.5	32.2568	29.9542	27.6516	25.3491	23.0465	20.7439	18.4413	16.1387	13.8361	11.5336	9.2310	6.9289	4.6313	2.3775	0.5034	0.0006
5.6	32.2388	29.9362	27.6336	25.3310	23.0285	20.7259	18.4233	16.1207	13.8181	11.5155	9.2130	6.9109	4.6134	2.3604	0.4930	0.0006
5.7	32.2211	29.9185	27.6159	25.3133	23.0108	20.7082	18.4056	16.1030	13.8004	11.4978	9.1953	6.8932	4.5958	2.3437	0.4830	0.0005
5.8	32.2037	29.9011	27.5985	25.2959	22.9934	20.6908	18.3882	16.0856	13.7830	11.4804	9.1779	6.8758	4.5785	2.3273	0.4732	0.0005
5.9	32.1866	29.8840	27.5814	25.2789	22.9763	20.6737	18.3711	16.0685	13.7659	11.4633	9.1608	6.8588	4.5615	2.3111	0.4637	0.0004
6.0	32.1698	29.8672	27.5646	25.2620	22.9595	20.6569	18.3543	16.0517	13.7491	11.4465	9.1440	6.8420	4.5448	2.2953	0.4544	0.0004
6.1	32.1533	29.8507	27.5481	25.2455	22.9429	20.6403	18.3378	16.0352	13.7326	11.4300	9.1275	6.8254	4.5283	2.2797	0.4454	0.0003
6.2	32.1370	29.8344	27.5318	25.2293	22.9267	20.6241	18.3215	16.0189	13.7163	11.4138	9.1112	6.8092	4.5122	2.2645	0.4366	0.0003
6.3	32.1210	29.8184	27.5158	25.2133	22.9107	20.6081	18.3055	16.0029	13.7003	11.3978	9.0952	6.7932	4.4963	2.2494	0.4280	0.0003
6.4	32.1053	29.8027	57.5001	25.1975	22.8949	20.5923	18.2898	15.9872	13.6846	11.3820	9.0795	6.7775	4.4806	2.2346	0.4197	0.0002
6.5	32.0898	29.7872	27.4846	25.1820	22.8794	20.5768	18.2742	15.9717	13.6691	11.3665	9.0640	6.7620	4.4652	2.2201	0.4115	0.0002
6.6	32.0745	29.7719	27.4693	25.1667	22.8641	20.5616	18.2590	15.9564	13.6538	11.3512	9.0487	6.7467	4.4501	2.2058	0.4036	0.0002
6.7	32.0595	29.7569	27.4543	25.1517	22.8491	20.5465	18.2439	15.9414	13.6388	11.3362	9.0337	6.7317	4.4351	2.1917	0.3959	0.0002
6.8	32.0446	29.7421	27.4395	25.1369	22.8343	20.5317	18.2291	15.9265	16.6240	11.3214	9.0189	6.7169	4.4204	2.1779	0.3883	0.0001
6.9	32.0300	29.7275	27.4249	25.1223	22.8197	20.5171	18.2145	15.9119	13.6094	11.3068	9.0043	6.7023	4.4059	2.1643	0.3810	0.0001
7.0	32.0156	29.7131	27.4105	25.1079	22.8053	20.5027	18.2001	15.8976	13.5950	11.2924	8.9899	6.6879	4.3916	2.1508	0.3738	0.0001
7.1	32.0015	29.6989	27.3963	25.0937	22.7911	20.4885	18.1860	15.8834	13.5808	11.2782	8.9757	6.6737	4.3775	2.1376	0.3668	0.0001
7.2	31.9875	29.6849	27.3823	25.0797	22.7771	20.4746	18.1720	15.8694	13.5668	11.2642	8.9617	6.6598	4.3636	2.1246	0.3599	0.0001
7.3	31.9737	29.6711	27.3685	25.0659	22.7633	20.4608	18.1582	15.8556	13.5530	11.2504	8.9479	6.6460	4.3500	2.1118	0.3532	0.0001
7.4	31.9601	29.6575	27.3549	25.0523	22.7497	20.4472	18.1446	15.8420	13.5394	11.2368	8.9343	6.6324	4.3364	2.0991	0.3467	0.0001
7.5	31.9467	2.6441	27.3415	25.0389	22.7363	20.4337	18.1311	15.8286	13.5260	11.2234	8.9209	6.6190	4.3231	2.0867	0.3403	0.0001
7.6	31.9334	29.6308	27.3282	25.0257	22.7231	20.4205	18.1179	15.8153	13.5127	11.2102	8.9076	6.6057	4.3100	2.0744	0.3341	0.0001
7.7	31.9203	29.6178	27.3152	25.0126	22.7100	20.4074	18.1048	15.8022	13.4997	11.1971	8.8946	6.5927	4.2970	2.0623	0.3280	0.0001
7.8	31.9074	29.6048	27.3023	24.9997	22.6371	20.3945	18.0919	15.7893	13.4868	11.1842	8.8817	6.5798	4.2842	2.0503	0.3221	0.0000
7.9	31.8947	29.5921	27.2895	24.9869	22.6844	20.3818	18.0792	15.7766	13.4740	11.1714	8.8689	6.5671	4.2716	2.0386	0.3163	0.0000
8.0	31.8821	29.5795	27.2769	24.9744	22.6718	20.3692	18.0666	15.7640	13.4614	11.1589	8.8563	6.5545	4.2591	2.0269	0.3106	0.0000
8.1	31.8697	29.5671	27.2645	24.9619	22.6594	20.3568	18.0542	15.7516	13.4490	11.1464	8.8439	6.5421	4.2468	2.0155	0.3050	0.0000
8.2	31.8574	29.5548	27.2523	24.9497	22.6471	20.3445	18.0419	15.7393	13.4367	11.1342	8.8317	6.5298	4.2346	2.0042	0.2996	0.0000
8.3	31.8453	29.5427	27.2401	24.9375	22.6350	20.3324	18.0298	15.7272	13.4246	11.1220	8.8195	6.5177	4.2226	1.9930	0.2943	0.0000
8.4	31.8333	29.5307	27.2282	24.9256	22.6230	20.3204	18.0178	15.7152	13.4126	11.1101	8.8076	6.5057	4.2107	1.9820	0.2891	0.0000
8.5	31.8215	29.5189	27.2163	24.9137	22.6112	20.3086	18.0060	15.7034	13.4008	11.0982	8.7957	6.4939	4.1990	1.9711	0.2840	0.0000
8.6	31.8098	29.5072	27.2046	24.9020	22.5995	20.2969	17.9943	15.6917	13.3891	11.0865	8.7840	6.4822	4.1874	1.9604	0.2790	0.0000
8.7	31.7982	29.4957	27.1931	24.8905	22.5879	20.2853	17.9827	15.6801	13.3776	11.0750	8.7725	6.4707	4.1759	1.9498	0.2742	0.0000
8.8	31.7868	29.4842	27.1816	24.8790	22.5765	20.2739	17.9713	15.6687	13.3661	11.0635	8.7610	6.4592	4.1646	1.9393	0.2694	0.0000
8.9	31.7755	29.4729	27.1703	24.8678	22.5652	20.2626	19.9600	15.6574	13.3548	11.0523	8.7497	6.4480	4.1534	1.9290	0.2647	0.0000
9.0	31.7643	29.4618	27.1592	24.8566	22.5540	20.2514	17.9488	15.6462	13.3437	11.0411	8.7386	6.4368	4.1423	1.9187	0.2602	0.0000
9.1	31.7533	29.4507	27.1481	24.8455	22.5429	20.2404	17.9378	15.6352	13.3326	11.0300	8.7275	6.4258	4.1313	1.9087	0.2557	0.0000
9.2	31.7424	29.4398	27.1372	24.8346	22.5320	20.2294	17.9268	15.6243	13.3217	11.0191	8.7166	6.4148	4.1205	1.8987	0.2513	0.0000
9.3	31.7315	29.4290	27.1264	24.8238	22.5212	20.2186	17.9160	15.6135	13.3109	11.0083	8.7058	6.4040	4.1098	1.8888	0.2470	0.0000
9.4	31.7208	29.4183	27.1157	24.8131	22.5105	20.2079	17.9053	15.6028	13.3002	10.9976	8.6951	6.3934	4.0992	1.8791	0.2429	0.0000
9.5	31.7103	29.4077	27.1051	24.8025	22.4999	20.1973	17.8948	15.5922	13.2896	10.9870	8.6845	6.3828	4.0887	1.8695	0.2387	0.0000
9.6	31.6998	29.3972	27.0946	24.7920	22.4895	20.1869	17.8843	15.5817	13.2791	10.9765	8.6740	6.3723	4.0784	1.8599	0.2347	0.0000
9.7	31.6894	29.3868	27.0843	24.7817	22.4791	20.1765	17.8739	15.5713	13.2688	10.9662	8.6637	6.3620	4.0681	1.8505	0.2308	0.0000
9.8	31.3792	29.3766	27.0740	24.7714	22.4688	20.1663	17.8637	15.5611	13.2585	10.9559	8.6534	6.3517	4.0579	1.8412	0.2269	0.0000
9.9	31.6690	29.3664	27.0639	24.7613	22.4587	20.1561	17.8583	15.5509	13.2483	10.9458	8.6433	6.3416	4.0479	1.8320	0.2231	0.0000

September Ranch
Preliminary Calculations for RO Treatment Reject Water Disposal

ASSUMPTIONS

- Annual potable water demand, including system losses: 57.21 AFY
- RO reject water production: 15%
- RO treatment system removal target 50%
- Groundwater sodium concentration: 120 mg/L
- Daily wastewater flow for 110 connections @ 250 gpd/unit: 27,500 gpd
- Sodium addition from household wastes: 40-60 mg/L
- CAWD sodium limit for wastewater connections: 140-150 mg/L

CACLULATIONS

- Average daily potable water requirement:
  - (57.21 AFY)/(365 days) = 0.1567 AF/day
  - (0.1567 AF/day)(325,851 gal/AF) = 51,060 gpd; round to 51,000 gpd

- Average groundwater pumping demand, adjusted for 15% RO reject:
  - (51,000 gpd)/(1-0.15) = 60,000 gpd

- Average RO reject waste volume:
  - 60,000 gpd – 51,000 gpd = 9,000 gpd

- Average daily mass sodium pumped from groundwater (#/day):
  - Mass = (8.34)(0.060 MGD)(120 mg/L) = 60 #/day

- Average sodium concentration in RO reject water, based on 50% removal:
  - Sodium, mg/L = (0.5 x 60 #/day)/(8.34)(0.009 MGD) = 400 mg/L

- Average sodium concentration in treated water: (0.5)(120 mg/L) = 60 mg/L

- Average sodium concentration in sanitary wastewater:
  - (60 mg/L) + (40 to 60 mg/L waste addition) = 100 to 120 mg/L

- Average resultant sodium concentration in "blended" sanitary + RO reject water:

  - @ 40% of RO reject water discharge to sewer:

$$\frac{(27{,}500 \text{ gpd})(100 \text{ to } 120 \text{ mg/L}) + (3{,}600 \text{ gpd})(400 \text{ mg/L})}{27{,}5000 \text{ gpd} + 3{,}600 \text{ gpd}} = \textbf{135 to 152 mg/L}$$

  - @ 50% of RO reject water discharge to sewer:

$$\frac{(27{,}500 \text{ gpd})(100 \text{ to } 120 \text{ mg/L}) + (4{,}500 \text{ gpd})(400 \text{ mg/L})}{27{,}5000 \text{ gpd} + 4{,}500 \text{ gpd}} = \textbf{142 to 159 mg/L}$$

CARMEL LAHAINA
Utility Services, Inc.
P.O. Box 6, Carmel Valley, Ca. 93924 (831) 659-3595, Fax 656-9480
carmellahaina@aol.com

March 31, 2006

September Ranch Partners
PO Box 222255
Carmel, CA 93922

Dear Jim,

Carmel Lahaina Utility Service, Inc. is a utility management corporation with specific focus to the water and wastewater industry. We oversee and inspect utility installation projects, tank erections, pumping plants, package treatment plants and pond construction. We have assisted clients in water treatment plant startup, reverse osmosis plant startup, wastewater plant startup, water reclamation plant startup, and operation of the same. Our staff currently holds Grades 1, 2 and 5 State licenses in Wastewater, Grades 1, 2 and 3 in Water, Grades 2 and 3 in Distribution, and General Engineering Contracting.

I am writing you this letter to inform you that Carmel Lahaina Utility Services, Inc. is ready, willing and able to contract operate any treatment facility located at September Ranch here in Carmel, CA. I would like to thank you in advance for giving us the opportunity to serve September Ranch Partners. Please do not hesitate to call if you have any questions.

Sincerely,

Brian Garneau
Office Manager

Kennedy Jenks: Technical Memorandum No. 8

26 May 2006

Technical Memorandum No. 8

To: Sachi Itagaki, P.E., Project Manager

From: Robert Ryder, P.E., Process Engineer

Subject: September Ranch Water Treatment Alternatives
K/J 034813*03

Background

The proposed water supply for the September Ranch residential development is a groundwater well with an allowable annual yield of 57.21 AF per year (18.64 MG per year). Sampling and analysis of the water quality of the Main Well was completed this year and the concentration of total dissolved solids (TDS), iron, manganese, and total coliform bacteria were found to exceed California primary and secondary maximum contaminant limits or levels.

A summary report by Questa Engineers in April 2006 proposed that a reverse osmosis (RO) membrane water treatment plant be utilized to lower the TDS and other constituents to below drinking water limits. A concentrated brine reject water of 15% of the daily potable supply which would be 9,000 gpd average would be produced of which only half could be discharged to the sanitary sewer due to a sodium limitation for wastewater concentrations and the other 4,500 gpd hauled away each day to the Monterey Wastewater Treatment Plant's outfall for disposal to the ocean. The water capacity loss for R.O. treatment and the handling of brine residues would be a problematic water capacity loss and a continuing major expense for the September Ranch development.

You initially inquired if a pellet softening water treatment alternative could be feasible for this facility as a possibility to reduce well water pumping quantities and offsite disposal quantities for water treatment residues. Kennedy/Jenks Consultants has been interested in pellet softening as is commonly used in European and also in many Florida and Midwestern U.S. water treatment projects (Merkel, 1999; Benefield, 1999). Our interest in pellet softening was initiated as a means of reducing salinity of sodium ion exchange water softeners and TDS in water supplies and waste discharges in California in recent years. We have pilot tested and evaluated pellet softening processes at Soquel, Hollister, Cambria, Santa Paula, Oxnard, Valencia, and other locations; and are quite familiar with the chemistry and technology for application in California.

The concept of multi-stage R.O. treatment to reduce brine disposal quantities and thereby produce more usable potable water is also extensively used by industrial power plants, but less commonly by municipal facilities. There is also a third alternative for hardness and TDS removal that has been extensively used for municipal water supplies in Florida which is nanofiltration membranes. These are larger pore size membranes than R.O. but effectively remove the larger divalent ions, including calcium, magnesium, bicarbonate, sulfate, etc. from water and these like lime treatment for pellet softening also remove a substantial portion of TDS. A study conducted

by Kennedy/Jenks with Port Hueneme Water Agency (PHWA) using reverse osmosis, nanofiltration, and electro dialysis removal (EDR) is found in the attached references.

Pellet Softening

The pellet softening process targets the removal of calcium and bicarbonate by precipitation to produce a calcium carbonate (calcite-limestone) solid particle which forms a hard crystal upon a small sand grain (Graveland, 1983; Horsley, 2005). This provides very concentrated dry granules of calcite which can be hauled away and usually beneficially used to “lime” and reduce alkalinity of acidic soils of farmed fields and vineyards typical of coastal areas of California (Cornwall, 1990).

In a recent article (deBoer, 2005) pellet crystallization is described as a zero-discharge technique that has resulted in numerous applications world wide, not only for softening and TDS removal, but for fluoride, phosphate and heavy (toxic) metals and organics removal as well (Mercer, 2005). Two types of alkaline chemicals are commonly used to raise the pH of the water to the calcium carbonate saturation limit of 10.5±, sodium hydroxide (NaOH) or calcium hydroxide ($Ca(OH)_2$). NaOH is utilized when a simple liquid chemical is chosen, and increase in sodium ion in the water is not of concern. However, the use of calcium hydroxide is also used and in that case similar to any cold lime water softening slurry process, and has the advantage of greater reduction in TDS, no sodium increase, lower chemical cost, but greater solids residues. Both chemicals were tested at Soquel and performed equally. It is the latter, chemical calcium hydroxide addition that is viable for September Ranch because of the necessity to lower sodium in discharges to the wastewater system.

The Soquel Creek Water District (SCWD) is currently considering installation of pellet softening at their five groundwater treatment plants if and at such time as their consumers wish to improve aesthetic water quality to include centralized water softening. The pilot plant testing and conceptual level pricing provided SCWD with a conceptual plan of providing centralized softening to lower hardness, TDS, and improve the aesthetic quality of the water on very limited land area sites.

Water Quality and Pellet Softening Effects

A compilation of the Main Well water quality in terms of general constituents; principal cations and anions, metals, and other pertinent characteristics relating to lime-pellet water softening are shown in Table 1. This table shows that the well water is a low pH, high TDS, hardness, iron and manganese water which also indicates the presence of Total Coliform, probably of soil origin as the fecal source E. Coli were not detected.

The well waters’ principal ions are calcium and bicarbonate as shown in the calculated milli-equivalent/liter (MEQ/L) column. However, there is an excess of anions, which are attributable

to a high carbon dioxide (CO_2) concentration, which can be readily stripped off by aeration to then lower bicarbonate alkalinity, elevate the pH to about 7.5 and greatly reduce the quantity of calcium hydroxide lime slurry needed for pellet softening and as a result the quantity of calcite solids residues for disposal.

The Main Well water quality is ideal for lime pellet softening as there is a predominance of both calcium and alkalinity, and dosage with lime slurry to a pH of 10 to 10.5 will enable the crystallization of calcite to form hard pellets of 3 to 4 millimeters in diameter. Treatment will occur in an upflow slurry contactor. The third column in the table indicates what should be the finished water quality following treatment stages which include (Horsley, 2005):

1. Air stripping to reduce CO_2 and elevate pH to 7.5±

2. Lime pellet softening to pH 10.5±

3. CO_2 neutralization to pH 8±

4. Granular media pressure filtration to remove the cloudy lime milk turbidity carry over from the pellet softener.

Lime pellet softening is estimated to reduce the TDS from 992 mg/l to about 480 mg/L and the total hardness from 512 mg/l $CaCO_3$ to about 215 mg/L $CaCO_3$. The iron and manganese in the well water will be oxidized by aeration stripping and will be coprecipitated onto the calcite pellets, which should almost totally remove these constituents (Permutit, 1994). It is expected that the elevated pH will also substantially reduce viable total coliform, which can further be totally destroyed by chlorination prior to filtration. A discussion of pellet softening as found in an American Water Works Research Foundation (AWWARF) document is found in the attached references.

Although a Monterey County health staff member commented on our 22 May 2006 conference call that 480 mg/L TDS is very close to the 500 mg/L best secondary containment level and does not leave much margin for error, the response can be that the actual long term upper secondary contaminant level for TDS in California is in fact 1,000 mg/L; and even the untreated well water meets that criteria, and is a typical quality for many communities in California (DHS, 1998).

The sodium concentration of the water will not be affected, and remain at 121 mg/L. There are no primary or secondary drinking water standards for sodium. Questa Engineers indicates a typical sodium increase of 40 to 60 mg/L by domestic use, with resultant waste discharges of sodium at 161 mg/L, slightly above the limit of 150 mg/L of the Carmel Area Wastewater District (CAWD).

There are possibilities of lowering the incremental sodium increase in domestic use to 20 to 30 mg/L which would then be within the sodium acceptance parameters of the CAWD. These sodium reduction methods would include provisions to require that any residential water softeners, if homeowners use them, use potassium chloride rather than sodium chloride for ion exchange regeneration, encourage potassium chloride for hypochlorite disinfection for swimming pools, if allowed, and potassium hydroxide rather than sodium hydroxide in cleaning products.

At any rate, the predicted sodium concentration in the wastewater even with a 40 mg/L incremental sodium increase is 161 mg/L compared to the R.O. projections of a maximum of 159 mg/l (Attachment C of Questa Report), so the difference is not significant and may be tolerable to the CAWD.

Overall, the capital cost of the pellet softening-filtration alternative should be less than half of the cost of an R.O. membrane system; and power, energy, and chemical costs of less than a quarter of R.O. costs. However, the largest savings will be in solids residue disposal costs as compared to brine discussed as follows; and the fact that rather than an average RO reject stream of 9,000 gallons per day of water; the reject stream will be less than 200 gpd, and primarily of filter backwash water. Questa estimates that 50% to 60% or 4,500 to 5,400 gpd of the RO reject stream would have to be trucked each day to the Monterey Regional Water Polution Control Plant while the remainder could be discharged to the sanitary sewer.

At a predicted peak daily treatment capacity of double that of the daily average for water treatment facilities, 120,000 gpd, or 85 gpm is the size needed for the water treatment facility and the brine level would then be 9,000 gpd or two 4,500 gallon trucks.

Air stripping would be accomplished at a 10 gpm/sf rate, in a 3 1/2 feet diameter stripping tower, pellet softening is at a 15 to 20 gpm/sf rate and would be accomplished by two 3 feet diameter redundant pellet softener columns, and filtration at a 3 gpm/sf rate by two 6 feet diameter anthracite and silica sand media pressure filters (Permutit, 1994).

There is moderate use of pellet softening for municipal supplies in the United States, but many installations in Europe and Japan. The largest municipal installation in the U.S. is at Hollywood, Florida. Permutit literature cites municipal installations in Wyoming and Iowa, but since acquisition by U.S. Filter Company there has been no aggressive marketing of pellet softening in this county. We have contacted Permutit and they have supplied a list (attached as a reference) of 62 municipal pellet softening facilities in the U.S., 41 in Florida, but only six west of the Mississippi River, the closest being at Gillette, Wyoming. In the Netherlands, calcite pellets from softening plants are sold to farmers to lime agricultural lands (Cornwall, 1980). However, that may not be possible for one small facility in California.

In the United States, in the late 1990s there was an introduction of a Dutch pellet softener through Wheelabrator (1998), but since their acquisition by U.S. Filter, that improved pellet softener is no longer available. Information on the Wheelabrator technology is found in the attached references. Recently, Kennedy/Jenks Consultants in the interest of utilizing more of this innovative technology in the western U.S. have had Roberts Filter Co. of Darby, Pennsylvania fabricate pilot pellet softeners and have designed systems up to 800 gpm capacity for full scale production. The pellet softening results were favorable in all pilot test situations and implementing final design and construction is pending for most of these agencies as an economical means to reduce salinity.

Residue Disposal

The waste from a pellet softening plant is small hard crystals of limestone surrounding the tiny silica sand grains used as the nucleus (deBoer, 2005).

The calculated annual quality of limestone pellets is 93,300 pounds = 46.65 tons per year. The overall volume is about 40 cubic yards per year. The pellets can be discharged into 20 cubic yard dumpster containers and hauled offsite about twice per year, as shown on the attached page of pellet softening calculations (Table 2).

It is quite likely that the pellet disposal cost would be minimal, as there are nearby agricultural land areas of acidic soil in the Salinas Valley that can benefit from lime addition. Typically, vineyards and other agricultural land utilize about 50 pounds of lime per acre per year, which would require an approximately 1,900 acre area to agronomically utilize the lime pellets.

Even with pellet disposal costs to a landfill estimated at $200 per ton, the annual costs would be $9,400 per year as compared to a brine waste disposal cost estimated at $0.10 per gallon, which would total $164,000 per year. The difference is very substantial.

TDS Removal by Lime Softening

There were comments received from various California Department of Health Services Engineers questioning if water softening reduces TDS. The response is, of course, it does, as calcium, magnesium, and bicarbonate are all precipitated and used by lime softening processes. However, cold lime softening is not a usual water treatment practice in California as it is in the Midwest, Florida, and other regions in the United States. The only municipal water treatment plant that I know of in California that utilizes a cold lime softening process is at Lompoc; and the DHS and Monterey County Environmental Health staff can visit Lompoc at any time to verify that lime softening reduces TDS. There may be others; however, it is not only what is shown on the table below that demonstrates both the hardness and TDS reduction, but a table of results for Spiractor (Permutit, 1994) in the attached literature.

Characteristic	Concentration	Harlan, IA WTP Raw	Harlan, IA WTP Treated	Gillette, WY WTP Raw	Gillette, WY WTP Treated
pH	units	7.4	9.8	7.7	8.4
Calcium	mg/L	220	60	152	56
Magnesium	mg/L	98	80	28	24
Sodium	mg/L	37	37	66	68
Bicarbonate	mg/L	224	14	162	54
Carbonate	mg/L	0	3.2	--	--
Chloride	mg/L	31	31	80	80
Sulfate	mg/L	100	100	4	4
TDS	mg/L	335	177	532	296
Total Hardness	mg/L $CaCO_3$	991	466	180	80

One of the difficulties that may confront DHS reviewers is that the constituents of TDS, iron, and manganese are all Secondary Maximum Contaminant Levels for aesthetic water quality and the technology for achieving the objectives are not as defined in regulations as for primary contaminents. The secondary MCLs for iron equal 0.3 mg/L; manganese equals 0.05 mg/L; turbidity equals 5 NTU, but is flexible for TDS chloride and sulfate. Secondary Maximum Containment Levels (DHS, 1998).

Characteristics	Units	Recommended	Upper	Short Term
TDS	mg/L	500	1,000	1,500
Chloride	mg/L	250	500	600
Sulfate	mg/L	250	500	600

There is no limit for water hardness in public health regulations; and that has resulted in a proliferation in California of many consumers to have sodium or potassium chloride ion exchange softeners. Only in recent years is there now concern that the discharges for these ion exchange units are resulting in excessive TDS, chloride and sulfate in washwater and degradation of water quality in surface water and groundwater is of more concern to the State Water Quality Control Board than the DHS as these are for the most part environmental rather then public health concerns.

The conference call of 22 May 2006, with owners, attorneys, environmental specialists, and engineers representing September Ranch and Monterey Environmental and Health staff indicated that regulatory agency staff had had limited exposure to lime softening, and the resultant TDS reduction or pellet softening.

Communication between Monterey County with California Department of Health Services (CDHS) staff when queried about pellet softening indicated that CDHS staff also had limited knowledge and experience with this technology although it is an older water treatment technology than the better known R.O. or other membrane process; and had recently been presented in two recent American Water Works Associations publications (Horsley, 2005 and Benefield, 1999)

There was, of course, knowledge of the Reverse Osmosis (RO) process as it has been used rather extensively in California for the past ten years as a means for TDS reduction of brackish water, but with relatively substantial brine discharge proportions (Duranceau, 2001). Projected results from the Oxnard RO project are also found in the attached references.

However, it is necessary to incorporate a lime precipitation water softening process for removal of calcium, magnesium, bicarbonate, and silica to achieve R.O. reject brine proportions as low as 5%, the objective for September Ranch (O'Brien and Gere, 2006).

Quite likely as environmental process engineers like, Dr. Val Frenkel and myself, we have worked on and are aware of technological process developments and experience world wide; and State and County regulators do not have the same opportunity.

Kennedy/Jenks has conducted five pellet softening water treatment pilot plant tests in California on brackish water TDS reduction in recent years as stated previously and State DHS and local regulators were informed, observed, and or reviewed the data for each of these tests. Kennedy/Jenks could do a pilot plant pellet softening test at September Ranch to demonstrate the simplicity, capital, chemical, and energy cost savings and it is suggested that this remain an option to multistage R.O. treatment that is discussed as follows to propose a water treatment process that is apparently approvable because of past knowledge by the regulators.

Multi-Stage R.O.

A common means to increase the usable water supply and reduce brine discharges is by multi-stage R.O., where the brine from the first stage then is pumped to and treated by a second stage, and in some cases even a third stage of R.O. (Duranceau, 2001).

Typical reject proportions are 70% for the second stage and 50% for the third stage. Then it is possible to reduce brine haul costs by using a multi-stage R.O. approach. The attached data sheets for 3 stage RO by Dr. Val Frenkel, Kennedy/Jenks Consultants' Membrane Specialist indicates that it is possible to utilize antiscalent chemical inhibitors to minimize R.O. membrane fouling by calcium carbonate and silica to produce a 90% recovery and 10% brine discharge, but to achieve a 95% recovery and 5% discharge both calcium carbonate and silica would have to be removed by a chemical precipitation lime softening process.

Zero discharge of R.O. treated water in industrial and power plant water treatment projects has been rather common for the past ten years and Dr. Frenkel has designed facilities of this type, including one at the Nevada Power Company near Las Vegas. Kennedy/Jenks designs of R.O. treatment at Ventura and Oxnard are also multistage facilities, but not as low as < 5% reject.

There is now interest in zero discharge in municipal R.O. treatment and patented system by O'Brien and Gere of New York called Arrow Advanced Reject Recovery (2006), which also utilizes a softening process in the treatment train. Again, it is likely that there is no current operational facilities of this type or municipal water suppliers in California and just why this is a patented process when so commonly used in power plant and industrial systems is unclear.

However, it is a near zero discharge multistage R.O. water softening treatment process that is proposed as the apparent best water treatment process to maximize potable water availability and minimize brine reject for September Ranch. The Walker Claricone slurry softener (Walker, 1998) is suggested as a compact, operationally simple process that could fit in well with the proposed treatment train. Literature for Walker is provided in the attached references.

R.O. Stage	Reject Water % of Raw	Total GPD
First	15	9,000
Second	10	6,000
Third (with softening)	5	3,000
Third (with crystallization)	1	< 600

This alternative would reduce brine haul costs by more than 90% and instead of a daily haul, only twice a week. However, there would be considerably greater capital and O&M costs for multi-stage R.O., and not only would iron and manganese require removal by oxidation-filtration processes before the first stage R.O. but water softening and silica removal would be required before second or third stage R.O. However, the potable water percentage would increase to nearly 99% of what is proposed for groundwater withdrawal.

Nanofiltration

Nanofiltration is also a viable membrane process which is used to remove 60 to 80% of hardness and as a result a substantial reduction of TDS (Faller, 1999). The expected treated water quality for nanofiltration would be:

Characteristic	Units	Well Water	Nanofiltered Water
Total Hardness	mg/L $CaCO^3$	512	135
TDS	mg/L	992	515

The overall water recovery would be about 90% for a first stage unit, and 97% for a two stage nanofiltration unit. Overall, this would reduce the haul to about 1,800 gpd.

Summary

1. The September Ranch groundwater quality appears ideal for a cold lime pellet softening water treatment approach to reduce TDS, iron and manganese below potable water quality levels for residential drinking water consumption.

2. The capital cost of the pellet softening equipment and filters should be less than half of the cost of an iron-manganese filter – R.O. or nanofiltration, water treatment facility.

3. The O&M costs of the pellet softening alternative should be less than one quarter the cost of R.O. and principally be in reduced electric energy costs.

4. The cost of removal of the calcite pellets is less than ten percent of the costs of excess brine haul of a single stage R.O. system for disposal at Monterey WWTP, and occur twice a year rather than every day.

5. The pellet softened water with rigorous sodium use reduction criteria for residents should assure that an acceptable residential wastewater discharge sodium concentration to the Carmel Area Wastewater District even without sodium reduction by water treatment.

6. There is minimal need to pump an excess of water beyond the 57.21 AF per year or lose a portion of the allowable water supply required for the September Ranch Development, as water treatment losses with pellet softening should be less than 200 gpd.

7. Iron and manganese removal prior to membrane filtration would be required for both R.O. or nanofiltration, but will be removed as an intrinsic part of the pellet softening process.

8. Three stage R.O. treatment with water softening can reduce brine reject volumes to 600 gpd, and result in nearly 99% usable water supply; however, at substantially high capital and O&M costs and complexity for facilities.

9. Nanofiltration is also an option for TDS reduction and can result in 97% water recovery for a two-stage system and brine reject volumes of 1,800 gpd. It could have substantially less costs than R.O.

10. A rigorous analysis of compatible siting facilities, capital, O.M., and disposal costs are necessary to verify what is the best water treatment process to utilize for the September Ranch. However, at this stage, multistage R.O. with softening is the apparent best

project to achieve regulatory approval. It is suggested that the door be kept open to compare pellet softening with multistage R.O. softening treatment, and if necessary operate a pilot plant at September Ranch to demonstrate and verify advantages and to fund a trip for State and County regulatory staff to observe pellet treatment in Florida and the Netherlands as necessary to seek approval of use.

We are available to discuss any of the data and findings of this Technical Memorandum in more detail and provide as requested additional support information of the pellet softening and related water treatment processes.

References

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Technical Memorandum No. 8

Sachi Itagaki, P.E., Project Manager
12 July 2006
K/J 034813*03

Table 1: September Ranch Water Plan

Water Quality Before and After Pellet Softening for Iron, Manganese, and TDS Removal - Main Well(1)

Characteristics General	Units	Well Water		Softened and Filtered Water		Drinking Water Limit
pH	--	6.9		8.0		6.5 – 8.5
Turbidity	NTU	3.8		< 0.5		5
Odor	TON	2		< 1		3
Conductivity	umhos	1,700		800		--
Total Dissolved Solids	mg/L	992		480		500
Color	CU	14		< 5		15
Total Hardness	mg/L $CaCO_3$	512		215		200*
Total Alkalinity	mg/L $CaCO_3$	442		50		200*
CATIONS			MEQ/L		MEQ/L	
Calcium	mg/L	139	6.95	20	1.00	--
Magnesium	mg/L	40	3.28	40	3.28	--
Sodium	mg/L	121	5.26	121	5.26	170*
Potassium	mg/L	3.6	0.09	3.6	0.09	--
			∑ =15.58		∑ =9.63	--
ANIONS						
Bicarbonate	mg/L	512	8.39	0.02	--	--
Carbonate	mg/L	ND	--	--	--	--
Chloride	mg/L	161	4.53	161	4.53	250
Sulfate	mg/L	250	5.10	250	5.10	250
Nitrate (N)	mg/L	ND	–	ND		10
Fluoride	mg/L	0.54	–	0.1		1
			∑ =18.02		∑ =9.63	
METALS						
Iron	mg/L	0.46			< 0.10	0.30
Manganese	mg/L	0.229			< 0.02	0.05
Chromium	µg/L	18			< 10	100
Lead	µg/L	6			ND	15
Selenium	µg/L	12			ND	50
Copper	µg/L	ND			ND	1,300
Zinc	µg/L	ND			ND	5
OTHER						
CO_2	mg/L	140			5	5*
Coliform Total	±	Present			Absent	ND
Coliform E Coli	±	Absent			Absent	ND

Notes:
* Suggested by KJC as desirable, but not a mandatory limit or level.
(1) Sample collected 20 March 2006 and analyzed by Monterey County Chemistry Laboratory ID AA86939.

Table 2: September Ranch – Pellet Softening Analysis

Estimated TDS Reduction from Pellet Softening:

Lower calcium by 6.45 MEQ/L

Ca Loss: 139 - 20 mg/L Loss =119 mg/L

Alkalinity Loss 6.45 MEQ/L x 61 = 393 mg/L
Total TDS Loss = 512 mg/L

Net TDS after Pellet Softening = 992 – 512 = 480 mg/L

Below to 500 mg/L recommended TDS level; therefore pellet softening will reduce TDS to recommended levels

Hardness Remaining After Pellet Softening

Hardness as CaC O_3 Ca = 20 mg/L x 2.5 = 50 mg/L $CaCO_3$

Mg = 40 mg/L x 50/12.2 = 164 mg/L $CaCO_3$
Total Hardness = 215 mg/L $CaCO_3$

Waste Solids Residue Produced at 57.2 AF/year x .326 MG/AF = 18.64 MG

Reaction $Ca(OH)_2 + Ca(HCO_3) \rightarrow 2CaCO_3 + 2H_2O$

Therefore sludge as Ca = 200/40 = 5 x 119 mg/L= 600 mg/L as $CaCO_3$

Lbs/year = 18.64 MG x 600 mg/L x 8.34 Lbs/year = 93,300 calcite #/year = 46.65 tons/year

At 1.2 T/CY = 38.9 CY per year.

Therefore, about two 20 cubic yard truckloads of calcite-limestone pellets per year to be sold for application to acidic agricultural soils.

Appendix B: Condition Compliance and Mitigation Monitoring and Reporting Plan

EXHIBIT D *Monterey County RMA – Planning Department* *Condition Compliance and Mitigation Monitoring and Reporting Plan*	Project Name: **September Ranch Combined Development Permit** File Nos: **PC95062 & PLN050001** APNs: **1) 015-171-010-000; 2) 015-171-012-000; 3) 015-361-013-000; 4) 015-361-014-000** Final Action by: **Board of Supervisors** Date: **TBD**

MITIGATION MEASURES

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
	4.2-1	**GEOLOGY AND SOILS** The proposed project shall have a 50-foot setback for residential dwellings on either side of the southern mapped trace of the Hatton Canyon fault. **(RMA – Planning and Building)**	The geologic investigation shall be submitted to the Monterey County Planning and Building Inspection Department for review and approval. An easement shall be shown on the final map precluding residential development within the 50-foot setback area, as identified in the geologic investigation. The easement shall be designated as a fault hazard area. If fault traces are found, building envelopes shall be adjusted sufficient to establish a 50-foot setback for residential dwellings on each side of any fault trace.	Applicant Applicant	Prior to the issuance of grading or building permits, approval of subdivision improvement plans (for construction), or prior to recordation of the final map (for the easement).	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			The applicant shall submit to the Monterey County Planning and Building Inspection Department, written evidence that all site work within the identified easement will be inspected and tested during construction by a qualified engineering geologist	Applicant	Prior to the issuance of building or grading permits.	
	4.2-2	**GEOLOGY AND SOILS** Underground utilities, which cross the fault trace shall be fitted with flexible couplings and shut off valves. **(RMA – Planning and Building)**	The geologic investigation shall be submitted to the Monterey County Planning and Building Inspection Department for review and approval.	Applicant	Prior to the issuance of grading or building permits, approval of subdivision improvement plans (for construction), or prior to recordation of the final map (for the easement).	
			The requirements of this mitigation measure shall be included as a note on an additional sheet of the final map.	Applicant	Prior to recordation of the final map.	
			The applicant shall submit to the Monterey County Planning	Applicant	Prior to the issuance of	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			and Building Inspection Department, written evidence that all site work within the identified fault easement will be inspected and tested during construction by a qualified engineering geologist		building or grading permits.	
	4.2-3	**GEOLOGY AND SOILS** Prior to the construction on lots 65, 66, and 68, and any additional construction on the equestrian center, the project engineering geologist shall confirm that no fault traces cross the proposed building sites. **(RMA – Planning and Building)**	The geologic investigation shall be submitted to the Monterey County Planning and Building Inspection Department for review and approval.	Applicant	Prior to recordation of the final map.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map. Building envelopes shall be adjusted to exclude development within 50 feet of the fault trace.	Applicant	Prior to recordation of the final map.	
			The applicant shall submit to the Monterey County Planning and Building Inspection Department, written evidence	Applicant	Prior to the issuance of building or grading	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			that all site work within the fault easement will be inspected and tested during construction by a qualified engineering geologist		permits.	
	4.2-4	**GEOLOGY AND SOILS** Proposed structures shall incorporate design in accordance with the latest Uniform Building Code and the appropriate seismic design criteria. A geotechnical investigation shall be prepared for each proposed building site to characterize soil and bedrock conditions so that suitable seismic foundation designs can be provided. The geologic investigation shall employ standard engineering practices to ensure adequate foundations and design standards for the building sites. **(RMA – Planning and Building)**	The geotechnical investigation shall be submitted to the Monterey County Planning and Building Inspection Department for review and approval.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			A note shall be placed on an additional sheet of the final map that indicates that a geotechnical report was prepared for each building site.	Applicant	Concurrent with recordation of the final map.	
	4.2-5	**GEOLOGY AND SOILS** Earthwork and grading shall be kept to a minimum within the landslide deposits; any work performed within these areas shall be performed under the supervision of a qualified engineering geologist. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified	Applicant	Prior to the issuance of grading permits for the affected lots.	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			engineering geologist.			
			The requirements of this mitigation measure shall be included as a note on all grading and building permits for the affected lots, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, as applicable.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during construction by a qualified engineering geologist.	Applicant per geologist	Prior to the issuance of grading permits	
	4.2-6	**GEOLOGY AND SOILS** Cut slopes in competent bedrock shall be constructed at slope inclinations no steeper than 0.5:1 to heights up to 15 feet, and should be approved by the project engineering geologist before grading. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineer.	Applicant per geologist	Prior to the issuance of grading permits.	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineer.	Applicant per engineer	Prior to the issuance of grading or building permits.	
	4.2-7	**GEOLOGY AND SOILS** Proposed cut slopes steeper than 0.5:1 or exceeding a height of about 15 feet may be allowed upon the approval by the project engineering geologist or geotechnical engineer. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of grading permits.	
			The requirements of this mitigation measure shall be included as a note on all	Applicant	Prior to the issuance of grading	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.		permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineer.	Applicant	Prior to the issuance of building or grading permits.	
	4.2-8	**GEOLOGY AND SOILS** Cut slopes within severely weathered rock that is susceptible to bedrock creep, or in areas of adverse bedding dip shall employ flatter slopes, typically 2:1 or less. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineer.	Applicant	Prior to the issuance of grading permits.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision	Applicant	Prior to the issuance of grading permits, the approval of	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.		Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of building permits.	
	4.2-9	**GEOLOGY AND SOILS** Structures located within old landslide deposits shall be constructed at or very near the natural grade to reduce cut slopes. Limited cut slopes can be created for access roadways and shall be constructed on slopes no greater than 2:1 and shall not exceed heights of 15 feet. Cut slopes shall be approved by the project engineering geologist or a geotechnical engineer before grading. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of grading permits or approval of subdivision improvement plans.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			of the final map.		the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineer.	Applicant per engineer	Prior to the issuance of grading or building permits for the affected lots.	
	4.2-10	**GEOLOGY AND SOILS** Cut slopes in colluvium, alluvium, or topsoil shall be constructed at a slope inclination not steeper than 2:1. All cut slopes shall be provided with permanent protection against erosion. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineer.	Applicant per engineer	Prior to the issuance of grading permits	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
					occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineer.	Applicant per engineer	Prior to the issuance of building or grading permits.	
	4.2-11	**GEOLOGY AND SOILS** Compacted fill slopes shall be constructed at a slope inclination not steeper than 2:1. All fill slopes shall be provided with permanent protection again erosion. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineer.	Applicant per engineer	Prior to the issuance of grading or building permits.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineer.	Applicant per engineer	Prior to the issuance of building or grading permits.	
	4.2-12	**GEOLOGY AND SOILS** Control cut and fill earthwork that may destabilize the land surface; vegetation removal; and control surface water infiltration. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineer.	Applicant per engineer	Prior to the issuance of grading or building permits.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building	Applicant per	Prior to the issuance of	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineering geologist.	engineering geologist	building permits,	
	4.2-13	**GEOLOGY AND SOILS** Residential lots located upslope of or adjacent to old landslide deposits shall have drainage systems that divert concentrated surface waters from the slide masses. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of grading permits	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during	Applicant per engineering geologist	Prior to the issuance of building permits,	

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			performance by a qualified engineering geologist.			
	4.2-14	**GEOLOGY AND SOILS** Landscape irrigation systems shall be kept to a minimum (Monterey County standards) on lots shown in landslide deposits. Construction on ancient landslide deposits shall be appropriately designed to result in overall improvement to the existing drainage conditions within the landslide areas. Unlined ponds on or adjacent to the slide mass shall be avoided. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of grading permits	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of building permits,	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
	4.2-15	**GEOLOGY AND SOILS** Subsequent design-level geotechnical investigations shall be performed at the appropriate time following preparation of definitive grading plans and during design of specific structures. In addition, subsequent geologic investigations shall be performed before construction on Lots 65, 66, and 68. Subsequent subsurface exploration shall be conducted before the final map approval to further characterize the possible mapped landslide in the vicinity of Lots 85 and 86. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the grading plan, which has been certified and approved by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of grading permits	
			The requirements of this mitigation measure shall be included as a note on all applicable grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The applicant shall submit to the Planning and Building Inspection Department written evidence that all site work shall be inspected and tested during performance by a qualified engineering geologist.	Applicant per engineering geologist	Prior to the issuance of building permits.	
	4.2-16	**GEOLOGY AND SOILS** The effects of erosion and sedimentation may be mitigated by vegetative cover and properly designed surface	The applicant shall include the identified techniques on drainage plans, which shall be submitted to the Monterey	Applicant per civil engineer	Prior to the issuance of grading or	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
		drainage features. Competent bedrock exposed in both natural slopes and cut slopes will be less susceptible to erosion and, therefore, may not need a protective slope cover. Many of these slopes tend to be covered by rocky rubble, which works its way down slope over many years. Proper surface drainage systems shall be designed to direct concentrated water runoff away from the tops of these slopes. **(RMA – Planning and Building)**	County Water Resources Agency for review and approval. The drainage plan shall be prepared by a registered civil engineer.		building permits.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
	4.2-17	**GEOLOGY AND SOILS** Shallow ground water conditions shall be considered in the design of roadways, utilities, and structures in these areas. **(RMA – Planning and Building)**	The applicant shall submit to the Monterey County Planning and Building Inspection Department for review and approval the geotechnical or geologic studies that identify drainage plan, which has been certified and approved by a registered civil engineer or architect.	Applicant per civil engineer or architect	Prior to the issuance of grading or building permits.	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
	4.2-18	**GEOLOGY AND SOILS** Drainage control shall include provisions for positive gradients so that surface runoff is not permitted to pond, either above slopes or adjacent to building foundations. Surface runoff and runoff from roof gutters shall be collected in lined ditches, closed pipes, or drainage swales and shall be conducted adequately to a storm drain, paved roadway, or water course. **(RMA – Planning and Building)**	The applicant shall submit to the Director of Planning, Monterey County Planning and Building Inspection Department for review and approval the drainage plan, which has been certified and approved by a registered civil engineer or architect.	Applicant per civil engineer or architect	Prior to the issuance of grading or building permits.	
			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever	

Permit Condition Number	*Mitig. Number*	*Conditions of Approval and/or Mitigation Measures and Responsible Land Use Department*	*Compliance or Monitoring Actions to be performed. Where applicable, a certified professional is required for action to be accepted*	*Responsible Party for Compliance*	*Timing*	*Verification of Compliance (name/date)*
					occurs first.	
	4.3-1	**WATER SUPPLY AND AVAILABILITY** Water use on the property shall not exceed the projected water demand, which is 57.21 AFY	The applicant, per the water system operator shall document annual water use and submit reports to the Water Resources Agency and RMA Planning Department on a quarterly basis	Applicant	Ongoing during the lifetime of the project	
	4.3-2	**WATER SUPPLY AND AVAILABILITY** The location of future wells on the September Ranch project site shall be based upon the following: • Wells will be located based on pumping tests designed and executed to yield information on the radius of influence of potential multiple pumping wells. • Project applicant will ensure that representative transmissivities for the three aquifer units are made available for informed decisions on placement of future wells to ensure new wells will not impact existing wells.	Prior to the issuance of permits for future groundwater wells, the County of Monterey shall review and approve well site plants to ensure that the insertion of new wells will not have an impact on neighboring wells.	Applicant	Prior to issue of permits for new wells, the County will review and approve well site plans to ensure new wells will not impact existing wells.	
	4.4-1	**HYDROLOGY AND WATER QUALITY** The proposed project shall include the construction, operation, and maintenance of detention basins to accommodate the 100-year storm event, with engineered design features to control release of detained flows to pre-development 10-year storm levels, as planned. **(RMA – Planning and Building and Water Resources Agency)**	For the subdivision improvements, the applicant shall submit evidence of a General Construction Activity Storm Water Permit obtained from the RWQCB to the Monterey County Planning and Building Inspection Department.	Applicant	Prior to the approval of subdivision improvement plans, or issuance of a grading permit for subdivision improvements, whichever occurs first.	

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			The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to the issuance of grading permits, the approval of Subdivision Improvement Plans, or recordation of the final map, whichever occurs first.	
			The project applicant shall submit a drainage plan to the MCWRA for review and approval.	Applicant	Prior to the issuance of a grading permit	

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	4.4-2	**HYDROLOGY AND WATER QUALITY** The project applicant shall prepare a drainage plan, which includes the proper design and placement of sediment traps to preen the discharge of sediments and pollutants into offsite drainage channels. In order to mitigate adverse water quality impacts that could be generated by the proposed project after construction, potential BMPs for storm water runoff quality control should be incorporated into project design. These could include such measures as vegetated buffer strips, use of porous pavement, "grass-phalt," cisterns of storm water storage, street sweeping, percolation basins and grease/oil traps (with regular maintenance programs. Good housekeeping, waste containment, minimization of disturbed areas, stabilization of disturbed areas, the protection of slopes and channels, the control of the site perimeter, and the control of internal erosion are the objectives of the BMPs. The BMPs include limiting soil exposure through scheduling and preserving existing vegetation; stabilizing soils through seeding, planting, and mulching; diverting runoff through earth diking, temporary drains, swales, and slope drainage; reducing velocity through outlet protection, checking dams, slope roughening/terracing; trapping and filtering sediment through silt fencing, straw bale barriers, sand bag barriers,	The project applicant shall submit evidence of a General Construction Activity Storm Water Permit obtained from the RWQCB to the Monterey County Planning and Building Inspection Department. The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map. The methods outlined in the mitigation measure shall be included in the design.	Applicant Engineer	Prior to the issuance of a grading permit. Prior to issuance of the grading permit, approval of the subdivision improvement plans, or concurrent with recordation of the final map, as applicable.	

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		brush and rock filters, storm drain inlet protection, and sediment basins. Specific and extensive BMP measures, such as those identified below, should be contained in the Final Erosion Control Report, which shall be submitted as a condition of the Final Map. • Temporary erosion and sedimentation control features shall be maintained until revegetation is sufficient to prevent erosion of disturbed construction and restoration sites. Sufficiency of revegetation shall be determined by the project's conservation manager and certified erosion and sedimentation control specialists. • Periodic pre-storm, storm, and post-storm monitoring inspections of BMP measures shall be conducted from the duration of construction phases and until temporary protection features have been removed. • Daily inspections shall be conducted during grading construction to assure condition and adequacy of erosion and sedimentation control features. • Daily repairs of damaged erosion- and sedimentation-control features (e.g., downed silt fencing, broken straw bales, damaged sandbags) shall be completed. **(RMA – Planning and Building, Public Works and Water Resources Agency)**	The project applicant shall submit a drainage plan to the MCWRA for review and approval. Monterey County Grading staff and Public Works staff shall complete bi-weekly inspections of the project site, or more often if necessary depending on site conditions, to ensure compliance with BMPs. Inspections shall be at the applicant's expense.	Applicant	Prior to the issuance of a grading permit	
	4.4-3	**HYDROLOGY AND WATER QUALITY** The applicant shall prepare CC&Rs, which include requirements for the type and frequency of catch basin, sediment trap, and storm water inlet cleaning and maintenance. The storm drainage system shall be maintained on a regular basis to remove pollutants, reduce	Prepare CC&Rs and submit to the Monterey County Water Resources Agency for review and approval.	Applicant	Prior to recordation of the final map.	

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		high pollutant concentrations during the first flush of storms, prevent clogging of the down stream conveyance system, and maintain the catch basins sediment trapping capacity. The homeowner's association, or some other similar responsible entity, shall provide for at least an annual inspection regimen and immediately repair or clean the system, as needed. **(RMA – Planning and Building and Water Resources Agency)**	The project applicant shall submit evidence of a General Construction Activity Storm water permit obtained from the RWQCB to the Planning Department. The project applicant shall submit a drainage plan to the MCWRA for review and approval.	Applicant Applicant	Prior to issuance of a grading permit Prior to issuance of a grading permit	
	4.6-1	**TRANSPORTATION AND CIRCULATION** At the intersection of SR 1/Carpenter Street, use overlap phasing to have the westbound right-turns synchronized with the southbound SR 1 left-turn movement. **(RMA – Public Works)**	Work with Monterey County Public Works and Caltrans staff to modify the intersection phasing.	Applicant	Prior to issuance of the first residential building permit.	
	4.6-2	**TRANSPORTATION AND CIRCULATION** At the intersection of Carmel Valley Road/Brookdale Drive/ September Ranch Road, install a right-turn taper on westbound Carmel Valley Road and install a left-turn lane for both the eastbound and westbound Carmel Valley Road approaches. **(RMA – Public Works)**	Show improvements on Subdivision Improvement Plans. Install tapers and turning lanes.	Applicant Applicant	Prior to approval of Subdivision Improvement Plans. Prior to issuance of the first residential building permit.	
	4.6-3	**TRANSPORTATION AND CIRCULATION** Contribute fair share fees, as determined by the County for CVMP Traffic Impact Fees. Fees would be required for	Pay the applicable traffic impact fee to Monterey County.	Applicant	Prior to the issuance of each	

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		the following improvements: • Signalizing the Carmel Valley Road/Dorris Drive intersection; • Signalizing the Carmel Valley Road/Laureles Grade intersection; and • Signalizing the Rio Road/Carmel Ranch Boulevard intersection. **(RMA – Public Works)**			residential building permit.	
	4.6-4	**TRANSPORTATION AND CIRCULATION** Contribute fair share fees for SR 1 improvements for all project-generated trips expected to use SR 1 north of Carmel Valley Road. The following improvements include: • At the intersection of SR 1/Ocean Avenue/Carmel Hills Drive, widening should occur to the eastbound and westbound approaches to have one exclusive left-turn lane, one shared left-turn/through lane, and one exclusive right-turn lane. **(RMA – Public Works)**	Pay a pro-rata fair share traffic impact fee to the Monterey County Public Works Department.	Applicant	Prior to issuance of each residential building permit	
	4.6-5	**TRANSPORTATION AND CIRCULATION** The project proponent shall contribute fair share fees for the left-turn channelization for both the eastbound and westbound approaches of the intersection of Carmel Valley Road/Brookdale Drive. **(RMA – Public Works)**	Pay a pro-rata fair share traffic impact fee to the Monterey County Public Works Department.	Applicant	Prior to issuance of each residential building permit	
	4.6-6	**TRANSPORTATION AND CIRCULATION** The project proponent shall contribute fair share fees for the overlap phasing improvements along Carmel Valley Road (as identified in the CVMP, 1995) at the following locations: • In front of September Ranch; • Opposite of Garland Ranch Regional Park, which is east	Pay a pro-rata fair share traffic impact fee to the Monterey County Public Works Department.	Applicant	Prior to issuance of each residential building permit	

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		of Robinson Canyon Road; and • Near Laureles Grade Road, which is east of Garland Ranch Regional Park. **(RMA – Public Works)**				
	4.6-7	**TRANSPORTATION AND CIRCULATION** The project applicant shall install a safe transit stop(s) convenient to both the entrance to the planned unit development and to the existing equestrian center. The applicant shall provide a passenger shelter in each direction, an improved pullout in each direction, and onsite signage at the project site showing the transit schedule and map. **(RMA – Public Works)**	The project proponent shall include transit stops on the Subdivision Improvement Plans, subject to review and approval by the Monterey County Public Works Department and Monterey-Salinas Transit. Construct the transit stop.	Applicant Applicant	Prior to approval of the Subdivision Improvement Plans. Prior to issuance of the first residential building permit.	
	4.6-8	**TRANSPORTATION AND CIRCULATION** The project applicant shall install the fourth (north) leg of September Ranch Road (the project access road) at the existing stop controlled T-intersection of Carmel Valley Road/Brookdale Drive. The project applicant shall be responsible for signalizing this intersection and any signal coordination costs associated with this signalization. **(RMA – Public Works)**	The project applicant shall show the improvement designs on the Subdivision Improvement Plans. Construct the improvements.	Applicant Applicant	Prior to approval of the Sub. Improv. Plans. Prior to issuance of the first residential occupancy permits.	
	4.6-9	**TRANSPORTATION AND CIRCULATION** Prior to the issuance of building permits, install an intersection ahead warning sign on eastbound Carmel Valley Road in advance of September Ranch Road to alert drivers on Carmel Valley Road. **(RMA – Public Works)**	The project applicant shall include the warning sign on the Subdivision Improvement Plans.	Applicant Applicant	Prior to approval of the Sub. Improv. Plans. Prior to issuance of the	

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			Install the sign.		first residential building permit.	
	4.7-1	**AIR QUALITY** The use of BACMs shall be required during grading operations. BACMs that shall be incorporated into the project include: • Water all active construction areas at least twice daily. • Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard. • Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. • Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. • Sweep streets daily (with water sweepers), if visible soil materials are carried onto adjacent public streets. • Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more). • Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (e.g., dirt, sand, etc.). • Limit traffic speeds on unpaved roads to 15 mph. • Install sandbags or other erosion control measures to prevent silt runoff to public roadways. • Replant vegetation in disturbed areas as quickly as possible. • Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph. • Limit the area subject to excavation, grading and other	The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map. The requirements shall be implemented as part of all grading operations. The Applicant shall submit a plan to the Director of Planning for review and approval, demonstrating how the best available control measures for controlling PM_{10} emissions will be implemented during grading and construction. Contractor shall be responsible for implementing the approved plan to ensure control of PM_{10} emissions.	Applicant Applicant	Prior to the issuance of grading permits. During construction.	

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		construction activity at any one time to no more than eight (8) acres on any given day. **(RMA – Planning and Building)**	Applicant shall provide a monthly reporting during construction demonstrating compliance with measure.			
	4.8-1	**NOISE** The southern facade of the inclusionary housing units shall have no balconies or decks facing Carmel Valley Road unless the perimeter of such balconies or decks are shielded by a five-foot high glass or transparent plastic barrier. **(RMA – Planning and Building)**	Submit the final design plans to the County of Monterey Planning and Building Inspection Department for review and approval.	Applicant	Prior to the issuance of building permits.	
			The requirements of this mitigation measure shall be included as a note in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to recordation of the final map.	
	4.8-2	**NOISE** Habitable rooms of the inclusionary housing units that face south shall have a source of supplemental ventilation to allow for window closure in such rooms. **(RMA – Planning and Building)**	Submit the final design plans to the County of Monterey Planning and Building Inspection Department for review and approval.	Applicant	Prior to the issuance of building permits.	
			The requirements of this mitigation measure shall be included as a note in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant	Prior to recordation of the final map.	
	4.9-1	**BIOLOGICAL RESOURCES** The project applicant shall submit a Final Map that is	Submit a Final Map and CC&Rs that implement the	Applicant	Prior to recordation of	

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		consistent with the recommendations outlined in the Forest Management Plan. The applicant shall prepare and submit an Open Space Management Plan and a Grassland Habitat Management Plan which will include the following: • Defines development envelopes for each residential lot to minimize vegetation removal; • The identification of potential areas for building envelopes prior to the final map. The tentative map shall show the appropriate placement of the buildings with respect to the current conditions (i.e., slope, vegetation areas). All building envelopes shall require plant surveys that shall be conducted at the appropriate time (individual blooming periods are shown in the biological report in Appendix H of the Recirculated DREIR); • Prohibits planting/introduction of nonnative invasive plant species (such as acacia, French or Scotch broom, and pampas grass) within any portion of proposed lots, and prohibit planting/introduction of any nonnative species outside the development envelope; • Development of landscape guidelines that encourage the use of native species indigenous to the area as ornamentals and prevent the use of invasive exotics; • Limits the use of fencing to designated development envelopes, and prohibit fencing of parcel boundaries in order to maintain areas for wildlife movement; • Restricts direct disturbance or removal of native vegetation to designated development envelopes, as planned, through project covenants, codes and restrictions (CC&Rs), through dedication of a conservation or open space easement, or other similar method (The project applicant currently proposes dedication of scenic easements over all portions of the	requirements of the Forest Management Plan, the Open Space Management Plan, and the Grassland Habitat Management Plan, and above easements. Include notes for all applicable requirements of this mitigation measure on an additional sheet of the final map. Include appropriate notes and requirements in the CC&Rs	Applicant Applicant	the final map. Prior to recordation of the final map. Prior to recordation of the final map.	

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		site outside designated development envelopes). • Establishes lot restrictions and common open space regulations that limit uses and prescribe management responsibilities in private and common open space areas beyond the building and development envelopes identified in the final map. • Defines the conservation (scenic) easements dedicated to an entity acceptable to the County of Monterey. These conservation easements are legally binding use restrictions recorded on privately owned land that can provide a high degree of protection to certain areas on the property while allowing the rest of the land to be developed and used at the owner's discretion. Conservation easements to the benefit of the County of Monterey shall be recorded with the sale of the lot and should run with the land regardless of the number of times the land is sold. Such easements shall be set aside for as much of the private open space on the property as is feasible to guarantee the long-term preservation of the site's overall biological resource values. Examples of the types of restrictions that shall be considered in these conservation easements include the following: • Restriction of all development rights within the easement area; • Maintenance of natural habitat; • Pesticide use restrictions; • Only compatible public recreation uses allowed within easement lands, not uses that cause disturbance to native vegetation and wildlife; • Restricted trails for pedestrians, hikers and cyclists within easement lands; • No vehicles of any kind allowed in easement lands except for those required by the habitat/open space	Prepare conservation easement deed between applicant and Monterey County. Record conservation easement	Planning and Building Inspection Dept Clerk to the Board	Prior to recordation of final map. Concurrently with final map recordation	

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		manager in performance of habitat monitoring or maintenance activities; • No alteration of land including grading, disking, compacting, soil removal or dumping shall be allowed unless the work is for the purpose of habitat management/restoration and authorized by the habitat/open space manager; • No removal of flora or fauna from the easement area including mowing or weed whacking unless authorized by the habitat/open space manager; • Limitations/restrictions will be placed on construction of permanent or temporary facilities (e.g., picnic tables or portable toilets) within the easement areas in accordance with the goals of the open space management program; • Leash laws within the easement areas must be enforced; and • Right of inspection of the easement area by the easement holder and habitat/open space manager. Refer also to mitigation measures 4.9-2, 4.9-6, 4.9-7, 4.9-8 and 4.9-9 for implementation. **(RMA – Planning and Building)**				
	4.9-2	**BIOLOGICAL RESOURCES** The project applicant shall submit a Forest Mitigation and Monitoring Plan, which will identify permanently dedicated open space 3 times the acreage of Monterey pine/coast live oak forest (3-to-1 ratio) that will be developed. **(RMA – Planning and Building)**	Submit a Forest Mitigation and Monitoring Plan prepared by a qualified professional and subject to review and approval by the Monterey County Planning and Building Inspection Department. In addition, the applicant shall submit periodic reports (as outlined in mitigation measure	Applicant	Prior to the issuance of grading permits or recordation of the final map, whichever occurs first.	

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			4.9-3) prepared by a qualified professional to the Monterey County Planning and Building Inspection Department outlining implementation and success of the Forest Management Plan.			
	4.9-3	**BIOLOGICAL RESOURCES** To reduce the loss of individual trees, all coast live oak trees and Monterey pine trees 6" or larger shall be replaced on a 1:1 basis by planting or transplanting trees in areas of suitable soil as determined appropriate by a professional forester. The following is recommended: • A tree replacement plan shall be prepared by a registered professional forester, and will be subject to review and approval by the County Planning & Building Inspection Department, that includes the following: - Identify tree planting areas with suitable soils that will also fulfill project landscape plans and visual screening objectives, as feasible. - Identify monitoring requirements, such as a site inspection at the end of the first winter after planting to confirm numbers, species of replacement, and locations of plantings. Annual inspections over seven (7) years shall confirm the objective of the plan, such as the survivability of the plantings, and the percentage of healthy trees. - The entire 100% of the plantings shall be established/surviving by seven years or monitoring (and replacement) shall continue until compliance is achieved, unless it is	Submit tree replacement plan as outlined in mitigation measure. Plant trees as required by plan. Monitor success of tree planting/relocations. Submit report to Monterey County Planning and Building Inspection Department.	Applicant per biologist Applicant per biologist Applicant per biologist	Prior to the issuance of grading permits, approval of Sub. Improv. Plans, or recordation of the final map, whichever occurs first. As required by plan. Annually for five years after planting, except as required for unsuccessful replantings/ transplanting.	

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		found to be detrimental to the health of the stand due to overcrowding. The long term objective is 100%. If initial planting levels exceed 1:1 replacement, then whatever percent assures 1:1 replacement should be the minimum standard, subject to the above foresters's finding caveat. - The location and species of all required replacement trees planted shall be mapped so they can be monitored for over the seven year period. The monitoring period shall be extended for individual trees that die or are in poor health and must be replaced. - Transplanting of onsite native seedlings within construction areas and protection of those occurring near construction areas to maintain natural diversity and adaptation. - All replacement trees shall be of local genetic stock. - All replacement trees shall be of local, native stock. All replacement Monterey pines shall be grown from on-site native stock collected within the 500 foot elevation zone of the planting site. Replanting shall avoid open spaces where currently there are no trees unless there is evidence of soil deep enough and of good enough quality to support the plantings. **(RMA – Planning and Building)**	Map locations of planted and transplanted trees. Transplant seedlings. Include requirements of the tree replacement plan as a note on all grading permits, building permits, in the CC&Rs, and on an additional sheet of the final map. Last phase will not be recorded if tree replacement is not meeting 100 percent survival.	Applicant per biologist Applicant per biologist Applicant per biologist	As trees are planted and transplanted. As seedlings are removed. Prior to issuance of a permit or prior to recordation of the final map, as applicable.	
	4.9-4	**BIOLOGICAL RESOURCES** Pines adjacent to ones slated for removal shall be protected individually with orange construction fencing placed around their dripline. Pines not slated for removal shall not be damaged. To avoid mechanical damage to	The requirements of this mitigation measure shall be included as a note on all grading plans, Subdivision Improvement Plans, and on an	Applicant	Prior to the issuance of grading permits, approval of the	

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		pines not slated for removal, the following measures are recommended: • Minimizing impacts to retained tress by individually cutting adjacent removal trees; • Minimize mechanical tree damage such as skinning of the trunks, partial pushovers, etc. during construction or harvesting operations; • Build barricades around trees to prevent mechanical damage by equipment in yard and landscape environments. Try to minimize root damage by keeping trenching and digging to a minimum; • During landscaping operations, maintain final soil level around tree trunks and roots as much as possible to the same height as it was before construction; • Direct all drainage from developed areas away from low or flat areas near trees to prevent saturation of soils at the base of trees; and • Require protection of oak and Monterey pine trees located outside designated development envelopes unless proven to be diseased or unhealthy as determined registered professional forester **(RMA – Planning and Building)**	additional sheet of the final map. Implement the requirements of this mitigation measure. Forester should be present bi-weekly during construction to monitor compliance with mitigation measure.	 Applicant per arborist Arborist	Sub. Improv. Plans, and prior to recordation of the final map. During construction. During construction	
	4.9-5	**BIOLOGICAL RESOURCES** There is no proven method available that will prevent pitch canker from infecting susceptible trees. To prevent the spread of the fungus into the pines within the project site, some actions can be taken to slow down the spread of the fungus, including the following: • Minimize removal or severe pruning of trees during periods of peak beetle activity, particularly during maximum growth during the spring. Remove or chip trees and debris promptly and in accordance with handling guidelines of the Oak Mortality Task Force	The requirements of this mitigation measure shall be included as a note on all grading plans, Subdivision Improvement Plans, and on an additional sheet of the final map.	Applicant per arborist	Prior to the issuance of grading permits, approval of the Sub. Improv. Plans, and prior to recordation of the final map.	

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		and Agricultural Commissioner for oaks and the Pitch Canker Task Force for pines; • All trees proposed for removal shall be removed carefully so as not to injure (including breaking nearby branches, cutting trunks, etc.) adjacent trees not slated for removal. There are some Monterey pines that are pest resistant to pathogen and these trees may be used but should not constitute more than 30 percent of the planted stock as a seeded base for planting; and • Encourage healthy growth of trees. Susceptibility to beetle attack increases with poor health or damage due to breakage, wounding, or soil compaction. **(RMA – Planning and Building)**	Implement the requirements of this mitigation measure. Arborist should be present bi-weekly during construction to monitor compliance with mitigation measure.	Applicant Arborist	During construction. During construction.	
	4.9-6	**BIOLOGICAL RESOURCES** Submit a final Forest Management Plan, which includes a Forest Mitigation and Monitoring Plan subject to review and approval by the County Planning & Building Inspection Department that includes the following: • Avoid grading, filling, and all construction activity within the dripline of oak trees, where possible. Any construction or activity within the dripline of oak trees shall be reviewed and approved by a qualified forester or arborist with their recommendations for protection as appropriate; and • Develop CC&Rs that shall include oak tree protection as outlined in the Forest Management Plan on individual lots as part of future home construction, as well as guidelines for appropriate landscaping management to protect remaining oaks. Wherever possible, future homes should be sited outside of the dripline of any oak. **(RMA – Planning and Building)**	Submit a final Forest Mitigation and Monitoring Plan prepared by a qualified professional and subject to review and approval by the Monterey County Planning and Building Inspection Department. In addition, the applicant shall submit quarterly reports prepared by a qualified professional to the Monterey County Planning and Building Inspection Department outlining implementation and success of the Forest	Applicant per arborist Applicant per arborist	Prior to the issuance of grading permits, approval of the Sub. Improv. Plans, or recordation of the final map, whichever occurs first. On-going during construction phases	

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			Management Plan.			
	4.9-7	**BIOLOGICAL RESOURCES** Clear definition of the development envelope for each lot in the coastal scrub areas, restrictions of the remainder of the lots, and implementation of the Tentative Map (Mitigation Measure 4.9-1) that details the general open space management measures and conservation easement designations on lots should reduce some of the impacts to coastal sage scrub. In addition, to reduce the impacts to coastal sage scrub, the following mitigation measures are required: Submit final Open Space Management Plan that includes the following: • Protection and enhancement for the long-term viability of the habitat types onsite and the plant and animal species they support; • Incorporation into project documents that are passed on to homeowners. The plan should include, but not be limited to, the following: ◦ Limiting native vegetation removal and other disturbances in areas not specifically designated for buildings and other facilities to minimize losses to coastal sage scrub and grassland areas with high concentrations of native species as well as Monterey pine, coast live oak forest; ◦ Protection of sensitive plant species identified herein (and in subsequent studies) through design, setbacks, salvage and relocation, and other means wherever feasible; and ◦ Designation of trails and other directed access to/through common open space areas to reduce inadvertent habitat degradation.	Provide building envelopes for each parcel. Prepare and submit an Open Space Management Plan, subject to the review and approval by the county of Monterey Planning and Building Inspection Department. In addition, the applicant shall submit quarterly reports prepared by a qualified professional to the Monterey County Planning and Building Inspection Department outlining implementation and success of the Open Space Management Plan. The requirements of this mitigation measure shall be included as a note on all grading permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an	Applicant Applicant per biologist Applicant per biologist Applicant	Prior to recordation of the final map. Prior to the issuance of grading permits, approval of the Sub. Improv. Plans, or recordation of the final map, whichever occurs first. On-going during construction phases Prior to the issuance of grading permits, approval of the Sub. Improv. Plans, or	

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		(RMA – Planning and Building)	additional sheet of the final map. A biologist shall inspect the area to be graded, prior to and after grading, to ensure implementation of the plan.	Applicant per biologist	recordation of the final map, whichever occurs first. On-going during grading phases.	
	4.9-8:	**BIOLOGICAL RESOURCES** Submit a final Grassland Management Program that addresses the following: • Preservation, enhancement, and restoration of native grasslands on the site. Including: • Clear definition of the building footprint for each lot in the grasslands areas, restrictions on the remainder of the lot; and • Description of the implementation of an active grassland management program for both the lots and the common open space areas. • Light rotational, seasonally-timed grazing and/or appropriately timed mowing to reduce the cover of non-native annual grasses; • Limit soil disturbance through cultivation; • Preclude the use of herbicides unless applied directly to invasive, non-native species; • Address the removal of Monterey pine seedlings in the native grasslands (either through mowing or chipping); • Address restoration in areas dominated by invasive species like French broom; and	Provide building envelopes for each parcel. Prepare and submit a final Grassland Management Plan, subject to the review and approval by the County of Monterey Planning and Building Inspection Department. The applicant shall submit quarterly reports prepared by a qualified professional to the Monterey County Planning and Building Inspection Department outlining implementation and success of the Open Space Management Plan. The requirements of this	Applicant Applicant per biologist Applicant per biologist	Prior to recordation of final map. Prior to the issuance of grading permits, approval of the Sub. Improv. Plans, or recordation of the final map, whichever occurs first. On-going during construction phases. Prior to the	

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		• Consider the possible use of fire management on both the common open space and private open space grassland areas. **(RMA – Planning and Building)**	mitigation measure shall be included as a note on all grading permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map. A biologist shall inspect the area to be graded, prior to and after grading, to ensure implementation of the plan.	Applicant Applicant per biologist	issuance of grading permits, approval of the Sub. Improv. Plans, or recordation of the final map, whichever occurs first. On-going during grading phases.	
	4.9-9	**BIOLOGICAL RESOURCES** To reduce the acreage impacts to native grasslands, pre-construction surveys shall be conducted that identify areas with high concentrations of native species (areas with over 50 percent native grassland species). Native grassland acreage shall be replaced at a 1:1 ratio. **(RMA – Planning and Building)**	Conduct pre-construction surveys. Prepare and submit a Grassland Management Plan that includes the results of the pre-construction survey, subject to the review and approval by the County of Monterey Planning and Building Inspection Department.	Applicant per biologist Applicant per biologist	Prior to the issuance of grading permits, approval of the Sub. Improv. Plans, or recordation of the final map, whichever occurs first.	
	4.9-10	**BIOLOGICAL RESOURCES** To reduce the potential "take" of listed species the following are recommended: Prior to construction of roadways or individual houses, a botanical survey shall be conducted during the appropriate blooming period for each species. If no listed species are	Prepare and submit a botanical survey, subject to the review and approval by the county of Monterey Planning and Building Inspection Department.	Applicant per biologist	Prior to the issuance of grading or building permits.	

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		observed no further action is required. If listed species are found a report shall be prepared detailing the habitats affected by the project, the species potentially affected by the project, and the appropriate mitigation measures to reduce the "take" of listed species. Informal consultation with CDGF may be required. CDFG may require further actions. If listed species are found a report shall be prepared, as explained detailing the habitats affected by the project, the species potentially affected and appropriate mitigation measures to reduce "take" of listed species Informal consultation with the USFWS will be required if Monterey spineflower are found. Mitigation may include but not be limited to avoidance of populations, restoration, maintenance, and enhancement and obtaining an Incidental Take Permit from the USFWS and notification with the CDFG. **(RMA – Planning and Building)**	Include the requirements of this mitigation measure as a note on an additional sheet of the final map and in the CC&Rs. Obtain appropriate permits from CDFG or USFWS. Implement requirements of CDFG or USFWS permits A biologist shall inspect the site bi-monthly during construction to ensure implementation of the measure.	Applicant Applicant Applicant Applicant	Prior to recordation of the final map. Prior to construction or grading activities. As outlined in permit. On-going	
	4.9-11	**BIOLOGICAL RESOURCES** The project applicant shall submit to the Monterey County Planning and Building Inspection Department a Final Map that identifies the roadway realignments in the area of Lots 18-22 that avoid the identified population of Pacific Grove clover. **(RMA – Planning and Building)**	Submit Subdivision Improvement Plans and grading permit plans.	Applicant	Prior to the issuance of grading permits or approval of Sub. Improv. Plans.	
	4.9-12	**BIOLOGICAL RESOURCES** To avoid a take and/or further evaluate the presence or absence of raptors, the following is required:	Conduct preconstruction survey within time period recommended by resource	Applicant per biologist	Prior to the issuance of grading permits or tree	

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		• Removal should be conducted outside the nesting season, which occurs between February 1 and August 15. If grading before February 1 is infeasible and groundbreaking must occur within the breeding season, a pre-construction nesting raptor survey shall be performed by a qualified biologist. If no nesting birds are observed, no further action is required and grading may occur within one week of the survey to prevent "take" of individual birds that may have begun nesting after the survey. If birds are observed onsite after February 1 it will be assumed that they are nesting onsite or adjacent to the site. If nesting birds are observed, ground breaking will have to be delayed until after the young have fledged, as determined by bird surveys conducted by a qualified biologist, or after the nesting season. • The CDFG Central Coast Regional office does allow grading/or tree removal to occur if nesting birds are observed onsite, providing that a 500-foot buffer zone is created around the observed nest. **(RMA – Planning and Building)**	agencies prior to activities. Provide the Monterey County Planning and Building Inspection Department with written verification that nesting birds will not be disturbed and that a preconstruction survey has been performed and grading will occur in accordance with CDFG regulations. Obtain approval from CDFG for option outlined.	Applicant per biologist Applicant per biologist	removal. Prior to the issuance of grading permits or tree removal. Prior to grading or tree removal activities.	
	4.9-13	**BIOLOGICAL RESOURCES** To avoid a take and/or further evaluate the presence or absence of passerines, the following is required: • Grading within the grasslands shall be conducted outside the nesting season, which occurs between approximately February 1 and August 15. If grading before February 1 is infeasible and groundbreaking must occur within the breeding season, a qualified biologist shall perform a pre-construction nesting bird survey of the grasslands. If no nesting birds are	Conduct preconstruction survey within time period recommended by resource agencies prior to activities. Provide the Monterey County Planning and Building Inspection Department with written verification that nesting birds will not be disturbed and	Applicant per biologist Applicant per biologist	Prior to the issuance of grading permits. Prior to the issuance of grading permits or tree removal.	

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		observed, no further action is required and grading may occur within one week of the survey to prevent "take" of individual birds that may have begun nesting after the survey. If birds are observed onsite after February 1 it will be assumed that they are nesting onsite or adjacent to the site. If nesting birds are observed, ground breaking shall be delayed until after the young have fledged, as determined by bird surveys conducted by a qualified biologist, or after the nesting season. • The CDFG Central Coast Regional office does allow grading to occur if nesting birds are observed onsite, providing that a 75- 100-foot buffer zone is created around the observed nest. **(RMA – Planning and Building)**	that a preconstruction survey has been performed and grading will occur in accordance with CDFG regulations. Obtain approval from CDFG for option outlined.	Applicant per biologist	Prior to grading or tree removal activities.	
	4.9-14	**BIOLOGICAL RESOURCES** To avoid "take" and or further evaluate presence or absence of roosting bats the following measures are required: • Snags shall not be removed without first being surveyed by a qualified bat biologist, 2-4 weeks prior to planned tree removal to determine whether bats are roosting inside the trees. If no roosting is observed, the snag shall be removed within one week following surveys. If bat roosting activity is observed, limbs not containing cavities, as identified by the bat biologist, shall be removed first, and the remainder of the tree removed the following day. The disturbance caused by limb removal, followed by a one night interval, will allow bats to abandon the roost. • Remove large trees (>24" diameter at breast height [dbh]), or trees with cavities, between September 1 and October 30. This time period is after young are volant (flying), but before expected onset of torpor	Conduct preconstruction survey within time period recommended by resource agencies prior to activities. Provide the Monterey County Planning and Building Inspection Department with written verification that bats will not be disturbed and that a preconstruction survey has been performed and activities will occur in accordance with CDFG regulations.	Applicant per biologist Applicant per biologist		

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		(winter inactivity). Smaller trees may be removed at any time. • If trees larger than 24" dbh, or trees with cavities, must be removed outside this time period, night emergence surveys shall be conducted by a qualified bat biologist, 2-4 weeks prior to planned tree removal to determine whether bats are roosting inside the trees. If no roosting is observed, the tree shall be removed within 1 week following surveys. If bat roosting activity is observed, limbs not containing cavities, as identified by the bat biologist, shall be removed first, and the remainder of the tree removed the following day. The disturbance caused by limb removal, followed by a one night interval, will allow bats to abandon the roost.	Obtain approval from CDFG for option outlined.	Applicant per biologist		
	4.10-1	**CULTURAL RESOURCES** If archaeological resources or human remains are accidentally discovered during construction, the following steps will be taken: • There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until: • The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and • If the coroner determines the remains to be Native American: - The coroner shall contact the Native American Heritage Commission and the RMA – Planning Department within 24 hours. - The Native American Heritage Commission shall identify the person or persons from a recognized local tribe of the Esselen, Salinian, Costanoas/Ohlone	The applicant shall submit the contracts with a Registered Professional Archeologist and a Registered Professional Paleontologist to the Director of Planning, Monterey County Planning and Building Inspection Department for approval. The requirements of this mitigation measure shall be included as a note on all grading and building permits, on the Subdivision Improvement Plans, in the CC&Rs, and shall be included as a note on an additional sheet of the final map.	Applicant per archaeolo-gist or paleontolo-gist Applicant	Prior to the issuance of grading permits or approval of Sub. Improv. Plans, whichever occurs first. Prior to recordation of the final map and prior to issuance of permits.	

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		and Chumash tribal groups, as appropriate, to be the most likely descendent. - The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.9 and 5097.993, or - Where the following conditions occur, the landowner or his authorized representatives shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance: 1. The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission. 2. The descendent identified fails to make a recommendation; or 3. The landowner or his authorized representative rejects the recommendation of the descendent, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner. **(RMA - Planning Department)**	Implement the steps of the mitigation measure as necessary.	Applicant	On-going	
	4.11-1	**AESTHETICS** Prior to the issuance of a grading permit, the applicant shall submit a Final Map, which will be subject to review and approval by the Monterey County Planning and Building Inspection Department (MCPBID). The MCBPID establishes envelopes on each proposed lot to	Submit a final map with building envelopes, design guidelines incorporated into the CC&Rs, and dedicate open space easement(s). Include applicable requirements as a	Applicant	Prior to recordation of the final map.	

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		define the building area that result in minimal grading and protect the public viewshed by avoiding ridgeline development and preserving existing screening vegetation. Home sites in building envelopes on the bluffs overlooking Carmel Valley Road should be limited in building height, as needed, to reduce visibility and screen buildings from Carmel Valley Road. **(RMA – Planning and Building)**	note on an additional sheet of the final map. Submit a landscape and lighting plan subject to review and approval by the Monterey County Planning and Building Inspection Department.	Applicant	Prior to issuance of all building permits.	
	4.11-2	**AESTHETICS** Prior to issuance of a grading permit, the applicant shall submit design guidelines and landscaping plan subject to review and approval of the Monterey County Planning and Building Inspection Department. The plan shall utilize a rural-agricultural architectural theme for the proposed planned unit development, break up building mass of the units closest to Carmel Valley Road, and implement landscaping materials compatible with the surrounding area. This plan shall also address the sewage treatment facility. Landscaping shall incorporate mature trees in the area nearest to Carmel Valley Road. **(RMA – Planning and Building)**	Submit design guidelines and landscaping plans as part of CC&Rs. Include design and landscaping plans on building permit plans.	Applicant Applicant	Prior to recordation of the final map. Prior to issuance of building permits.	
	4.11-3	**AESTHETICS** Prior to issuance of a building permit, the project applicant shall dedicate open space easements as shown on the Preliminary Project Review Map through dedication of a scenic easement or other suitable method to insure its long-term protection. **(RMA – Planning and Building)**	Prepare conservation easement deed between applicant and Monterey County. Submit the easement language to the County for review and approval. Record conservation easement	Applicant Applicant	Prior to recordation of final map. Concurrent with recordation of the final map.	

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	4.11-4	**AESTHETICS** The applicant shall submit a public space (including public roadways) lighting plan subject to review by the Monterey County Planning and Building Inspection Department. The plan shall identify the use of non-reflective materials, subdued colors, and lighting that does not create offsite glare. **(RMA – Planning and Building)**	Submit lighting plan to the Planning Department for review and approval.	Applicant	Prior to issuance of building permits or approval of Sub. Improv. Plans, whichever occurs first.	
	4.11-5	**AESTHETICS** The type, height, and spacing of security and parking lighting shall conform to the County standard, which requires that lighting be directed downward and be of a minimum intensity that will allow for proper safety. **(RMA – Planning and Building)**	Include requirements in lighting plan submitted for mitigation measure 4.11-4. Submit lighting plan to the Planning Department for review and approval.	Applicant	Prior to issuance of building permits or approval of Sub. Improv. Plans, whichever occurs first.	
	4.13.4-1	**PUBLIC SERVICES AND UTILITIES** The proposed project shall participate in curbside collection of bottles, cans, paper, and yard waste. **(RMA – Planning and Building)**	The applicant shall provide verification to the County of Monterey Planning and Building Inspection Department that a licensed recyclables hauler has been contracted to service the project area.	Applicant	Prior to the issuance of building permits.	
	4.13.5-1	**PUBLIC SERVICES AND UTILITIES** The applicant shall either dedicate land or pay an in-lieu fee, which will be calculated after the tentative map has been approved and prior to recordation of the final map.	The applicant shall coordinate with the Monterey County Parks Department on the dedication of land and/or the payment of in lieu fees and the	Applicant	Prior to recordation of the final map**.**	

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		(Parks Department)	location of trail easements and identify such easements on the final map.			
	4.13.5-2	**PUBLIC SERVICES AND UTILITIES** The applicant, in coordination with the Parks Department, shall dedicate trail easements to the County for the connection of future trails with existing trails. The new public recreational trail shall, at a minimum, accommodate future and feasible connections to Canada Woods North and Monterra Ranch trail route and the possibility of other regional trail links to facilitate a regional trail system as outlined in the Greater Monterey Peninsula Area Plan. **(Parks Department)**	Identify trail easements on the final map.	Applicant	Prior to or concurrent with recordation of the final map**.**	
	4.13.5-3	**PUBLIC SERVICES AND UTILITIES** Any agreed upon trail easement/alignment shall be identified on the tentative map for approval and on the Final Map for recordation. **(Parks Department)**	Identify trail easements on the final map.	Applicant	Prior to the recordation of the final map**.**	
	5-1	**CUMULATIVE IMPACTS – TRANSPORTATION AND CIRCULATION** The applicant shall pay a fair share contribution towards improvements for Highway 1. **(RMA – Public Works)**	Pay fair share fee to the Public Works Department.	Applicant	Prior to the issuance of each building permit.	
	5-2	**CUMULATIVE IMPACTS – TRANSPORTATION AND CIRCULATION** At the intersection of Highway 68/Laureles Road: • Signal modification and widening of the intersection to utilize overlap phasing to have northbound right turn lanes on Laureles Grade Road go simultaneously with the westbound Highway 68 left-turns. • Modify east bound Highway 68 approach to include one through lane and one shared though/right-tern lane. **(RMA – Public Works)**	Provide plans to the Public Works Department showing the design of the improvements. Obtain encroachment permit. Construct improvements.	Applicant Applicant Applicant	Prior to issuance of building permits. Prior to the issuance of occupancy permits.	