EXHIBIT 14-G

REPORT
TO
MICHAEL R. BERUBE
P.O. BOX 22339
CARMEL, CALIFORNIA 93922

HYDROLOGY STUDY AND NITRATE LOADING ASSESSMENT for the MILLS COLLEGE PROPERTY MINOR SUBDIVISION at CARMEL VALLEY AND SCHULTE ROAD

CARMEL VALLEY
MONTEREY COUNTY, CALIFORNIA
APN 169-181-43

BY

GRICE ENGINEERING INC.
561A BRUNKEN AVENUE
SALINAS, CALIFORNIA
NOVEMBER 1994

000202Y

GRICE ENGINEERING AND GEOLOGY INC

ENGINEERING, GEOTECHNICS, HYDROLOGY, SOILS, FOUNDATIONS, AND EARTH STRUCTURES

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File No. 2835-94.03
November 14, 1994

Mr. Michael R. Berube
P.O. Box 22339
Carmel, California 93922

Project: Mills College Minor Subdivision
Carmel Valley Road and Schulte Road
Carmel
Monterey County, California
APN 169-181-43

Subject: Hydrology Study and Nitrate Loading Assessment

Dear Mr. Berube:

Pursuant to your request, we have completed a hydrology study and nitrate loading assessment for the Mills College Minor Subdivision.

As this subdivision of land is for division and further development with private single family residential structures, this report evaluates the affects of land use change on the groundwater supply and its projected nitrate quantity.

In general, the report was prepared with the assumption that the land use would progress from agricultural and residential to residential use as has been the normal trend in this area. In the study of hydrology, determining the water and nitrate balance, the study was limited to the area of the subdivision. The flow of the Carmel River through the property was ignored.

The groundwater demand within the subarea would decrease from 36.56 acre-feet per year (ac-ft/yr) to 3.99 ac-ft/yr.

The nitrate-nitrogen level of the groundwater is presently at 4.00 mg/l. The net change in the long term equilibrium nitrate-nitrogen level of the percolating groundwater is predicted to change from the theoretical present value of 23.82 mg/l to 9.31 mg/l at complete buildout.

The completed assessment is contained herein. Should you have any questions please feel free to call.

Very truly yours,
GRICE ENGINEERING INC.

Harold E. Grice, P.E.
R.C.E. 19424
R.G.E. 359

NOV 21 1994

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HYDROLOGY STUDY and NITRATE LOADING ASSESSMENT
for the
MILLS COLLEGE MINOR SUBDIVISION

INTRODUCTION

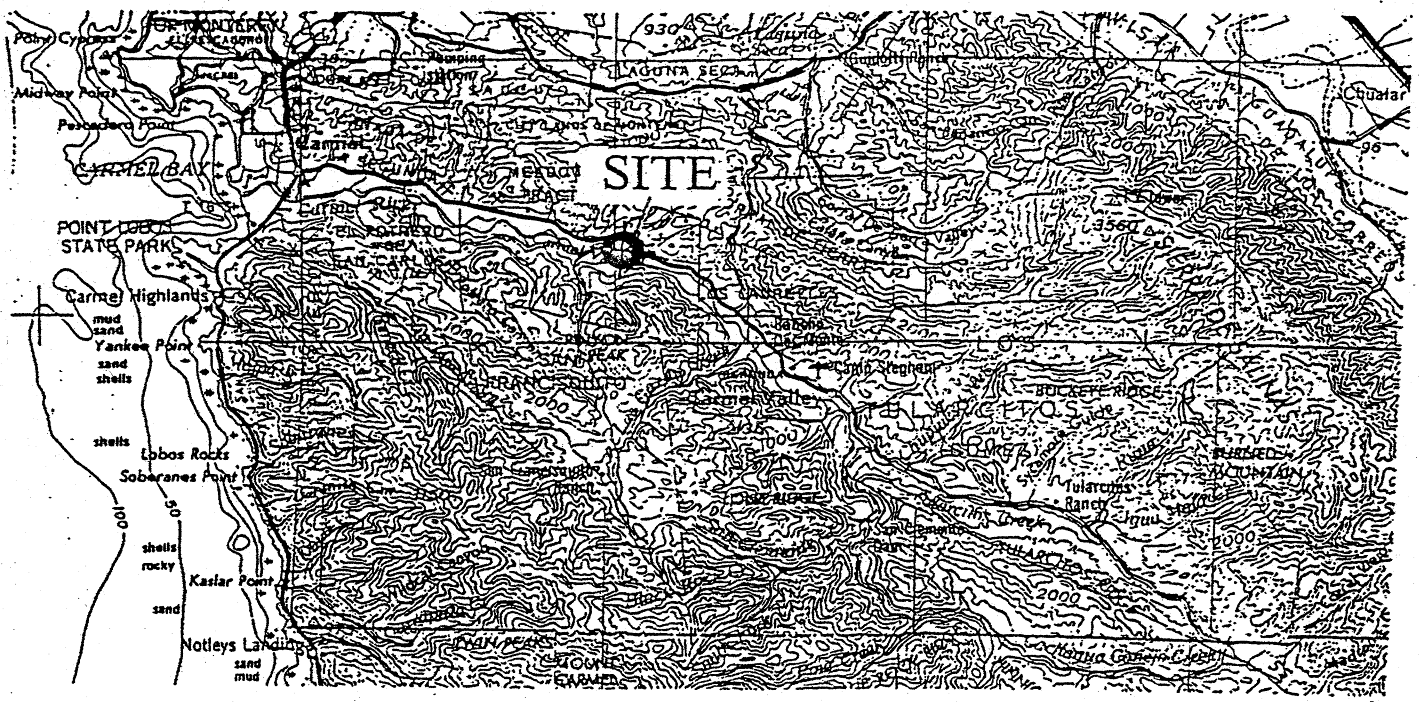
The project site is located south west of the intersection between Carmel Valley Road and Schulte Road, in middle Carmel Valley, Monterey County, California. Located on the low alluvial plains along the north bank of the Carmel River, the site approximately 6 miles inland from the Pacific Ocean. To the north of the site are the Sierra de Salinas and to the south the Northern Lucia Range.

Although the majority of the site is level with a slight slope towards the river, a steep stream bank crosses the southern portion of the site.

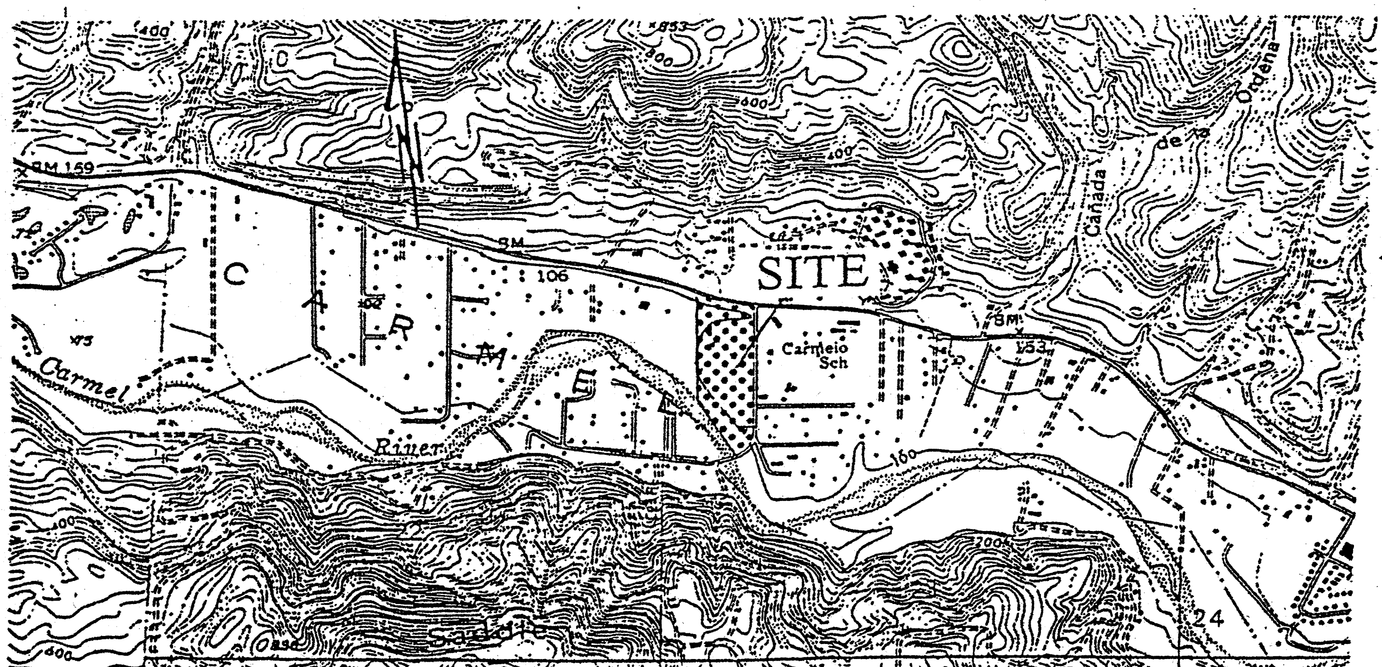
The majority of the property is presently undeveloped being used for agricultural purposes. However several structures exist on the property. The terrain is covered with wild grass, shrubs, and willow growth towards the river.

The Assessors's Parcel Number for the property is 169-181-43 and the subdivision will be referred to in this report as the Mills College Minor Subdivision. The existing parcel is of 20.02 acres, is to be divided in six pieces. Four will be Parcels A, B, C, and D of 4.4, 2.5, 2.5, 4.4 acres respectively. A Remainder Parcel will be of 10.0 acres. This parcel will be utilized primarily for agricultural purposes for the present time. The sixth piece, 2.2 acres, will be conveyed to APN 169-181-45, property to the west.

Existing zoning is designated as LDR 2.5 acre minimum by the Monterey County General Plan, Title 21. Generally, this is low density residential use on parcels of a minimum of 2.5 acres.



Vicinity Map



Location Map

GRICE ENGINEERING INC.
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Vicinity and Location Map
Mills College Subdivision - File 2835-94.03

Limits and Methods of Study

Subdivision ordinances of Monterey County require that proposed subdivisions be studied and evaluated for both the impact of the proposed development on the underlying aquifers relative to groundwater consumption and the potential net nitrate increase added to the aquifer recharge water by the additional septic disposal system(s), crop irrigation, or industrial effluent(s) should the subdivision be approved.

For the purpose of this report, the subject area of study is limited as directed by the Monterey County Health Department. For the water balance and nitrate loading study the area used is that of the site.

To estimate the net nitrate increase, this report follows methodology established by Anderson-Nichols in their 1981 report titled "North Monterey County Moratorium Area Groundwater Study". All other recommendations and methodologies were provided by the Monterey County Health Department-Environmental Health Division (MCHD-EHD) and Monterey County Flood Control & Water Conservation District (MCFC&WCD). Land use effluent nitrate levels were obtained from the report prepared by H. Esmaili and Associates, "Nonpoint Sources of Groundwater Pollution in Santa Cruz and Monterey Counties, California" (October 1978). Hydrology and geology information was obtained from the various references which are noted as each section is discussed.

Geology and Hydrology

Examination of geological and hydrologic basin studies of the Monterey Peninsula and Carmel Valley provide information pertaining to the vicinity of the project area.

Site Geology

Situated in the northern Santa Lucia Range, the Carmel Valley contains sedimentary, metamorphic and igneous rocks.

The oldest series is igneous granitic rocks of Mesozoic time. Depth to this complex are shallowest in the southwestern portion of the valley[1]. Situated above this are younger rock of consolidated sediments of the Middle Miocene.

Following the consolidated sediments are alluvial deposits considered to be placed during the Holocene Period (recently)[2] as erosion of the Carmel Valley slows. The depth of this alluvial deposit at this site is 60 feet in the north and dips to 120 feet in the south under the present river channel[3].

Hydrology

The general form of the Carmel Valley is moderate to steep walled, west tending valley, emptying into the Pacific Ocean. The valley was formed by erosion during periods of uplift and faulting. However, in recent times the erosion has turned to deposition of sands and gravels in the valley, which contains the area aquifer.

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[1]Reference 15

[2]Reference 13, 6.

[3]Reference 15.

Depth of the alluvial deposits and hence the aquifer is estimated at 200 plus feet at the valley mouth and gradually reduces to approximately 20 to 50 feet at Carmel Valley Village[4].

Recharge of the aquifer is principally by stream flow, with rates as high as 100 cubic feet per second, and the total storage is in the range of 50,000 acre-feet per year[5].

Water Use Parameters

The following assumptions applied to this hydrology-water balance and nitrate loading study for the Mills College Minor Subdivision:

1. The population of each residence is assumed to be 3.17 persons.

2. Daily water use is assumed to be 125 gallons per person.

3. The average daily domestic water usage of 396 gallons per day per residence is considered equally divided between the septic system and landscape irrigation. Domestic septic effluent return flow has a nitrogen strength of 40 mg/l. Domestic irrigation return flow has a nitrogen strength of 4.0 mg/l, the level of the well water in the area according to CAL-AM.

4. Return water flow to the aquifer is assumed to be the following:

   a. Residential septic effluent = 80 %
   b. Residential irrigation water = 20 %
   c. Commercial-industrial water use = 35 %
   d. Agricultural irrigation water = 20 %

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[4]Reference 16.

[5]Reference 15, page 13.

5. The water balance is the result of annual recharge minus the gross water consumption for residential, commercial-industrial, and agricultural uses, plus the return flow from these uses.

Groundwater exported from or imported to the subarea is not incorporated in the study of the impact of the proposed development on the aquifer or the nitrate loading study.

7. No consideration was given to underflow in the aquifers or of stream flow of Carmel River.

8. The basin of the study area is considered to be that of the project site.

LAND USE, POPULATION ESTIMATES, and WATER BALANCE

Determination of Land Use

Present land use patterns were established by estimating the existing human population, agricultural utilization, and commercial-industrial facilities. Present land use estimates were derived by examination of topographical maps, aerial photographs, and site visits. These figures will be used in the determination of the existing water demand and nitrogen loading of the Study Area.

The Study Basin occupies land designated as Low Density Residential with a minimum parcel area of 2.5 acres. Although various uses are allowed for this zoning district, for the purpose of this report it is assumed that at buildout the land will be divided into 2.5 acre parcels and that the parcels will be used for rural residential activities with one residential home built on each of the parcels.

To determine the Partial Builtout Land Use it was assumed that all the land in the Study Basin, except for that area of the Remainder Parcel, was divided into 2.5 acre parcels with one residential unit per parcel. As Parcels A and D are of 4.4 acres each, they were considered builtout as two 2.5 acres parcels cannot be derived from them.

Page 17, Appendix A, contains measurements of each type of land use and the calculations performed to derive the necessary estimates for the water balance and nitrate loading study.

Determination of Human Population

Calculations for the determination of the human population in the subarea followed the recommendations of the Monterey County - Department of Health.

To determine the human population, 3.17 people were assumed to reside in each of the residences as determined in the Existing, Partial Builtout, and Complete Builtout measurements and calculations.

In addition, mobile homes are counted as single family units, multiple unit residences and labor camps are also included in the existing population estimates when applicable. Also, the units of non-water dependant, light industrial were counted as residential for the purpose of this report.

Agricultural Estimates and Demand

The available maps and literature were examined concerning the presence of agriculture in the Study Area. Results indicated the amount of each type of agricultural activity and coverage, confirm residential density, and non-irrigated areas (yards, roads, open space).

Although row crop operations exist in the study area, no practices utilizing greenhouses was observed.

Commercial-Industrial Water Demand

No industrial activity, other than row crop agriculture, was noted in the study area.

Water Balance

The table on page 18, Appendix A, details the calculated Existing, Partial Builtout, and Complete Builtout Water Demand. The table on page 19 compares the calculated aquifer recharge as affected by the previous three stages of demand.

The existing land use places a demand of 36.56 acre-feet/year on the existing aquifer. As the study area is builtout as determined in the calculations, the demand for groundwater will be decreased to 3.99 acre-feet/year.

Presently, within the study area, the aquifer is in an overdraft of 30.55 acre-feet/year. At complete builtout the balance of inflow-outflow would change and the aquifer would be recharged at a rate of 2.02 acre-feet/year.

SEPTIC and IRRIGATION EFFLUENT TRANSMISSION

Quality

The nitrogen content of septic tank effluent is extremely variable and the working assumptions of planners varies accordingly.

Walker[6] estimated 33 kg of nitrogen are added to the groundwater per year by an average family of four. Assuming this amount is delivered by 300 gpd of effluent, the corresponding effluent nitrogen concentration would be 80 mg/l.

Sacramento County Health Department analyzed effluent in 6 residential septic tanks and found total nitrogen concentration ranged from 27 to 100 mg/l and averaged 56 mg/l (personal communication, June 1988); for planning purposes they assumed an average effluent concentration of 45 mg/l of nitrogen and a volume of 300 gpd for a family of 3. This is equivalent to 18.6 kg of nitrogen per year for 3 persons.

Guidelines issued by the Monterey County Health Department state that planners should use 40 mg/l as the nitrogen concentration of effluent. With a septic effluent return flow to the underlying aquifer of 50 gpd per person, this is equivalent to 8.8 kg of nitrogen per year for a family of 3.17 persons.

Domestic septic tank effluent typically contains no nitrate-nitrogen at all; the nitrogen it contains is 60 percent free ammonia and 40 percent organic nitrogen. Conversion of these forms of nitrogen to the nitrate form may occur after the effluent leaves the tank. Broadbent and Reisenauer[7] described nitrogen transformations in the context of the percolation of waste water through soil. Reduction of organic nitrogen to free ammonia is particularly rapid in the soil so the effluent nitrogen may as well be considered as all free ammonia.

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[6] Referance 20

[7] Referance 4

Another nitrogen transformation which is important in this context is nitrification, the conversion of ammonia nitrogen to nitrate-nitrogen by soil bacteria. Broadbent and Reisenauer conclude "In soils where waste water is applied regularly, nitrification is normally rapid unless temperatures are very low. Thus the ammonium in waste water containing 50 mg ammonia nitrogen per liter would be nitrified within a week at most."

Denitrification, conversion of nitrate nitrogen to N_2O and N_2, may also occur in effluent disposal systems. Both of these products are gaseous and escape to the atmosphere. The conditions which promote denitrification are characteristic of poorly drained, water logged soils. It is not expected to be a major factor at the proposed site. Coarse-textured, well-drained soils of low organic matter content have a low potential for denitrification (Broadbent and Reisenauer). The study area soils are such a medium; denitrification will not occur within it.

For estimating the effect of an additional septic disposal system on the nitrate content of the underlying aquifer, it is assumed that the concentration of nitrogen in the effluent percolating downward from the on-site septic disposal systems will be 40 mg/l, all of this nitrogen will be in the form of nitrate, and there will be no losses to denitrification. These assumptions are conservative from the standpoint of environmental protection.

In summary, septic tank effluent is assumed to contain 40 mg/l of nitrogen and all of this nitrogen is assumed to be converted to 176 mg/l of nitrate.

Microbiological Treatment

As septic tank effluent descends through the vadose zone to the groundwater below, some beneficial changes take place. The medium through which the effluent passes is a filter which removes micro-organisms. The effectiveness of this microbiological treatment action is described by a logarithmic decay law: each increment of filter length removes a constant proportion of the organisms flowing through it. The first interval removes 90%, the next 9%, the next 0.9%, etc. The practical implication of this mode of action is that there is negligible benefit from extending the filter beyond a certain length.

Effectiveness of filtration depends on soil type and hydraulic loading[8] and it is hard to generalize about, but 30 feet of fine, silty sand would probably provide adequate microbiological filtration of septic tank effluent in most cases. Certainly most county health departments would approve leach lines to be placed in such material 30 feet above the water table provided there were none but microbiological considerations to accommodate. Increasing the filter length to 60 feet would remove almost nothing extra; increasing it further to 90 feet would be of no particular value.

Nitrate

In contrast to microbiological filtration, the distance nitrate travels to the aquifer is irrelevant. Nitrate is a conservative solute in groundwater and in soil-pore water everywhere below the root zone. Dissolved nitrate released below the root zone may be diluted by mixture with water from other sources but it will not be changed into another form nor will it be adsorbed onto earth materials through which it passes. The effect of percolating effluent on the nitrate content of an aquifer depends only on the volume of effluent and its nitrate concentration, not on the distance of percolation. The effect on the aquifer is the same if the effluent is released in the capillary fringe of the aquifer or if it's released 200 feet above it.

This is not to say that there is never anything to choose from in selecting an effluent disposal method for on-site systems. On level, slowly draining soil, shallow leach lines will result in significant denitrification and some uptake of nitrate by vegetation growing along the leach lines:

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[8]Referance 9

Nitrate Accumulation

The parameters needed to calculate the concentration of nitrate-nitrogen beneath the study area if the subdivision is allowed are:

1. Septic system effluent is assumed to have a nitrate-nitrogen concentration of 40 mg/l with no denitrification occurring as the effluent passes through the root zone (mchd).

2. Annual rainfall recharge water is assumed to have a nitrate-nitrogen concentration of 1.5 mg/l(mchd).

3. Domestic irrigation water is assumed to have a nitrate-nitrogen concentration of 4.0 mg/l, the average quality of the water in the Carmel Valley Aquifers as supplied by Cal-Am.

NITROGEN BALANCE

The nitrogen balance is derived using an open system model combining the volume and respective nitrate-nitrogen concentration contributed by; waste water effluent from residential septic tanks, municipal and commercial-industrial wastes, agricultural and lawn fertilization, and nitrogenized recharge from precipitation and dividing the total by the annual recharge volume from the percolation of precipitation and effluent within the study area. The supporting calculations are on page 20, Appendix A.

The nitrate balance calculations determined that the present percolating water should contain 23.82 mg/liter of nitrate-nitrogen. Further analysis shows that this concentration will decrease to 18.31 mg/liter at partial buildout and to 9.31 mg/liter at complete buildout.

SUMMARY AND CONCLUSIONS

The Mills College Minor Subdivision, if approved, will subdivide the existing parcel of record into six pieces. The existing parcel is of 20.02 acres, is to be divided in six pieces. Four will be Parcels A, B, C, and D of 4.4, 2.5, 2.5, 4.4 acres respectively and will be offered for sale as residential parcels. A Remainder Parcel will be of 10.0 acres. This parcel will be utilized primarily for agricultural purposes for the present time. The sixth piece, 2.2 acres, will be conveyed to APN 169-181-45, property to the west. As the property to the west is a school, this land will most likely become a parking lot or playfield.

The addition of the Mills College Minor Subdivision will decrease the estimated groundwater demand within the Study Area from 36.56 ac-ft/yr to 3.99 ac-ft/yr.

If permission to subdivide is granted there will be a decrease in the long term equilibrium concentration of nitrate-nitrogen (NO_3-N) from 23.82 mg/l to 9.31 mg/l, representing a decrease of 0.61% in nitrate-nitrogen entering the groundwater in Study Area, as compared to the State of California Maximum Contaminant Level of 45 mg/l.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report are based on our understanding of the project as represented by the plans and the assumption that the soil conditions do not deviate from those represented in this site soils investigation. Therefore should any variations or undesirable conditions be encountered during construction, or if the actual project will differ from that planned at this time, GRICE ENGINEERING INC. should be notified and provided the opportunity to make addendum recommendations if required.

NOTIFY:	GRICE ENGINEERING INC.	Salinas (408) 422-9619
	561A Brunken Avenue	Monterey (408) 375-1189
	Salinas, California 93901	FAX (408) 422-1896

This report is issued with admonishment to the Owner and to his representative(s), that the information contained herein should be made available to the responsible project personnel including the architects, engineers and contractors for the project. The recommendations contained herein should be incorporated into the plans, the specifications and the final work.

It is requested that GRICE ENGINEERING INC. be retained to review the project grading and foundation plans to ensure compliance with these recommendations. Further it is the position of GRICE ENGINEERING INC. that work performed without our knowledge and supervision or the direction and supervision of a project responsible professional soils engineer renders this report invalid.

It is our opinion the findings of this report are valid as of the present date, however, changes in the conditions of a property can occur with the passage of time, due either to natural processes or to the works of man as may effect this property. In addition, changes in standards may occur as a result of legislation or the broadening of knowledge and these changes may require re-evaluation of the conditions stated herein. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

REVISED 10-25-1991

APPENDIX A

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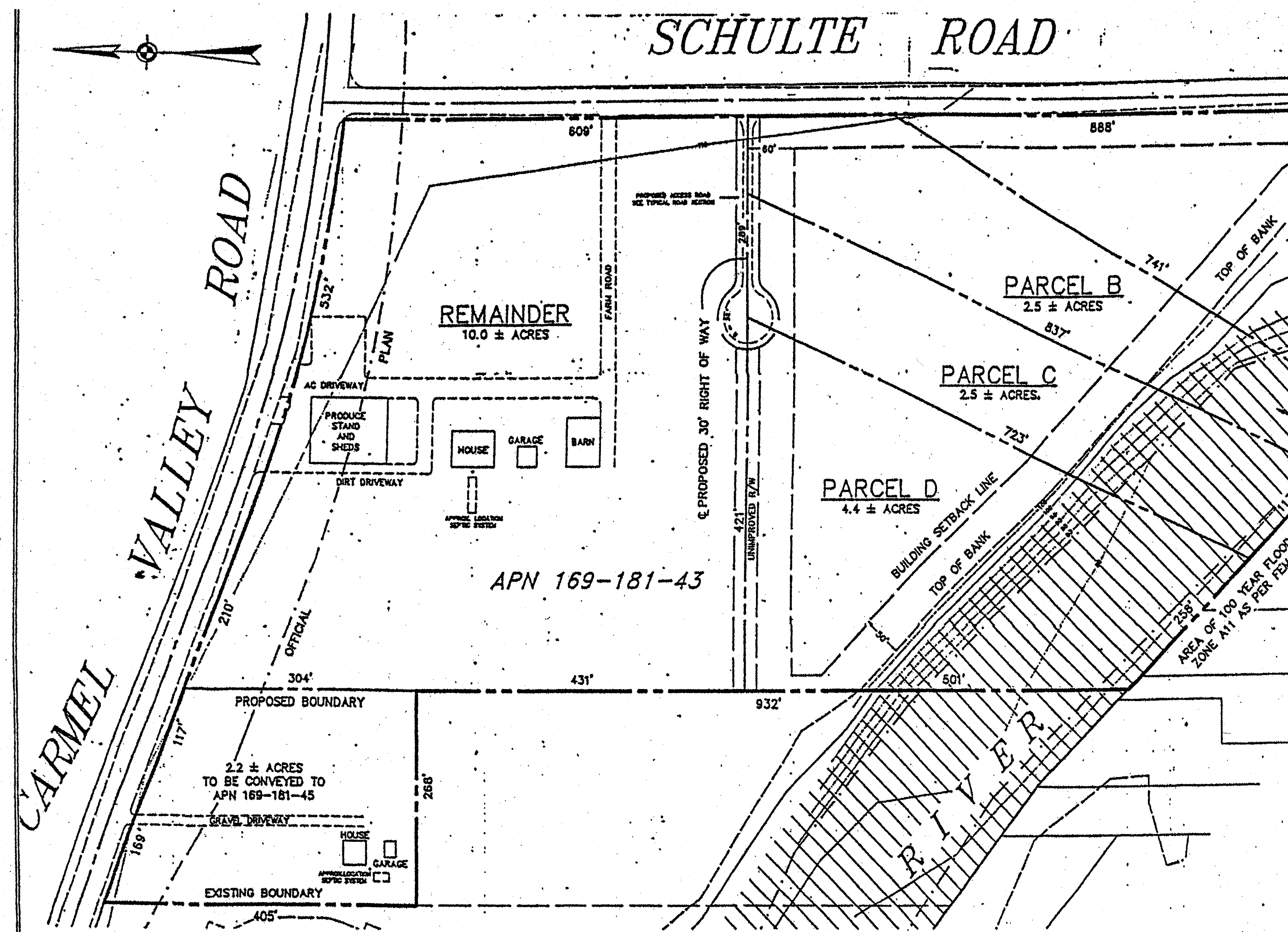

NOTES

1. SUBDIVIDER/ OPTIONEE:	MICHAEL R. BERUBE P. O. BOX 223339 CARMEL, CA 93922 408-624-1800		
2. OWNERS:	APN 169-181-43	SCOTT RAMSDEN/MILLS COLLEGE P. O. BOX 63002 SAN FRANCISCO, CA	
	APN 169-181-45	ALL SAINTS' PARISH CARMEL P. O. BOX 1296 CARMEL, CA	
3. EXISTING ZONING:	APN 169-181-43 APN 169-181-45	LDR 2.5 AC. POP-D-S	
PROPOSED ZONING	APN 169-181-43 APN 169-181-45	LDR 2.5 AC. POP-D-S	
3. EXISTING USE:	APN 169-181-43 APN 169-181-45	RESIDENTIAL/AGRICULTURAL DAY SCHOOL	
PROPOSED USE:	APN 169-181-43 APN 169-181-45	RESIDENTIAL/AGRICULTURAL DAY SCHOOL	
5. EXISTING AREAS	APN 169-181-43 APN 169-181-45	26.02 ± ACRES 10.56 ± ACRES	
PROPOSED AREAS	APN 169-181-43		
	PARCEL A PARCEL B PARCEL C PARCEL D REMAINDER	4.4 ± ACRES 2.5 ACRES 2.5 ACRES 4.4 ACRES 10.0 ACRES	
	TOTAL	23.8 ± ACRES	
	APN 169-181-45	12.75 ± ACRES	

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Mills College Minor Subdivision
File No. 2835-94.03

Parcel Map

000202RL

TOTAL STUDY AREA

Area of Study	26.00 acres	measured

EXISTING LAND COVERAGE

Existing Area in Estuary	3.69 acres	measured
Existing Area in Yards	6.44 acres	measured
EXISTING NONIRRIGATED AREA	10.13 acres	calculated
EXISITNG IRRIGATED AREA	15.87 acres	measured
EXISITNG RESIDENTIAL UNITS	3.00	counted
Exisiting Residential Units	3.00 units	from above
Persons Per Residential Unit	3.17	from MCEH
EXISTING HUMAN DENSITY	9.51	persons, calculated

PROPOSED FUTURE LAND COVERAGE

and uses that would not require special review on subject subdivision

		Size	
Proposed Parcels	1	10.00	Remainder
	2	4.40	Parcel A
	3	2.50	Parcel B
	4	2.50	Parcel C
	5	4.40	Parcel D
	6	2.20	(Parcel w/ 1 existing house, to be conveyed out)
Total		26.00	

Allowed Minimum Parcel Size	2.50 acres	Title 21	
PARTIAL BUILDOUT PARCELS	6 parcels	counted	
TOTAL BUILDOUT PARCELS	9 parcels	calculated	(rounded down)
Allowed Houses per Parcel	1.00	Title 21	
PARTIAL BUILDOUT HOUSES	6 houses	calculated	
TOTAL BUILDOUT HOUSES	9 houses	calculated	
PARTIAL BUILDOUT AG. LAND	7.77 acres	measured	
TOTAL BUILDOUT AG. LAND	0.00 acres	measured	
Partial Buildout Houses	6 houses	from above	
Total Buildout Houses	9 houses	from above	
Persons Per Residential Unit	3:17	from MCEH	
PARTIAL BUILDOUT POPULATION	19 persons	calculated	
TOTAL BUILDOUT POPULATION	29 persons	calculated	

CALCULATED WATER DEMAND FOR Cloninger Subdivision, W.O. 2635–94.03

	EXISTING TOTAL	BUILTOUT PARTIAL TOTAL	BUILTOUT COMPLETE TOTAL	
	3 DU	6 DU	9 DU	
Number of People	9.51	19.02	28.53	total people
Water Usage per Person	125.00	125.00	125.00	gallons /person /day
Total Annual Water Consumption	433,894	867,788	1,301,681	gallons /year
Area of Agricultural Activity	15.87	7.77	0.00	acres
Water Usage per Acre	723,498	723,498	723,498	gallons/acre/year
Total Agrcultural Water Usage	11,481,149	5,619,891	0	gallons/year
Total Water Consumption	11,915,043	6,487,679	1,301,681	gallons /year
	36.56	19.91	3.99	acre–feet /year

28.53 % 3.17 =
9 units
each w/ 3.17 people
.444 AF / unit
125 x 3.17 x 365 ÷ 325,851 = .444

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CALCULATED NITROGEN BALANCE IN SYSTEM, Mills College Subdivision, W.O. 2835-94.03

	EXISTING			PARTIAL BUILTOUT			COMPLETE BUILTOUT		
	Row Crops	Residential		Row Crops	Residential		Row Crops	Residential	
Total Annual Water Usage									
gallons/year	11,481,149	433,894		5,619,891	867,788		0	1,301,681	
Water Utilization									
Effluent, percent	0	50		0	50		0	50	
Irrigation, percent	100	50		100	50		100	50	
Return Flow									
Effluent, percent	80	80		80	80		80	80	
Irrigation, percent	20	20		20	20		20	20	
Nitrate-Nitrogen Source and Rate	inflow gallons/year	nitrogen mg/l	contribution pounds/year	inflow gallons/year	nitrogen mg/l	contribution pounds/year	inflow gallons/year	nitrogen mg/l	contribution pounds/year
Row Crops									
Effluent	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Irrigation	2,296,230	42.00	804.89	1,123,978	42.00	393.99	0	42.00	0.00
Residential									
Effluent	173,558	40.00	57.94	347,115	40.00	115.88	520,673	40.00	173.82
Irrigation	43,389	4.00	1.45	86,779	4.00	2.90	130,168	4.00	4.35
Stormwater									
Percolation	1,959,415	1.50	24.53	1,959,415	1.50	24.53	1,959,415	1.50	24.53
Total	4,472,591			3,517,286			2,610,255		
Total of Nitrate-Nitrogen Added to Aquifer Yearly		pounds	888.81		pounds	537.29		pounds	202.69
Estimated Concentration in Percolating Water		mg/l	23.82		mg/l	18.31		mg/l	9.31
Existing Nitrate-Nitrogene in Aquifer		mg/l	4.00		mg/l	4.00		mg/l	4.00

REFERENCES

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