Green Valley Study

Sonoma County Community &
Environmental Services

March 1978

TABLE OF CONTENTS

PREFACE

The Green Valley Study, similar to previous area studies in western Sonoma County, is performed as an "enhancement" of the now pending County General Plan. The County-wide General Plan, being large in scope, cannot effectively deal with small (sometimes unique) individual communities such as Green Valley. However, a specific land use plan can elaborate and magnify the General Plan's recommendations and apply them together with community input into a cohesive planning guide.

The residents and property owners of the Green Valley area initiated this study through their requests and petitions to the Board of Supervisors. Their input by way of community meetings contributed substantially to the outcome of the study and the recommendations presented.

INTRODUCTION

The Green Valley Study is perhaps one of the longest running land use studies ever conducted by the current Planning Division of the County Planning Department. The study originally commenced in October of 1974 at the request of the Green Valley Community Club and a petition signed by many property owners in the area. The Board of Supervisors created the "S" Study District and approved a zoning of S-A-B5 (Study-Agricultural Base Zone - 2 acre minimum lot size). Just two months later in December of 1974, again in response to a petition from area residents and request by the Green Valley Community Club, the Board attached a "J" Mobile Home Exclusion district to the S-A-B5 zoning for the study district. In February of 1975 the study district was extended. In addition, in the course of the public hearings, area residents requested that the minimum lot size be increased, thereby causing the Board of Supervisors to initiate a 5-acre minimum lot size. The study district and the 5-acre minimum were in effect until October of 1976 when the "S" district lapsed. It since has reverted back to the original zoning of A-I (primary agricultural) zone.

Green Valley is a serene, rural country setting, which has in the past been a community of first and second generation orchard farmers. However, due to its natural beauty, ruralness and yet accessibility to urban communities, Green Valley, like similar areas of western Sonoma County, has become a "desirable place to live". In the last six years more change has taken place in the Green Valley area than ever before in its history. Although this change is not unique to Green Valley alone but to all the western Sebastopol area, it has brought about a need and desire from each community for study and controlled planning. Planning which would check uncontrolled speculative lot splitting and land development and retain the existing life style.

Significant problems in the Green Valley area include the impact of future development on the area's water supply. All water is presently supplied by wells. As increasing development has occured over the last few years so has the impact upon the area's wells. There are, in fact, some areas of the study which must truck-in water during summer months, and with the added condition this year of a drought situation, some wells have reportedly gone dry.

Accompanying the concerns of water, area residents have also become increasingly concerned about the area's ability to further accommodate development on septic systems. Due to geology and soils composition in Green Valley it has been noted that many locations in the area have not passed percolation tests. The areas which seem not to have problems (passing perc tests) are unfortunately agricultural areas which brings up a third concern stressed by many Green Valley residents; the consequences of lot-splitting and subsequent development by in large removing productive agricultural lands from production and in addition creating land uses not compatible with agricultural uses.

The study uses the desires and goals of the community coupled with existing development patterns and "carrying capacity" of the land to achieve a specific land-use plan, a plan which will act as a future planning, zoning and policy direction guide for future development of the Green Valley Area.

BOUNDARIES AND REGIONAL CHARACTERISTICS

The Green Valley Study boundaries encompass approximately 1300 acres; nearly two square miles. The study boundaries are formed primarily by the Green Valley Creek on the east and on the south by the Harrison Grade Area study butting up to the southwest corner and the Forestville (Pocket Canyon) Area study butting the northern boundary.

Roads in the study area include Green Valley Road, Thomas Road, Maddocks Road part of Bones Road, El Molino Lane and Green Valley School Road. These roads total over six road miles.

Located in western Sonoma County, Green Valley lies approximately six miles northeast of Sebastopol.

Topographically the area is characterized by gently rolling agricultural areas surrounded on three sides by steep wooded slopes and a series of ridges and valleys. The vegetative cover is diverse consisting of open brush and oak grasslands, cultivated areas and concentrations of redwood and mixed broadleaf-conifer forest.

Climatically, the area being a part of the Coastal Range, Green Valley experiences relatively cool seasonal temperatures. The mean temperature year-round is 56 degrees. Seasonal rainfall averages approximately 50+ inches per year with relative humidity averaging between 65% and 70%.

CITIZEN INPUT

Since the Green Valley Study was initiated at the request of concerned citizens from the area it was only natural that the citizens themselves have as much input into the study as was possible. To obtain maximum citizen input, many community meetings were held whereby all property owners were notified by mail. An attitudinal questionnaire was mailed out soliciting responses on key issues pertaining to the planning of the area, and it was the citizens themselves who jointly agreed upon a set of desired goals to achieve in any conclusions of the study.

Citizen participants seemed to have "grave concerns" as to the rapid changes which have been taking place throughout the Green Valley area. They stressed their strong disfavor of seeing increasing activity of lot-splitting, of mobile home trailers, and, in general, the decline of productive apple orchards. Of special concern was the availability of groundwater, and how an increasing demand of this precious commodity would affect the entire area.

Due to the seriousness of this question alone and the acknowledgement of existing water scarcity to some parts of the area, a groundwater geologist was hired by the County to assist in the study and conduct an investigation into potentials of groundwater, relating to development of the Green Valley Area.

Relative to these issues, community consensus indicated a preference for a land use zoning plan which was based primarily upon the natural limiting factors of the environment; its "carrying capacity" for development. Also stressed as an important consideration in any "arrived at" plan was their desire to remain a rural community with rural standards.

The attitudinal questionnaire was mailed out early in the study process in an effort to gain insight into the problems affecting the area and also to establish a concensus of opinion as to the goals of the study. Of the 126 questionnaires mailed out approximately 54 were returned. This return indicated a 43% response and although not as high as desired did adequately reflect a valid consensus of opinion. (A return of 30% is considered statistically acceptable and most area studies exhibit a 40% return percentage). Some attitudes the questionnaires did indicate were:

- Present growth in Green Valley is occuring at a rate too fast to be adequately planned.

- Any new growth in Green Valley should be planned so as to preserve the rural character.

  Lot splitting should be slowed by:

  1. Increasing minimum lot sizes
  2. By establishing septic and water standards

- Viable agricultural production is a matter of serious concern

- Mobile homes should not be permitted as permanent homes in the area

GOALS AND POLICIES

The Goals and Policies stated herein are derived from a blending of the community's desires and the County overall policies reflecting implementation of objectives.

Goal: It shall be the goal of the study to maintain the destinction and rural quality of living environment in the Green Valley Area.

Objective: Potential development should be designed so as to maintain the rural state and integrity of the present community and based upon the natural support capacity of the land.

Goal: Agriculture shall be protected and permitted to prosper.

Objective: To encourage the continued productivity of existing and potential agricultural lands through the use of zoning controls. Also to request incentives and support from local and state governmental jurisdictions to further the agriculture viability.

Goal: Future development should relate and be limited to the natural carrying capacity of the land as defined by soil class, slope, geologic stability and water availability.

Objective: To retain the natural life support system of the land and retain the rural character inherent.

Policy:

1. The extent of the residential development shall preclude the introduction of urban or suburban type services such as expansive public water and/or sewer systems.

2. Development should occur in compact area when feasible to preserve greater agricultural land.

3. As a condition of lot split and/or subdivision approval, proof of water and percolation shall be provided prior to County approval.

4. The cutting or harvesting of timber shall be managed in such a way so as not to harm scenic areas, interfere with fish or wildlife habitats, degrade or impair watershed areas or infringe upon existing and potential living environments.

Goal: Scenic values throughout the Green Valley area should be protected including both natural and man-made features.

Objective: To preserve significant visual features for the prosperity of the area residents and the enjoyment of future residents and visitors.

Policy:

1. Areas along roadways with significant views should be protected through the use of building setback lines.

2. Roadways themselves throughout the Green Valley area are scenic due to their rural nature and should be preserved as country roads.

3. The placement of residential dwellings shall be at a minimum 200 feet setback from adjoining agricultural use.

4. Agricultural preserves shall be encouraged. Other forms of tax relief incentives should be explored as a priority concern for the preservance of agriculture.

PLAN SUMMARY

Green Valley is located on the northwest reaches of the Sebastopol planning area. Like many of the small communities or settlements formed here, Green Valley originated as an apple productive agricultural area. In the last few years a good deal of change and growth has taken place, bringing about a desire from the community residents for study and planning. Of particular concern to Green Valley residents was the amount of groundwater available in the area and the effect increased development would have upon water availability. Another concern, inter-related to water availability, was the conversion of agricultural lands into residential development.

As a part of the study process, a groundwater study was performed by a licensed independent geologist. The conclusion of that study indicated Green Valley truly is an area of limited groundwater resource. The Groundwater Study also recommended that in order for the area to sustain itself in terms of groundwater recharge, larger lot sizes should be implemented.

PROPOSED PLAN

The proposed land use and zoning plan for Green Valley is a composite made up from the

- goals and policies of the community
- the County General Plan recommendations
- the Groundwater Study
- existing development patterns
- data collected pertaining to physiographic and environmental conditions of Green Valley

Two primary considerations are the long range goals of the proposed plan.

- To perserve, encourage and protect agriculture and the natural features of the area.

- To accommodate rural residential development, without conflict to the agriculture resource based upon the area's natural support systems.

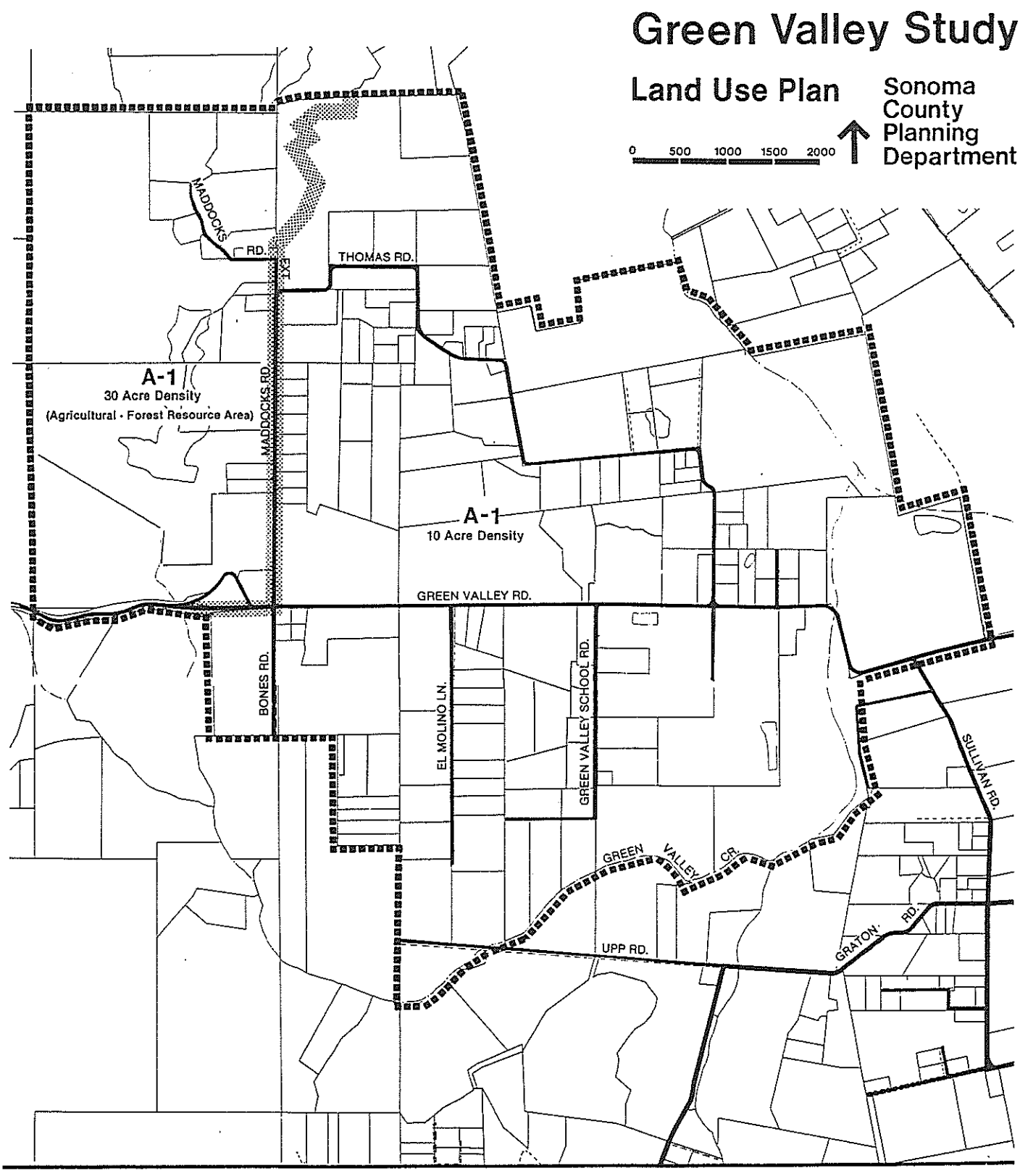
LAND USE

The land use plan is viewed as a mini-general plan delineating in a general manner the course of future development. Basically, the land forms of Green Valley are agricultural, interspersed with rural residential units.

Proposed land use represents a broad-brush approach to keeping lands east of Maddocks Road to an agricultural 10-acre minimum and lands west of Maddocks Road, agricultural in 30-acre minimums.

Due to the small size of the Green Valley study area, no new roads are envisioned and only minor improvements to existing roads. The plan does recognize the value of the protection of scenic corridors and the preservation of the Green Valley Marsh and riparian vegetation.

Study Area Boundary



Proposed Land Use

The difference between a Land Use Plan and a zoning plan can be slight or great, depending on the particular area and circumstances involved. Generally speaking, a Land Use Plan should act as a master plan whereas a zoning plan deals with existing uses and their compatibility with one another.

The Land Use Plan for the Green Valley area which follows, is derived from a consensus of goals and objectives of the local citizenry in coordination with existing development patterns, physical constraints and the commitment by local jurisdictions to preserve agriculture. The proposal is a "broad-brush" approach and can be defined as an effort to

- preserve, encourage and protect agricultural activity as the first priority.

- accommodate rural residential development without conflict to agriculture based upon the areas natural support systems.

The Map which follows depicts the proposed land use. Basically it separates the larger, more severe topographic areas west of Maddocks Road into 30-acre minimums, agriculture use, and the smaller, gentler sloping lands to the east of Maddocks Road into 10-acre minimums, agricultural use.

ZONING

The proposed zoning plan recognizes the desire to retain agricultural viability of Green Valley, yet uses comgining zone designations to allow flexibility.

The base zone recommended is "A" (Agriculture). Five combining zone categories are included for application to specified areas. They are:

A-E - Agriculture Exclusive (20-acre minimum)
A-B-5 - 5-acre minimum - Agriculture - 5-acre minimum
A-B-5 - 10-acre minimum - Agriculture - 10-acre minimum
A-B-5 - 30-acre density - 10 acre minimum
P.A. - 15-acre density - 3-5 acre minimum

The zoning map (page 10) reflects these designations upon the study area.

Also combined with the base agricultural zoning is the "J" district designation. This zoning district is provided at the request of the area residents who wish to prohibit permanent use of mobile homes (trailers) and thus preserve the aesthetic and economic integrity of the Green Valley area.

Setback Requirements

Agricultural Areas - In an effort to avoid conflict between residential units and agricultural uses, such as spraying of orchards, a 200 foot setback is recommended to separate agricultural activity from housing development.

Waterways - To preserve the riparian vegetation and prevent further erosion of the Green Valley Creek, a setback of 100 feet is recommended from the stream bed.

Visual Corridors - A building setback of 120 feet has been recommended along Green Valley Road in order to implement its designation as a scenic highway by the County General Plan. Also recommended as a visual corridor for scenic travel is Thomas Road and Maddocks Road. A setback of 20% of lot depth is recommended here.

Unique Biotic Area

Green Valley Creek Marsh is pointed out as being an area of extreme ecologic sensitivity. Hopefully, through identifying this habitat, efforts can be made to study and minimize impact upon this unique wetland.

■■■■■ Study Area Boundary

A-B-5 Primary Agricultural District Special Building Site Area Regulations

A-PA Primary Agricultural, Planned Area Combining District

AE Exclusive Agricultural District

SETBACKS

Agricultural Areas - 200 ft. setback from dwelling to intensive agricultural area.

Waterways - 100 ft. setback from centerline of creek.

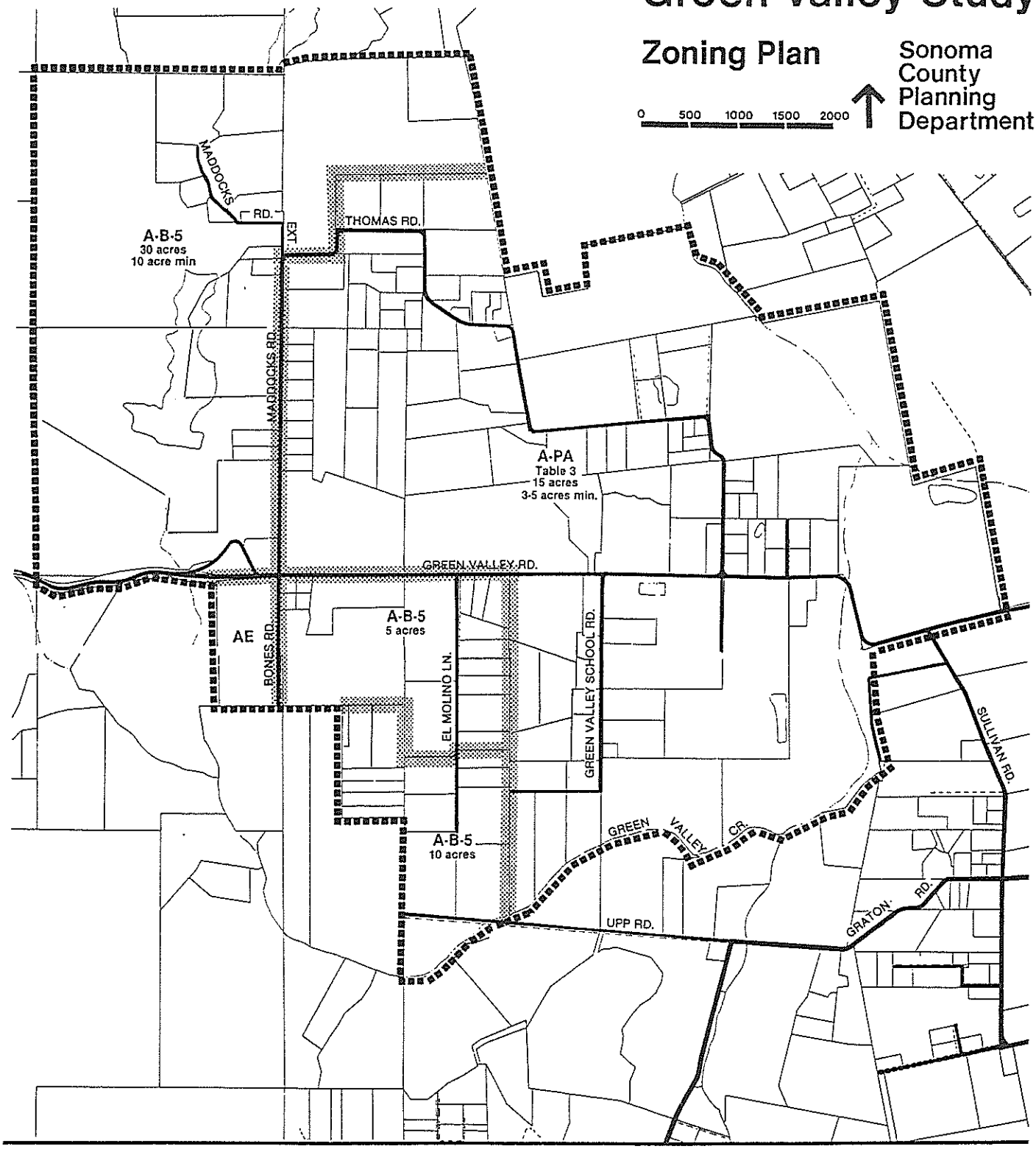
Visual Corridors - 120 ft. setback along Green Valley Road. 20% of lot depth recommended along Thomas and Maddocks Roads.

Green Valley Study

Zoning Plan

Sonoma County Planning Department

0 500 1000 1500 2000



Proposed Zoning Plan

The proposed zoning plan for Green Valley has been conceived with the following goals in mind:

- to retain and protect the agricultural base of Green Valley.
- to provide for planned and reasonable rural residential growth.
- to provide a tool or "indicator" where growth can locate in appreciation of water availability and septic conditions.

In preparing a plan, many factors were taken into consideration. Among those were:

- the goals and policies of the community
- The County General Plan recommendations
- the Groundwater Study
- the Harrison Grade and Forestville Area Plans
- collected physiographic and environmental data pertaining to Green Valley
- existing development patterns

Recommendations - The base zone for the study area is recommended as agricultural. However, due to particular land uses occuring in certain areas of the study, various combining zones are also recommended.

Agricultural Exclusive - The 20-acre parcel located at the southwest corner of Bones Road and Green Valley Road is proposed as A.E.(Agriculture Exclusive). This is the only parcel of land in the area taknng advantage of the "Ag Preserve" program.

A-B5 30-acre Density - Lands lying west of Maddocks Road to the south and north are proposed as A-B5 30-acre density, 10-acre minimum. This indicates agricultural zoning, 30-acre density. However for a person who has 60 acres the flexibility exists for the property owner to split his property one of two ways; in either two thirty acre parcels or into one 10-acre parcel and a residual of 50 acres for the other.

The majority of this land is underlain by Franciscan formation and thus water is scarce. In addition, the majority of slopes in excess of 20% steepness are found here.

A-B5 5-acre Minimum/A-B5 10-acre Minimum - These two categories are found in the southwestern portion of the study. They are located south of Green Valley Road and along or to the west of El Molino Lane.

This area has experienced much of the new growth occuring in Green Valley. The separation between the area recommended for 5-acre density as compared to the 10-acre density, generally follows the underground geologic formation; the 5-acre area representing where water is available and the 10-acre where it has been concluded that water is not available.

A-P.A. Zone, Table 3 - The remaining land, which comprises land along Green Valley School Road, land north of Green Valley Road, and land along Thomas Road east of Maddocks Road, is proposed as Agriculture - Planned Area Zone, Table 3. (Table 3 follows below). The basic criteria for this zoning follows the desire to retain agriculture yet to allow some property parcelization to occur.

The majority of the property in this zoning category contains producing apple orchards. Other large parcels are planted in vineyards, used for cattle grazing, or lie within the flood plani area of Green Valley Creek. A few smaller parcels exist along the roadways (the majority of which were created many years ago). Due to the limitations of water availability and septic conditions the small parcels are of inadequate size to be self-supporting and if perpetuated would have adverse results.

In order to preserve agriculture and promote new agricultural uses, a minimum lot size of ten acres is needed. According to the Ag Commissioner's Office and knowledgeable persons, ten acres is the smallest unit viable to sustain an economically productive agricultural use.

"PA" TABLE 3

PLANNED AREA COMBINING DISTRICT

Base Parcel Size of Record (acres)	0 - 14.9	15 - 29.9	30 - 44.9	45 - 59.9	60- 74.9	75 - 89.9	90 - 104.9
Maximum Permitted Residential Development Area	1	2	4	6	4	10	12
Maximum Number of New Parcels Permitted	0	1	2	3	4	5	6

Application of "PA" Zone

Item 1. Base parcel size of record shall be that as shown on the adopted Zoning Map of the Forestville Plan.

Item 2. The residential development area (exclusive of the residual) permitted by the adopted "PA" table shall not exceed a denisty of 3 acres per dwelling unit. In all cases, the residual parcel shall be rezoned to a "B-5" designation as a condition of subdivision approval.

Item 3. New parcels permitted in addition to the residual not less than 20 acres in size, shall also be permitted provided, however, that any such additional parcel not less than 20 acres in size shall be rezoned to a "B-5" designation or similarly restricted as a condition of subdivision approval.

Item 4. All land divisions within the adopted "PA" Zone shall conform to the Adopted Open Space Plan for that area.

The proposed zoning basically holds a 15-acre lot minimum. However, a person who owns a piece of property between 15 acres and 29.9 acres would be allowed to split his land into two parcels, one parcel could be between 3 and 5 acres in size, the remaining parcel would contain the residual, but would never be smaller than ten acres. The purpose of allowing the smaller lot, ranging from 3 to 5 acres in size is primarily to preserve the majority of the land in large productive use, yet allowing the property owner the right to create an additional parcel for residential use.

An additional zoning designation is added to each category, that being "J" District or mobile home exclusion district. This added regulatory zoning designation stems from the desire of the majority of community residents not to allow permanent placement of mobile homes in Green Valley. It was the consensus of opinion that to preserve the aesthetic and economic integrity of the area mobile homes should not be allowed as permanent residential structures.

Zoning Impact

Contained in the following tables is a comparison of the potential impacts from existing zoning and the proposed zoning plan. Keeping in mind that the estimates used are based on current trends and data available and that each reflects an ultimate built-out capacity. It is not likely that such an ulitmate build-out would occur, so the end figures are extreme maximums, but for the purpose of evaluation it is reasonable to use the comparison.

TABLE I

EXISTING DENSITY IMPACTS

Number of Ex. Parcels	Number of Ex dwell un.	Existing Population	Existing School Enr.	Existing Auto Trips	Water Usage	Sewage Disposal
156	118	304	65	1062	45,600	15,200

TABLE II

ADDED POTENTIAL DENSITY IMPACTS UNDER EXISTING ZONING

Parcel Size	Added Parcels 1 du/parcel	Population	School Enroll.	Auto Trips	Water Usage	Sewage Disposal
2 Ac	360 478	928 1233	198 262	3280 4302	139200 184800	46400 61600
5 Ac	144 262	371 675	79 144	1296 2358	55650 101250	18550 33750
10 Ac	72 190	185 489	39 104	648 1710	27750 73350	9250 24450

TABLE III

PROPOSED ZONING PLAN IMPACTS

Parcel Size	Added No. of Parcels	Added Population	Added School Enr.	Added Auto Trips	Added Water Usage	Added Sewage Disp.
5 Ac	6	87	47	306	13,050	4,350
10 Ac	0					
PA Zon.	23					
30 Ac	5					
TOTAL	34					
CUMULATIVE TOTAL	152	391	112	1368	58,650	19,550

Household Size = 2.58 persons per household (1970 Census Tract 1537)
School Enrollment = .55 children/household, average school district
Auto Trips = 9 average weekday trips per dwelling
Water Usage = 150 gallons per day per person (Sonoma County Health Dept.)
Sewage Disposal = 50 gallons per day per person (Sonoma County Health Dept.)

OPEN SPACE

One of the requirements of a specific plan, according to state law, is that an Open Space Plan be included as an element of the plan. Open space plans, according to law, should contain specifics as contained in

1. Preservation of Natural Resources

2. Managed Production of Natural Resources

3. Outdoor Recreation

4. Public Safety

In addition to the State law requirements for open space, citizens within the Green Valley community also identified a need to retain open space through their goals and policies. Although the two concepts (the community's idea and the State law requirement of open space) are somewhat different, they both are legitimate forms of open space and can be interrelated.

Open space has many different meanings to different people. Unlike what most people think, it is not always an area where nothing is allowed. Open space can be a sense of feeling. If houses are built close enough to be within view of one another, yet far enough apart that residents cannot yell to be heard from the other, then this can be a form of open space. Open space should have a functional part of its being, whether it be visual, protective or productive.

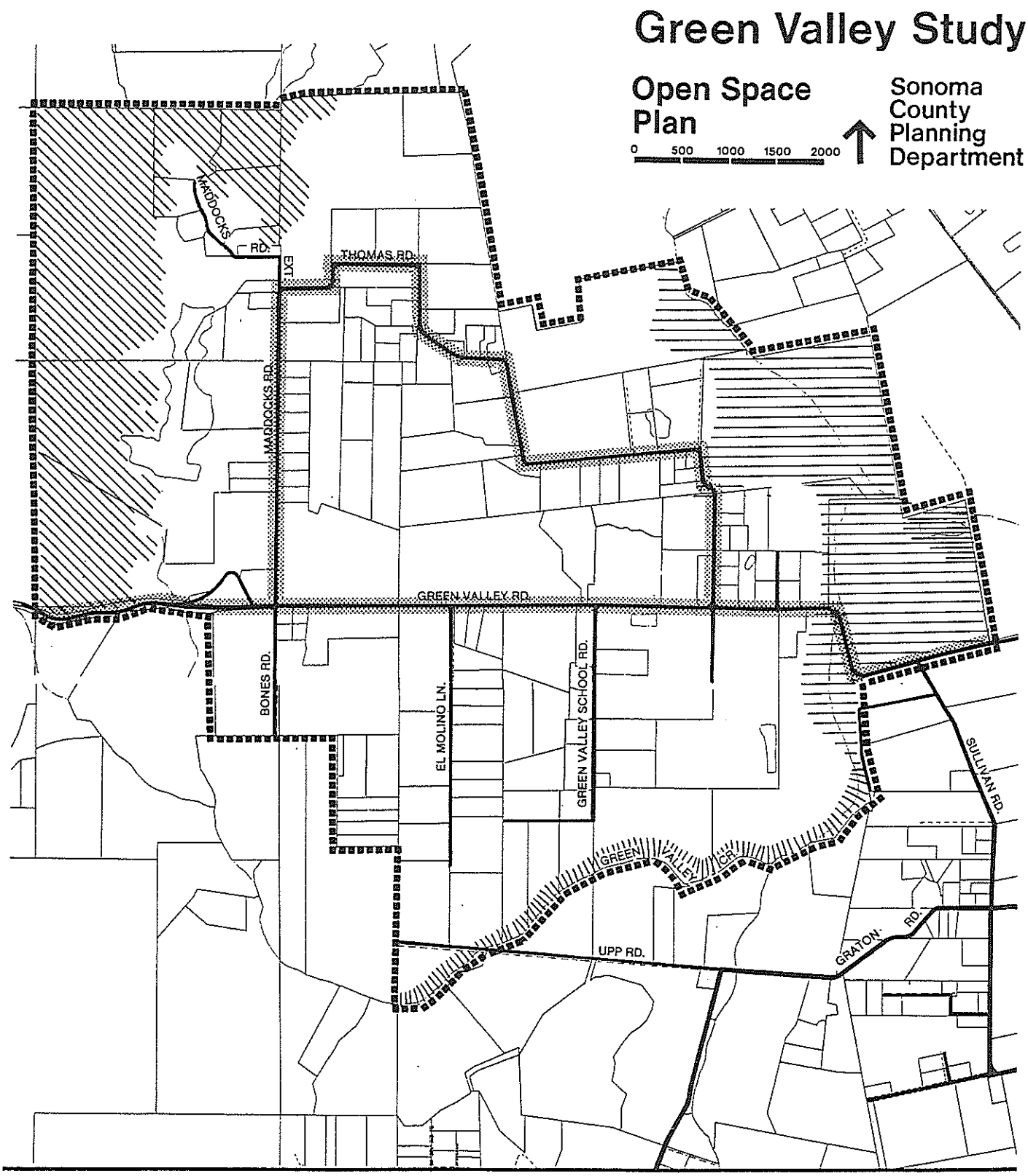
The map on the following page depicts the Open Space Plan for the study area. Generally speaking there are four basic areas of open space recorded here. A fifth area not recorded on this map is the area recognized as water-scarce areas. These areas are shown on the map labeled water spare areas.

Excessive Slopes

In the westerlymost portion of the study lies that area having slopes of 20% or greater. The difference in geologic formation separating this area from the more gentle slopes creates several limiting factors. Residential development to any degree becomes prohibitive due to erosion, septic system limitations, road access and water scarcity. In addition, this area contains a natural resource in the presence of conifers and timber production. Uncontrolled removal of this resource would have unquestionable environmental damage to down-slope properties.

Flood Plain

The easterly area delineated on the map represents the extent of the one-hundred-year flood as determined by the Army Corps of Engineers and Sonoma County Water Agency. Generally speaking, this delineation follows the 95 foot± elevation running along Green Valley Creek. Any and all proposals for development within this area should be referred to the County Water Agency to determine building elevations.


Study Area Boundary
Excessive Slopes
Flood Plain (below 95 ft. elevation)
Unique Biotic Area (Green Valley Marsh)
Streams/Riparian Vegetation
Scenic Roadways (Green Valley Road, Thomas Road, Maddocks Road)
Green Valley Study
Open Space Plan
0 500 1000 1500 2000
Sonoma County Planning Department
MADDOCKS RD. EXT.
THOMAS RD.
MADDOCKS RD.
GREEN VALLEY RD.
BONES RD.
EL MOLINO LN.
GREEN VALLEY SCHOOL RD.
SULLIVAN RD.
GREEN VALLEY CR.
UPP RD.
GRATON RD.

Unique Biotic Area

Also found in this area at the extreme east corner is a part of the Green Valley Creek Marsh. This unique biotic community was once believed to be quite extensive. Over the years, with the different disturbances which have taken place, the marsh is half of the size it once was. In addition, much of the ecological habitats have been eliminated. As a part of the Open Space Plan, this marsh should be preserved wherever possible.

Streams/Riparian Vegetation

A fundamental element of the open space plan is the maintenance of Green Valley Creek in its natural state. In order to preserve the natural state of the creek, protect the riparian vegetation habitat, and any archaeological remains a setback requirement of 100 feet is recommended for any development or new agricultural use along the creek. This would be consistent with County Ordinance and policy used by the County Water Agency.

Scenic Roadways

Green Valley Road is denoted in the County General Plan Transportation element as a "Rural Scenic Highway". In fact, a recommendation of the General Plan is to make Green Valley Road a high priority for designation as a scenic highway corridor. To this end and also to the extent of implementing the goals and policies recommended by the community residents, a minimum setback recommendation of 120 feet from centerline of Green Valley Road is made.

Thomas and Maddocks Roads are also proposed as scenic corridors and should retain a minimum average setback from edge of roadway a distance of 20% of lot depth.

The intent of open space delineation of these roadways is to preserve their natural "rural" features and maintain the scenic visual corridor each possesses.

EXISTING CONDITIONS

LAND - USE
ZONING
PARCELIZATION

The Green Valley Study is the first major effort of Sonoma County to do any formal planning of this area. Until 1972 Green Valley, like much of the rural area of the county was categorized as "unclassified zoning district". Due primarily to requests from area residents, the zoning was changed in 1972 to Agriculture.

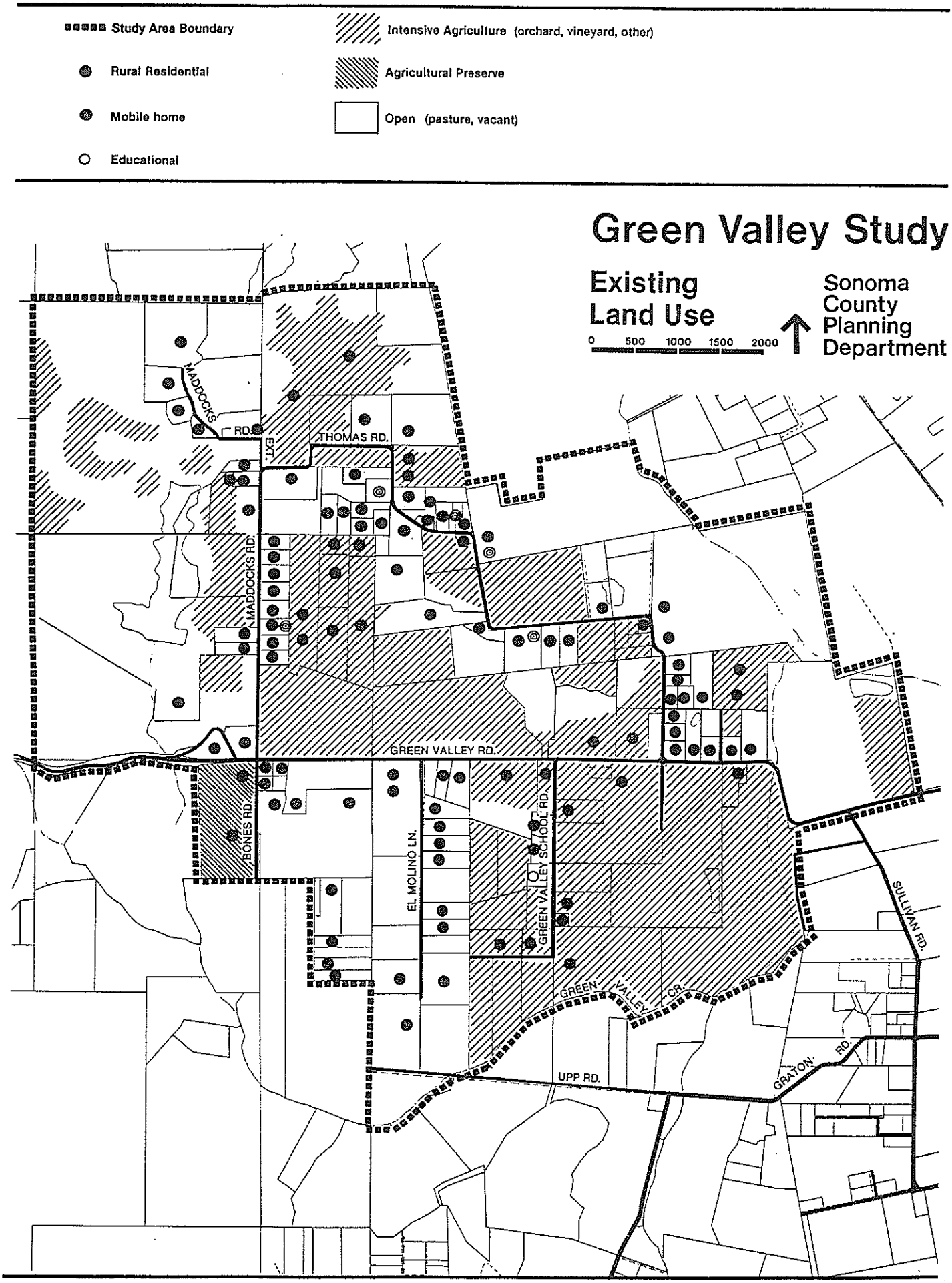
The varying sizes of parcels throughout Green Valley reflect past levels of regulatory zoning. It has only been in the last couple of years, with the proposed County General Plan, that any degree of consideration has been given to establishing average parcel sizes and minimums.

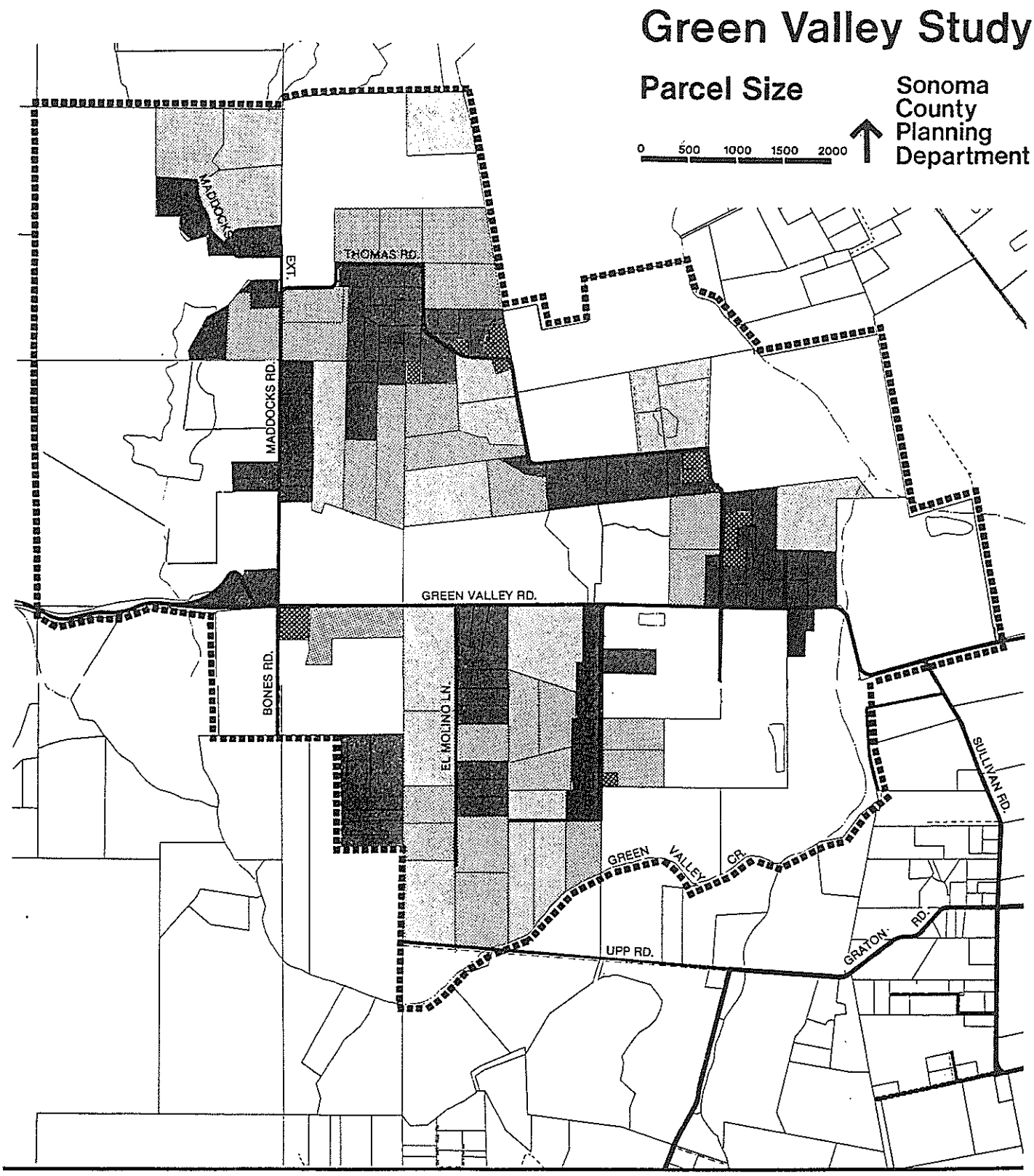
The Study Area comprises approximately 1300 acres. Presently there are 156 existing parcels, 118 existing dwellings and a population of 304 persons.

Over past years Green Valley has shown slow but steady growth. In 1967 there were 117 parcels of land but only 61 dwelling units. In the last five or six years Green Valley has experienced "accelerated growth" in comparison to its past. In 1971 there were only 70 dwelling units in the study area (a small increase from four years earlier), but in 1976 this figure increased to over 100 and in 1977 to 118 dwelling units. This indication of growth would not be substantial were it in an area zoned for residential growth. However, in an area zoned for agriculture it indicates a trend forming and ultimate change if something is not done to prevent it.

A vast majority of the existing and newly formed lots have taken place along the roadways of the study. A look at the parcel size map (page 20) reveals that a "normal size" lot does not exist in Green Valley. Lot sizes vary from approximately one-half acre to over one-hundred acres. Many of the smaller lots were formed several years ago and in areas where water was available. The consequences of this pattern of development continually taking Place can have long term serious impact. The ramifications and resulting impacts to water use, concentrated effluent disposal, and traffic could seriously and permanently damage the life support systems of the area.

The potential for further lot-splitting and resultant growth depends largely on the adequacy and availability of water and favorable septic conditions. As we can see by the geologist's study of groundwater in Green Valley (page 27), the areas likely to have water are limited, most having already been built upon. However, the pressure for continued splitting and new development, regardless of water, will undoubtedly continue.


Study Area Boundary
Rural Residential
Mobile home
Educational
Intensive Agriculture (orchard, vineyard, other)
Agricultural Preserve
Open (pasture, vacant)
Green Valley Study
Existing Land Use
0 500 1000 1500 2000
Sonoma County Planning Department
MADDOCKS RD. EXT.
THOMAS RD.
MADDOCKS RD.
GREEN VALLEY RD.
BONES RD.
EL MOLINO LN.
GREEN VALLEY SCHOOL RD.
SULLIVAN RD.
GREEN VALLEY CR.
UPP RD.
GRATON RD.


Study Area Boundary
Less Than 1 Acre
1.0 - 4.9 Acres
5.0 - 9.9 Acres
10.0 - 19.9 Acres
20.0 or More Acres
Green Valley Study
Parcel Size
0 500 1000 1500 2000
Sonoma County Planning Department
MADDOCKS EXT.
THOMAS RD.
MADDOCKS RD.
GREEN VALLEY RD.
BONES RD.
EL MOLINO LN.
SULLIVAN RD.
GREEN VALLEY CR.
UPP RD.
GRATON RD.

DEMOGRAPHIC CHARACTERISTIC

Obtaining accurate demographic information concerning the Green Valley area is, at best, difficult. The study area falls within two census tracts (1536-1537) both of which are very large and generally pertain to areas other than Green Valley itself. A certain amount of information is drawn from the 1970 census and the special "mid-decade" census of 1975. The majority of information is derived from the mail-out questionnaire and personal interviews conducted during the study process.

As was mentioned previously, Green Valley was originally settled and inhabited by first and second generation farmers coming from various parts of the U.S. Approximately ten years ago there began to be a slow but steady immigration from various parts of the Bay Area as well as various parts of Sonoma County to Green Valley. Many of the community's newest residents have come from other locations of the county; many from the greater Sebastopol area.

The largest portion of residents in Green Valley are of middle age. Many are older and retired and most do not have school age children. Several of the new residents commute to jobs outside of the study area even though they may have several acres of orchard to tend at home.

In past years Green Valley was a small community where everyone knew one another and when someone raised a barn all his neighbors were there lending a hand. Several of the founding families have remained in the area. However, things have changed and growth has influenced the complexion of the settlement to the point of altering its character and make-up.

Table I (below) indicates population based upon an actual count of dwelling units in Green Valley and a population factor as derived from the 1970 Census information.

TABLE I

GREEN VALLEY STUDY AREA
CURRENT POPULATION

DWELLING UNITS	POPULATION FACTOR	ESTIMATED POPULATION
118	2.58	304

As was mentioned previously, the boundaries of the study lie at the outer limits of two separate census tracts. Due to this situation it is difficult to accurately assess true demographic information. The following is a synopsis of information indicative of the study area as portrayed by the census tract material.

TABLE II

COMPARISON OF INCOME

AREA	MEDIAN INCOME
Tract 1536	$9,500
*Tract 1537	7,005
Sonoma County	10,500

*Information from 1975 mid-decade census Tract 1537 exhibits one of the lower income levels found throughout the County. Probable cause could be the result of a rural-based economy coupled with a high retirement group.

Labor force information indicates that the study area has a majority "Grey Collar" work force. Grey collar represents sales workers, clerical, craftsmen, operatives, and transportation workers. It may also be assumed that local employment is centered around the seasonal agricultural industry.

SERVICES

Schools

Green Valley lies within the boundaries of the Oak Grove School District. Elementary age children attend Oak Grove School and Junior High children attend Willowside School. High School students in Green Valley attend El Molino High School of the Analy High School District.

In discussions with Mr. Al Carniglia, past Superintendent of the Oak Grove School District and Mr. Robert Gross, Principal of Oak Grove and Willowside, it was learned that student enrollment in 1977 for the school district has declined somewhat compared to previous years. The decline has not been substantial and is not looked on as a continuing trend. In fact considering the classroom facilities at each school site, each school is normally referred to as at capacity, i.e. there are no empty classrooms and the average class size is not less than 25 pupils. However, it was pointed out each facility could accomodate a reasonable increase in students distributed through grades K thru 8.

The Green Valley Area contributes to only a portion of the student enrollment at these two schools, and as was previously mentioned, the enrollment decline is not viewed as a continuing trend. Consequently, it is predicted that within five years time, if development in this area continues as previous patterns indicate, each school will be in need of additional classrooms.

Fire Protection

Fire protection for the study area is provided by the Graton Fire District located on North Main and Ross Road in Graton. The district is a volunteer fire department with twenty-nine members on the roster. It is fairly well equipped with two Class A Pumpers, a smaller pumper, one 2000-gallon tanker, a brush truck and small pickup truck.

Comparatively speaking, the Green Valley area has adequate fire protection at present when compared to most rural areas of the County. However, as denser development occurs the need for increased service will also occur.

Police Protection

Green Valley and surround unincorporated communities are provided police protection by the County Sheriff's Department. The study area is divided by the overlapping patrol "beats" of Sheriff's Deputies. The western area is patrolled by a unit out of the Guerneville sub-station and the eastern area is patrolled by a unit out of the Santa Rosa based office. Theoretically, Green Valley has two units available to it, although in practicality, due to the immense area each patrol car must cover, a unit may take fifteen to twenty minutes to respond to a call, if it is not already responding to a call somewhere else.

As is in most rural areas of the County, major crimes are very minimal and minor crimes present only an infrequent number of calls. However, again as is the case throughout the County, as more development occurs in rural areas, so do the number of responses required of the Sheriff's Department.

Roads/ Circulation

Roads within the study area (Green Valley Road, Thomas Road, Green Valley School Road, El Molino Lane, Maddocks Road, and Bones Road) are maintained by the County Public Works Department. All but Green Valley Road are classified as "minor" in the County Road System; Green Valley Road being classified as a "collector road".

Each of these roads are typical of rural country roadways with narrow paved areas and graveled shoulder areas leading to drainage areas.

Traffic counts in the area have only been taken on Green Valley Road. In July 1973, Green Valley Road east of Harrison Grade Road showed 314 vehicles per day; east of Thomas Road showed 1052 vehicles per day. The most recent counts were taken in July 1976 and showed Green Valley Road, west of Ross Road, to have 1258 vehicles per day. These recent counts indicate a significant number of cars traveling on Green Valley Road through the study area to be increasing yearly.

The "five year improvements plan" of the Public Works Department, does not indicate any major road improvement projects for Green Valley other than normal maintenance of a minor nature. Future development will determine the extent to which the roads remain the same or are improved.

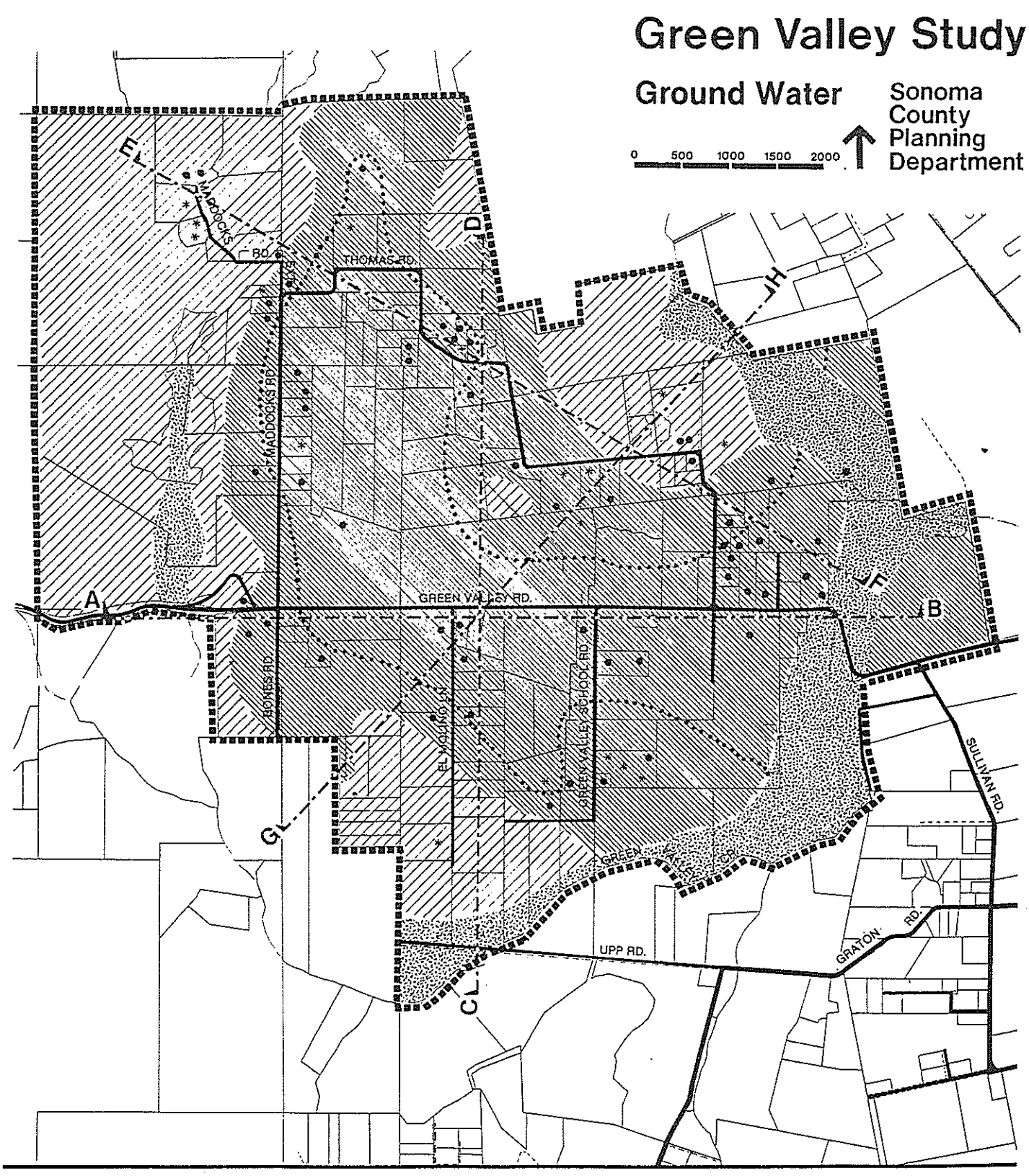
WATER AVAILABILITY

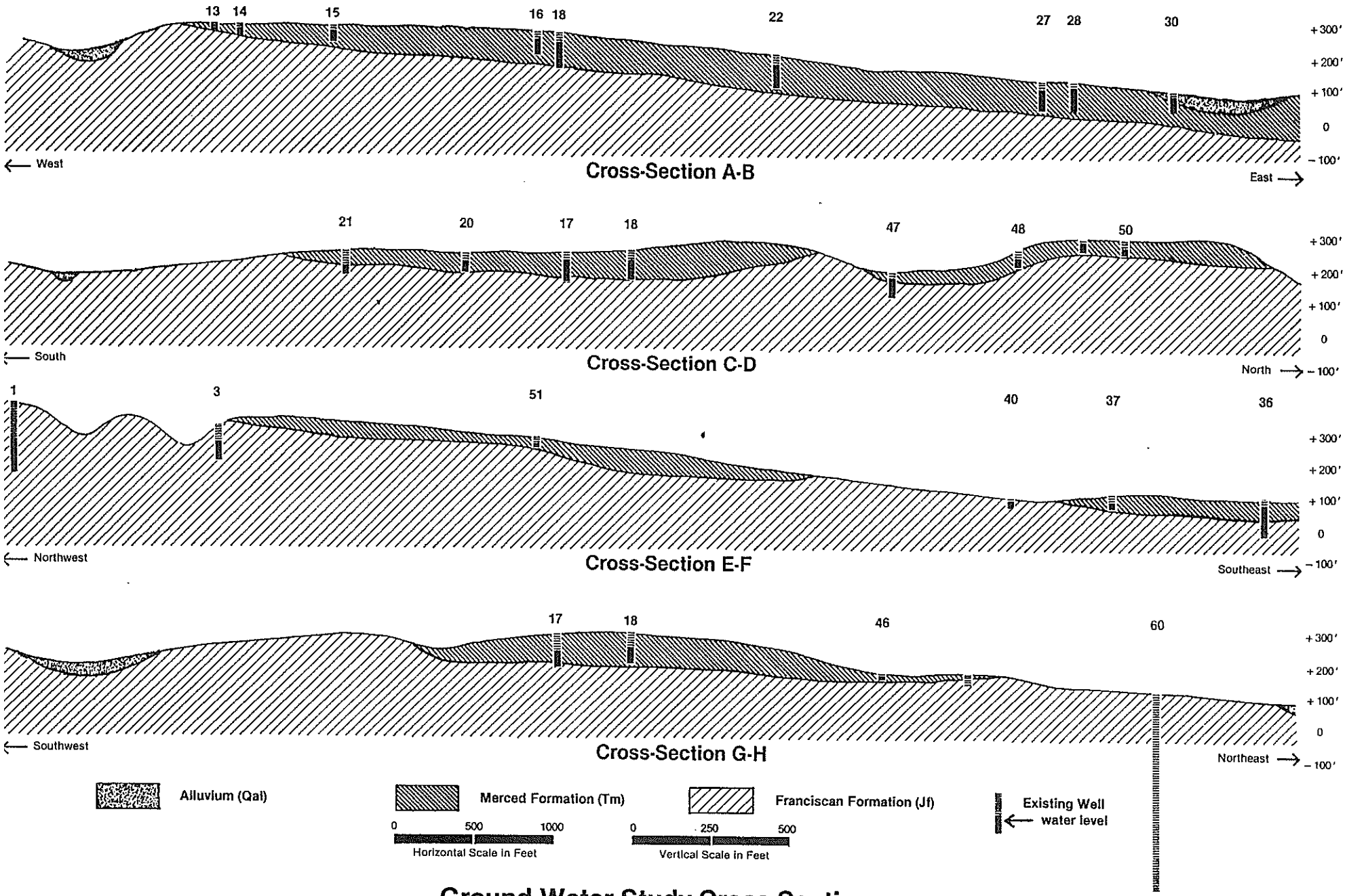
It has been indicated in various sections of this report that the availability of groundwater is of prime concern in the Green Valley Area. It has long been suspected that Green Valley is an area short of available water. The consultant geologist who conducted a groundwater study in coordination with this study, confirms the lack of available water and defines the reasons in his report contained in Appendix B.

Not surprising, nearly all of existing development has taken place within or along the boundaries of the predominate water-bearing strata (Merced Formation). Even the development of orchards follows the boundaries of the Merced. Normally, this geologic formation will yield great quantities of water. However, in the study area the Merced appears to be very thin in parts and does not appear to hold large reservoirs of water.

Well yields reported in the study are marginal at best in comparison to State and County standards. This year, being the second year of drought, has caused some wells to go dry which have never been dry in the past. All of this adds further credibility to the suspected condition and conclusions of the groundwater study.

More study and analysis need to be performed to "absolutely" predict the natural capacity and availability of water in the study area. However, it is fair to conclude through the groundwater study performed by Mr. Boudreau (Appendix B) that the development of new wells will have an effect on existing water conditions and most assuredly adversely impact marginal wells.


Study Area Boundary
Boundary of area within which Merced is at least 50 feet thick
Alluvium (Qal) loose sand, gravel and clay
Cross-Section
Merced Formation (Tm) moderately - consolidated sandstone
Producing Well
Franciscan Formation (Jf) highly - consolidated sandstone and shale
Dry Hole or Well with no information
Green Valley Study
Ground Water
Sonoma County Planning Department
0 500 1000 1500 2000
MADDOCKS RD.
THOMAS RD.
GREEN VALLEY RD.
BOWES RD.
EL MONTE RD.
GREEN VALLEY SCHOOL RD.
SULLIVAN RD.
UPP RD.
GRATON RD.
A
B
C
D
E
F
G
H
J



Ground Water Study Cross-Sections

Well No.	Coordinates	Owner	Year Drilled	Elevation	Depth	Method of Drilling	Perforated Interval	Water-bearing Zones: Depth to top	Thickness	Character	Water Level: Geologic Formation	Date Measured	Depth from Surface	Pump: Type	Discharge(gpm)	Test: Rate(gpm)	Drawdown	Quality: Use	Mineral Content	Bacteria	Driller	Comments
1	C-4	Hoyt	1974	370	236	M-R	72-236			ss	Jf	10/74	140			1/8	96	D			Weeks	Hauls Water, L
2	C-4	Hoyt		360	35	Dug					Jf							D				
3	E-5	Custer	1900	320	88	Dug					Jf	9/76	47					D				
												3/77	48									
4	F-6	Custer	1950	320	35	Dug					Tm	9/76	23					D	s/Fe			
												3/77	20									
5	F-6	Zurilgen	1975	340	42	Auger					Tm							D			Foote	
6	F-6	Byrne		350	50	Dug					Tm	9/76	27									
												3/77	28					D	G			
7	H-6	Shotwell	1972	350	78	Auger					Tm	5/73	25		8	45		D	Hard, Fe		Weeks	L
8	H-6	Hill	1972	340	72	Auger		48			Tm							D	s/Fe		Foote	
9	H-6	Medlin		330		Auger					Tm	9/76	43					D				
10	J-5	Maddocks	1965	300	38	Auger					Tm		17		10			D	s/Fe		Foote	
11	J-6	Ennis	1973	320	60	Auger					Tm				7			D	S/Fe		Foote	
12	L-5	Wandruff	1965	280	40	Auger					Tm				5			D			Weeks	
13	M-5	Konopasek		300	37	Dug-Aug					Tm	9/76	24		5			D	G		Foote	
14	M-6	Konopasek	1976	300	43	Auger		23	10	sd	Tm	9/76	19		11			D			Foote	
15	N-7	Shook	1937	280	37	Dug-Aug					Tm	9/72	12		10			D	G, s/Fe		Foote	
												11/76	13									
16	M-9	Novelli		280	90	Dug-Aug						3/77	12									
17	N-9	Novelli	1973	280	120	Cable					Tm			J	6			D	G			
											Tm-118		50		20	65		D	G, s/Fe		Peterson	L
18	M-10	Seder	1970	270	108							10/73										
19	N-9	Powell	1971	270							Tm	4/77	30		15			D	h/Fe, H		Peterson	
20	O-9	Flint	1975	260	74			25			Tm			J	10			D	G, s/Fe			
21	Q-10	Camilleri	1970	240	67	M-R					Tm			J	4			D	G, s/Fe		Peterson	Sealed - offgas
											Tm-45	4/77	31	J	2			D	G		Weeks	
22	M-12	Franco	1974	210	110	M-R					Tm			J				C	G		Weeks	
23	N-12	Danos		200		Dug					Tm							D	G			
24	N-13	Danos		170							Tm							D	G			
25	P-12	King		150							Tm				1/4			D				Sev. Dry Holes
26	M-15	Gregori		150							Tm							D	G			
27	L-15	Clifford	1959	150	80	Cable					Tm				10			D	G		Peterson	
28	L-16	Averbuck	1957	140	90						Tm				10			D	G			
29	L-17	Keith	1945	120	68						Tm				10			D	G			
30	L-17	Keith	1955	100	58						Tm	11/76	8		15			I	G		Thompson	
31	L-15	Smith		130							Tm	11/76	24					D	G			
32	K-15			120							Tm							D	P-Fe,S			
33	K-15			120							Tm							D	P-Fe			Pumps sd
34	K-15	Flint	1960	120							Tm				5			D	High S		Peterson	
35	K-16	Madden		110	68						Tm				5			D	P-Fe,S			
36	K-17	Madden	1970	100	135						Tm-94				10			I	G		Weeks	
37	K-15	Flint	1955	110	60						Tm							D	P-S			Pumps Sd
38	J-16	Widdoes	1945	100	38						Tm				2			D	G		Davis	
39	I-17	Widdoes	1958	95	58	Cable					Tm	11/76	8		40			I	Fe		Strout	
40	I-14	Poynter		100	14	Auger					Tm							D	G		Foote	Dries up
41	I-15	Widdoes	1938	100	220						Jf				Dry							Hauls
42	I-14	Jesson		100	30	Auger					Jf							D	G			
43	I-14	Jesson		110	30	Auger					Jf							D	G			
44	J-13	Stahl		140	27	Auger					Tm	5/75	6		1½			D	Fe		Weeks	
45	J-12	Perry		180	20	Auger					Tm				Dry						Weeks	
46	J-12	Perry		150	14						Tm				2			D				Pumps sand
47	I-11	Castro	1965	180	85	Cable					Jf				10			D	G			
48	H-10	Howard		200							Tm							D	G			
49	G-10	Manweiler		290	55	Dug					Tm											
50	F-10	Thomas	1948	290	60	Cable					Tm	1948	35		1			D	G		Thompson	
51	G-9	Thomas	1974	270	45	Auger					Tm	11/76	23		1			D	G		Foote	Hit Jf at 44'
52	F-9	Ragghianti	1956	290	85	Auger						3/77	22									
53	G-8	Fiori	1972	290	45	Auger					Tm				20			D	G			
54	G-8	Fiori		280	12	Dug					Tm				5			D	G			
55	D-7			330							Tm							D	G			
56	C-7	Maes		330	50	Dug					Tm											
57	F-7	Jewell		360		Dug-Aug					Tm				5			D	G			
58	K-7			300							Tm							D-I	G			
59	O-10	Heiney	1973	260j	76	M-R					Tm-57	4/73	10		8			D			Weeks	
60	H-14	Williams		120	650						Jf				Dry						Weeks	
61	O-12	Fibben	1974	180	100	M-R					Tm-46	11/74	18					D			Weeks	
62	Q-12	Fletcher	1974	200	112	M-R					Tm-62	10/74	20					D			Weeks	

M-R mud-rotary
Dug: hand-dug
Auger: bucket rig
Cable: cable tool

ss: sandstone
sd: sand

J:jet

D: domestic
I: irrigation

G: good
P: poor
Fe: iron
S: sulphur

AGRICULTURAL RESOURCE

Agriculture has been basic to Green Valley throughout its past. The fine soils, mild climate, and ready markets for its products have helped develop the agriculture activity in Green Valley as with the entire western Sebastopol area. The main agricultural pursuit has been the Gravenstein Apple although there are at least seven other varieties grown. In past years other agricultural crops, such as cherries, pears, prunes, berries and recently grapes have been tried. However, apple production seems to remain the most viable product at least for the time being.

[1]Apple processing located in the Sebastopol-Graton area, accounted for 90% of all the fruit processing in the county in 1973. In-County canneries are in operation from August to March, retaining tons of high-quality Gravensteins in cold storage to blend with Grade C apples from Washington State.

Prunes have no fresh market outlet. They are dried and dehydrated in the County for storage and marketing out of the County.

Grapes are a relatively new crop introduced recently into Green Valley. Due to the fine sandy soils and mild climate, it has not been expected that vineyards would do particularly well here.

[1]Over the Past decade, the agricultural industry has been plagued by increasing costs of raw materials and labor. Envirnomental quality regulations, increased energy costs, the increased cost of financing, and rising taxes are all putting a severe bind on the industry. Farmers have always had to deal with significant annual fluctuations in crop demand and value. The overall production value in the County has grown slowly but steadily over the years. However, in 1973, there was a 44% increase in sales over 1972 caused primarily by the sudden and dramatic increase in the price paid for apples and varietal wine grapes, Sonoma County's most unique products. The following table illustrates the revenue fluctuation for the last ten years.

[1]Excerpts from Sonoma County: "A Framework for Impact Analysis" special publication 3212, University of California

AGRICULTURE CROP REPORTS, SONOMA COUNTY (in $1000)

REVENUE

Fruit Crops	1965	1970	1972	1973	1974	1975	1976
Apples	3,528	5,163	7,132	11,353	9,760	8,604	7,838
Oranges	3,470	4,817	3,012	21,692	12,268	9,486	13,354
Pears	833	768	700	841	764	713	725
Prunes	4,302	4,575	4,082	5,136	5,862	3,818	2,578

Apple producers in the Green Valley area, as well as many in the greater Sebastopol area, report that it is becoming unfeasible to continue in apple production. "Skyrocketing production costs and low income received from the market" say these producers, is driving them out of the business. Many of these orchardists are second generation apple producers, having inherited the family farm along with the business. Many are now approaching an elder age where hard work with decreasing return and increasing operating expense begin to not hold much of a future especially in an industry which has not been mechanized and must still be done through individual labor.

For several years the County has been planning to conduct a study evaluating the viability of the apple industry in Sonoma County. However, to date this has not taken place. When and if such a study does take place, perhaps many questions can be answered and new methods established that will help the apple producers. Such analysis is not within the confines of this study, but should be undertaken soon by the County.

Underlying these existing economic concerns present today is the committment by the County, in its prepared General Plan, for retention and preservation of agricultural lands. The committment to agriculture simply means assuring that there will be agricultural land available for cultivation and food production in the future. In this respect the County should strive to maintain the viability of existing agriculture or to encourage the production of alternative crops. Ways and means must be found by government and property owners working together to continue this most important industry in Sonoma County. One very important and big step which must be taken is the consideration by tax assessors of agricultural areas and uses as permanent uses and not their developmental potential.

PHYSICAL CHARACTERISTICS

ARCHAEOLOGY

According to sources at California State University, Sonoma, Anthropology Department, there are no known archaelogical sites within the Green Valley Study Area. However, it was pointed out that at least three known sites have been recorded in the near vicinity of Green Valley Creek. These sites have been located to the southwest and northeast. Current information recorded is very sketchy at this time but does indicate the possibility of further "finds" should investigation and excavation occur. Therefore, it is stressed that although no archaelogical sites have been recorded within the study area, information collected by professional archaeologists indicate their possible presence. The area of greatest sensitivity is the alluvium area along Green Valley Creek. A recommendation of this report is that an established setback be maintained along the creek to prohibit disturbances to possible archaeological sites.

VEGETATION/ WILDLIFE

Vegetation in the Green Valley area exhibits a varied and diverse mixture of vegetation types. From open grassland, spotted by young oaks, to thick conifer forest to geometric shapes of orchards and vineyards. Small strands of Redwoods are also located in sporadic areas of the study.

No actual survey has been performed in the study area for rare or endangered species of plant life. However, several unique varieties of plants have been identified within close proximity to Green Valley. In discussions with Betty Lovall of the Native Plant Society, it was learned that a survey will be taken of the Green Valley Area with collected information documented by the Native Plant Society.

Four wildlife groups are found in the study area. The first group is found along the eastern and southern boundary of the study, along the alluvium soils. Many forms of grasses, forbs, and an overstory of some scattered oat willows and shrubs are found here. Also found here are vineyards, orchards and pasture lands. Deer are mainly found on the uplands adjacent to these areas. They come into this area to feed in the orchards, vineyards, pastures and gardens.

California quail frequent most of the soils in this group. They especially like to live near stream channels and foothills where the cover consists of shrubs and live oaks.

Mourning doves and limited numbers of ring-necked pheasant occur where food and cover are adequate. Pheasant were common in the County when large areas were in wheat and barley.

Other birds found commonly on this group of soils are the white-tailed kite, robins, mockingbirds, thrushes, brown towhees, white crowned sparrows and cedar waxwings.

The second wildlife group (Group 7) is found in the upland areas and terraces of the study area, mostly in the northwest and central portion. The soils here normally produce coniferous timber.

Columbian black-tailed deer, grey squirrel, bandtailed pigeon, mountain quail and brush rabbits are the main kinds of game that live in areas of these soils. Other kinds of wildlife are woodpeckers, nuthatches, thrushes and other birds.

Source: Soil Survey, Sonoma County Soil Conservation Service

SOILS/
SOILS RESOURCE

Soil formation is a constantly evolving process. Time, parent material, slope, climate, vegetation and vacterial all affect the soil formation process. Soil is really a mixture of mineral and organic matter with air and water. Certain groups of similar soils can be distinguished as a moving-like character. These soils are grouped into soil series which have been identified by the soil conservation service of the Federal Government.

There are five soil groups prevalent in the study area. The most widely occuring is the Goldridge series which accounts for slightly over 60% of the total. The Goldridge series is found principally as the major pocket of soils extending in a branch band from the area around Thomas Road and El Molino Lane. These soils are ideally suited for apple orchards and are mostly of Class III and IV rating, though there are lesser productive ones in the hillsides west of Maddocks.

The remaining 40% is nearly equally divided between the Blucher series, which are, incidently, some of the more productive and better rated Class II soils (found adjacent to the Green Valley Creek) and the Josephine and Hugo series, both prevalent in the hillsides west of Maddocks Road. The latter two soil groups are well drained loams and gravelly loams with clay loam subsoils. These soils are mainly used for timber though cleared areas are also suitable for grazing. The last soil group is of the Sebastopol series and is a sandy loam constituting only 1% or approximately fourteen acres of the soil acreage in the study area. It is found north of Green Valley Road at the most eastern edge of the study boundary. This soil is associated with the Goldridge series and is Class III rated and well suited to apple orchard farming. It is underlain by a clay subsoil.

Some of the general properties of the soil series present in the Green Valley are listed in the soil analysis table following. Each phase or sub-category of the soil series present is also noted.

SOIL ANALYSIS TABLE

Soil Series	Acreage	%	General Description	Soil Chss/Capability Units		Suitable Crops	Septic Tank Limitation
Goldridge GdE GdF GdC GdD²	820	62	Moderately well drained sandy loam. Sandy clay loam subsoil. Soil depth to 60". Underlain by coarse-grained weakly consolidated sandstone	IIIe-1 IVe-1 VIe-1	1. All are subject to erosion 2. Tend to be acidic 3. Fertility is moderate to high 4. Water capacity: 2 to 11 inches 3 to 12 inches	Pasture Timber Orchard	Severe
Hugo HkF HnG	201	15	Well drained very gravelly loam. Gravelly sandy clay loam subsoil. Soil depth to 60 inches. Underlain by fine grained sandstone/ shale	VIe-4 VIIe-4	1. Subject to erosion 2. Problem caused by coarse soil texture. 3. Neutral to strong acid 4. Fertility moderately low 5. Water capacity: 2 to 8 inches 3 to 10 inches	Timber Range & Pasture	Severe
Blucher BhA BhB BlB	148	13	Poorly drained loam Mixed sedimentary alluvium subsoil Soil Depth to 60 inches	IIw-2	1. Limitation of wetness caused by poor drainage/ flooding 2. Medium acid to moderately alkaline 3. Fertility is moderately high 4. Water capacity: 7 to 9 inches 8 to 10 inches 6 to 8 inches	Dryland Irrigated pasture Row crops Season crops	Severe

Soil Series	Acreage	%	General Description	Soil Chss/Capability Units		Suitable Crops	Septic Tank Limitation
Josephine							
JoG JoF²	118	9	Well drained loams Clay loam subsoil Soil Depth to 60 inches Underlain by weathered fine-grained sandstone or shale	VIIe-4	1.Severe erosion problems 2.Tend to very acidic 3.Fertility is moderately high 4.Water capacity: 4 to 10 inches 4 to 7 inches	Timber & Limited Grazing	Severe
Sebastopol							
SbC	14	1	Well drained sandy loam Clay subsoil Depth to 30 inches	IIIe-1	1. Potential erosion problem 2. Highly acidic 3. Fertility is moderate 4. Water capacity: 8 to 10 inches	Orchards, Pasture & Hay Crop	Severe

Soil Resource

Soil is the basic resource from which man derives foodstuff, for it supplies the medium and the nutrients for plant growth. Without proper management, however, man can destroy this resource and it will be irretrievably lost. Removal of vegetation, inadvertent covering of land with impervious surfaces and unwise cultivation bring about change in the process of soil formation by altering the components which are integral to this process.

Removal of vegetation removes a major soil constituent, humus, and at the same time serves to increase surface runoff leading to soil erodibility. Covering the land with impervious surfaces also adds to soil erosion through increased runoff. Secondarily, water is unable to percolate back into the soil recharging aquifers. Cultivation alters soil feature and structure by breaking up the grouping of soil particles at the surface. This action can alter soil formation by retarding the downward movement of gravitational water. We must keep in mind that man can unknowingly alter the soil formation process and increase soil erosion, posing a long-term threat to the landscape and man himself. It is essential to use the soil for its best resource while adapting to the need to provide habitation for mankind.

In this regard, there should be made an effort to utilize the more high fertile soils of the Goldridge and Blucher series for agricultural production. The better, more fertile soils are found in the mid-to-eastern-portion of the study area traversing across Green Valley Road in a north to south band. Here there has been direct influence by floodwaters of the creek depositing the silt on adjacent lands. The Goldridge series of a Class IV rating accounts for 38% of the soil classes in the study area and are well suited to orchard production. Due to the fact that these soils are all subject to erosion, care must be taken to cultivate across the contour. Aside from issues regarding adjacent land use and parcelization, the soils described above should be protected for either large scale or family-type agricultural enterprises.

More intense rural residential development could be considered, in the foothills around Maddocks and Thomas, where slopes permit reasonable, safe development.

SEPTIC TANK LIMITATIONS

Soils in this area are not highly permeable for intense septic tank installations associated with rural development. Where soils are not sufficiently permeable, septic systems will eventually malfunction and fail. Where there is sufficient land area around residences to absorb the necessary leach lines and effluent that is discharged, public health hazards are minimized. However, as increasing development occurs, the problems of sewage disposal and system failure worsen and the cumulative effect is the total saturation of soils and resultant contamination of groundwater supplies. Public Health Standards are increasingly becoming more restrictive, as well they should, to protect a county growing with substantial rural development. The severe limitation of soil permeability in this area will, in itself, constrain rural lot development. Contained in the groundwater study by Mr. Boudreau, is a proposed ultimate minimum lot size of three areas where the Merced formation is known to be in excess of 50 feet in thickness; in areas where the Merced is not 50 feet thick he suggests that lot minimums increase in size. (See Appendix B)

SLOPES

A majority of the study area is in rather gently rolling landscape except for a few areas along the 200-foot contour where the flatter terrain along Maddocks breaks to the east sloping downward toward Green Valley Creek. The steepest terrain, 30% plus slopes, is found west and north of Maddocks and Thomas Roads. Though not extensive in total area, these slopes comprise approximately 375 acres. In this regard we have concluded that this area should be generally reserved for less intensive development owing to the natural constraints typical of these slopes. For in most instances septic systems are not allowed in 30% sloping areas. Access to these areas severely scars the hillside and requires roads or driveways which are too severely inclined and with development of impervious surfaces, roofs, decks and roads, increase erosion and runoff hazards which threaten both hillside vegetation and lower lying lands and developments.

GEOLOGY

Geology is a science that deals with the study of the origin and structure of the earth as evidenced through rock and rock formations. Interpretation of an area's geology aids us in better understanding the earth's physical properties in a particular locale. This information is useful for evaluating earthquake hazard, landslide potential and groundwater recharge areas and reservoir basins.

The geologic formations of Green Valley are divided into three classes: Merced, Franciscan and Alluvium.

Merced - The Merced formation is a marine deposit consisting of fine sand, sandstone and minor zones of clay, gravel and pebble. This formation usually appears yellow-grey or reddish-brown in color and in this western part of the Sonoma County rests atop the Franciscan formation on mountain ridges. Typically, the Merced is a major water producer with wells producing from 20 to over 1000 g.p.m. Groundwater is usually of excellent quality though iron and manganese may be present. The Merced formation is semi-dominant in the Green Valley area consisting of about 640 acres principally contained in the area between Green Valley Creek and Maddocks Road.

Franciscan Formation - This formation is notorious for its shattered rocks and high instability. This formation underlies 40 to 50% of Sonoma County. It consists of igneous, sedimentary and metamorphic rock groups. Serpentine, a metamorphic rock, is widely spread in the Franciscan though isolated knobs of volcanic rocks underlain by shale and sandstone are also present. Other sedimentary rocks found are chert, limestone and conglomorate graywacke. Metamorphic rocks consist of schists, greenstone and silicate-carbonate. This formation is generally poor in yielding groundwater, though sufficient domestic supply can be yielded where wells tap water stored in fractures resulting from faults. Wells typically produce from 0.2 to 68 g.p.m. This formation constitutes about 472 acres of the study area and is mostly situated east of Maddocks. There is also a small area identified north of Thomas Road close to the intersection with Green Valley Road.

Younger Alluvium - This formation consists of unconsolidated deposits of sand, silt and clay. Alluvium is a water deposited landform which is characteristically formed in typically dry eliminates like those of California and Sonoma County. The mud or sand and gravel is laid down by flowing water as its velocity is slowed by topographical gradient. These areas tend to serve as a principal aquifer recharge material and correspondingly are a good source of water. Care must be taken to prevent overbuilding over these areas as the increase in impervious surfaces interrupts the recharge process as well as contributes to the erosion of creek banks.

Faults and Ground Instability - Faults are defined as fractures in the earth's crust accompanied by a displacement of one side of the fracture with respect to the other and in a direction parallel to the fracture.

According to data analyzed from USGS sources, there do not appear to be any visible faults extending through the Green Valley area. There are only two rather small areas that have any relative hazard from seismic shaking. The first and more prominent portion (about 130 acres) coincides with the alluvial plain along Green Valley Creek (resulting from the unconsolidated nature of the alluvial materials). The second area, some 75 acres in size, extends in a north-south orientation along the eastern slopes of the hills west of Maddocks Road.

Aside from these two areas, the surface and underlying soils appear to be rather stable. Obviously, the most stable areas are in those areas possessing less than 15% slopes which, in description, is generally found as horse shoe shaped and following along the creek in a south and westerly direction, then extending almost due north along Maddocks Road. Slopes greater than 15% are of relatively stable rock and contain few landslides.

March, 1976

APPENDIX A
SONOMA COUNTY PLANNING DEPARTMENT
GREEN VALLEY STUDY DISTRICT QUESTIONNAIRE

(You may want to indicate more than one answer. If so, please indicate order of priority -- i.e., 1, 2, 3.)

1. What size is your property? 10 acres. Average

2. Which of the following best describes the current use of your land?

   (a) 69% Single-Family Residence
   (b) 23% Retirement Home
   (c) 42% Agriculture
   (d) 8% Vacant
   (e) ____ Speculation for Development
   (f) ____ Other (specify)_____

3. What plans do you have for your property? Rural Residential & Orchard Farming

4. Do you feel that your present water availability is adequate? 68% Yes 29% No

5. Have you experienced any problems with septic systems? 4% Yes 96% No

6. How would you describe the Green Valley area?

   (a) 19% Agricultural
   (b) 88% Residential-Agricultural
   (c) 10% Rural Residential
   (d) 2% Residential
   (e) ____ Other _____

7. What do you think of the present rate of development in the greater Green Valley area?

   (a) 50% Too fast to be adequately planned.
   (b) 20% Fast, but it takes care of itself.
   (c) 27% Growth rate is just about right.
   (d) ____ Too slow.
   (e) ____ Other_____

8. What gives you a sense of rural character? (Open fields, orchards, trees, views, other) Most of those mentioned plus lots of space between houses

9. What is your preferred distance from neighbors? (a) 0 Close together; (b) 63% within sight so they cannot be heard; (c) 35% far away so they cannot be seen.

10. Do you want to have animals on your property? 65% Yes 17% No
    What type and how many? cows - horses

11. If not, do you have any objections to your neighbor having animals? ____ Yes 100% No

12. The area's roads seem to lend much to the rural character. Would you prefer to see the roads (a) 10% paved and widened: (b) 81% repaired and holes filled only but not widened; (c) 6% left alone; (d)other wider shoulders

13. Do you feel that the lot split procedure, by which most rural development is accommodated, should be: (a) 83% slowed by increasing minimum lot size and/or by establishing septic and water standards; (b) 12% left alone to allow further lot splitting.

14. What minimum lot size would you recommend?

   (a) 10% 1 to 2 acre minimums
   (b) 31% 2 to 5 acre minimums
   (c) 47% 5 to 10 acre minimums
   (d) 8% nothing below 10 acre minimum
   (e) 29% lot sizes based on septic suitability, water availability and related to economic impact on taxes.

15. Why did you move to the area or buy property here?
    (a) 75% Country atmosphere
    (b) 12% Availability of land at a reasonable price
    (c) 33% Agricultural pursuits
    (d) ____ Investing in land
    (e) ____ Other Retirement 2% / Family Property 6%

16. Encouragement of viable agricultural production in your area is a matter of:

    (a) 56% serious concern
    (b) 31% moderate concern
    (c) 10% little or no concern
    (d) 2% should not be preserved

17. In your opinion, do agricultural activities in the Green Valley area primarily

    (a) 56% contribute to the County's economy?
    (b) 31% function to provide the agricultural needs of individual owners?
    (c) 27% preserve the rural feeling of the area but only contribute marginally to commercial agricultural activities?
    (d) ____ Other

18. Do you believe that future growth should be planned so as to preserve the rural character of the area? 92% Yes 7% No

19. Do you believe large lot zoning should be used to continue agricultural viability? 83% Yes 18% No

20. What would you like to see this study accomplish? Regulation for fair and adequate use of land both for agricultural and rural residential water and septic conditior

21. What DESIRABLE or UNDESIRABLE changes have you noticed taking place in your area?

    Stray dogs - undesirable

22. Do you know of any historic building or archaeological sites (Indian sites, warheads, etc.) in your area X Yes ____ No. If yes, please indicate where.

    Green Valley School

IF YOU HAVE ANY QUESTIONS,
PLEASE CALL
MIKE SHEPPARD - 2802

The return address is printed on the back of this page. After completing the questionnaire, please fold, fasten with a staple or tape, put on a stamp, and drop in the mailbox.

APPENDIX B

GEOLOGY, GROUND WATER, AND WELLS IN THE GREEN VALLEY STUDY AREA
Sonoma County, California

By Eugene Boudreau

INTRODUCTION

Purpose & Scope of the Investigation

The Green Valley Study Area is an irregularly shaped piece of land about 2 miles across in its maximum east-west and north-south dimensions. Ground water is the principle source of water for domestic and agricultural uses, and as the population is increasing the demand on the ground water supply is also increasing. This report is a portion of the inventory of the physical features of the Study Area that is being compiled under the direction of the Sonoma County Planning Department for incorporation in a plan that will be used to help direct the course of future development.

The purpose of this report is to provide sufficient geologic and hydrologic data to aid in the prudent development and protection of the ground water. In particular, the objectives of this study were to:

1. Delineate the extent, thickness, and water-bearing characteristics of the geologic units in the area.

2. Determine the source, occurrence, availability, and the direction of movement of the ground water.

3. Determine the range of the chemical quality of the water.

4. Estimate the quantity of ground water used and the quantity available from the aquifers, and correlate this to population densities they can support.

5. Determine what further ground water studies would be useful.

6. Evaluate methods used in drilling, equipping, and developing wells in relation to well yields, water quality, and well problems.

Information & Method of Study

Previous geologic work done in the area has been published by the California Division of Mines and Geology (Bulletin 162, GEOLOGY OF THE SEBASTOPOL QUADRANGLE, 1952), and by the U.S. Geological Survey (Sheet 5 of BASIC DATA CONTRIBUTION 12, 1971). Some information on a few of the wells is contained in the Survey's WATER SUPPLY PAPER 1427, GEOLOGY & GROUND WATER IN THE SANTA ROSA AND PETALUMA VALLEYS, 1958.

For this study, the Planning Department obtained about 20 drillers' logs of wells from the State Board of Water Resources. Also, residents of the Study Area were sent questionnaires concerning their wells, but these were never turned over to me.

Field work done by the author of this report consisted of examining some of the surface geology, interviewing many of the well owners (a large percentage refused to cooperate), and measuring well levels. Well locations, together with indications of relative yield and quality, are shown on Figure 1. Well data are tabulated in Table 1. Field work was done between September, 1976, and April, 1977.

Well-Numbering & Locating System

Each well has its own number, and its location is fixed at somewhere within a block 500 feet square by the arbitrary coordinates shown on the margins of Figure 1. Each well has its coordinates listed in Table 1.

GEOGRAPHY

Topography & Drainage

The Study Area is a part of the Coast Ranges of California, and it consists of a series of ridges and valleys. Its boundaries are shown on Figure 1. Elevations range between a high of about 440 to a low of 90 feet above sea level. The higher elevations are found in the western portion, and the lower elevations in the eastern portion. Slopes are usually gentle to moderate in terrain underlain by the soft Merced rock, but they are often quite steep where the Franciscan rock underlies the surface.

All of the Study area is included on the Geological Survey's 7.5 minute Camp Meeker Quadrangle sheet.

Green Valley Creek wraps around the southern and eastern margins of the area. No data are available for calculating stream discharge.

Climate

The area has a temperate marine climate characterized by wet winters and dry summers. Annual precipitation in the nearby town of Graton between the years 1930-52 averaged about 40 inches, with the greatest amount falling during the period December through March. Fogs from the ocean help to cool the area and contribute some moisture during the non-rainy months.

Culture

Agriculture is the main industry, with apple orchards being the main feature.

GENERAL GEOLOGY

The rate at which water is discharged from and recharged to an aquifer is dependent on the character and distribution of the geologic units and on the climate and physiography of the area.

Geologic Units

The overall geologic situation is rather simple, although most of the details of the bedrock are masked by soil cover. Enough outcrops of rock can be seen, particularly in roadcuts, to give a rough but adequate picture of the surface geology. Enough well drilling has been done to provide a fair amount of information on the subsurface relationships of the geologic units, or formations.

The most detailed map available of the surface geology (on a scale of one mile to the inch) is contained in GEOLOGY OF THE SEBASTOPOL QUADRANGLE, which also contains a written report on the geology. This map is generally accurate.

There are 3 separage geologic units in the area. From youngest to oldest, these are: Alluvium, of recent age; the Pliocene-age Merced Formation; and the Mesozoic-age Franciscan Formation. These units differ with respect to age, mode of origin, rocktype, structure, thickness, extent, and water-bearing characteristics.

Alluvium underlies the floors of the main valleys, and it consists of lenses of loosely-consolidated clay, sand, and gravel. This formation represents material eroded from the bedrock on the neighboring high ground that has been transported and deposited by stream activity over the past few thousand years. Sand and gravel were deposited in stream channels where water action was swift, while clay formed on floodplains where quiet water conditions prevailed. Alluvium tends to thicken towards the centers of valleys, and also in the down-stream direction. Maximum thickness of the Alluvium might be about 50 feet.

The narrowness of the belt of Alluvium along the south edge of the area, as well as the deeply entrenched nature of the stream channel to the west, is an indication that erosion is removing the Alluvium at a rapid rate.

The Merced Formation was deposited on the floor of a shallow sea that covered much of western Sonoma County from about one to five million years ago when the area was below sea level. The initial seafloor was an irregular old land surface that had been carved from the Franciscan rocks. Buildup of the Merced ceased when the area was elevated above sea level, and since then much of the Merced has been removed by erosion.

Constituents of the Merced rock were derived from erosion of the Franciscan, and also from erosion of the Sonoma Volcanics to the east around Santa Rosa. The material was carried to the sea by streams, and then further transported and sorted by ocean currents.

A common Merced rocktype is a fine-grained, somewhat clayey sandstone (cemented sand) that is only moderately consolidated. Near the surface Merced is buff-colored due to the effects of oxidation of its iron-bearing minerals, but at depth, where it is unoxidized, the color is blue-gray. Some beds of well-rounded and polished small gravel are present along portions of the base of the Merced, and these are old beach deposits formed when the Merced sea first encroached on the Franciscan land surface.

"Quicksand" is reported in a few drillers' logs. This clean, loose sand represents beach sands and sand dunes, and it is of the same grain size as the sands along the present-day coast at Bodega Bay.

Fossil shells of shallow-water shellfish are common in parts of the Merced.

According to driller's logs, maximum thickness of the Merced in the study area is about 120 feet.

Underlying the younger units, and outcropping over much of the western part of the Study Area, is the Franciscan Formation, which is 100-140 million years old and an estimated 50,000 feet thick. This unit underlies most of western Sonoma County, as well as much of the rest of the Coast Ranges in western California. The Franciscan is made up of a group of highly-consolidated marine sediments (sandstone, shale, and chert), marine volcanics (called greenstone), intrusive bodies of serpentine, and metamorphosed derivatives of these rocks.

Sandstone and shale (compacted clay) were the only Franciscan rocks seen, but others could be present. These rocks are brownish in color near the surface but at depth the sandstone is gray and the shale is dark gray to black.

Figure 1 shows the general surface geology of the area, along with well locations. Figure 2 contains 4 generalized geologic cross-sections through the area showing the relationships of the geologic formations and the wells as projected from surface information and driller's logs.

Structural Geology

The structural arrangement of the rocks refers to their geometry, and this is derived from their mode of formation and the subsequent effects of folding and faulting.

Lenses of Alluvium are flat-lying to slightly tilted.

The beds of Merced rock are probably tilted at light to moderate angles from the horizontal as a result of the movements in the earth's crust that made dry land of what was once the seafloor. This tilting is probably to the east.

No major faults are shown in the Merced, but there must be a number of minor ones.

During its long history the Franciscan has been strongly deformed and broken during numerous episodes of folding and faulting. These movements have given the formation such a complex structural arrangement that it is impossible to make exact predictions of the conditions at depth.

GROUND WATER OCCURRENCE & AVAILABILITY

Almost all of the ground water in the Study Area is derived from local rainfall and streamflow that have percolated into the ground. (There may be some trapped sea water in the Franciscan.) Much of the rainfall evaporates, runs off, or is transpired to the atmosphere by vegetation, but part of it percolates into the ground and becomes ground water. The amount that percolates into the ground is somewhat related to the amount of rainfall and the pattern of the storms. Of the water that does percolate into the ground, part is retained as soil moisture, and part continues on downward to the zone of saturation, where it fills all pore spaces and small fractures. (There are no underground streams to be found.)

Water in the zone of saturation continues to move under the influence of gravity from the upland areas down towards the valleys to points of discharge, such as springs, seeps along stream channels, or wells. This continued movement is what accounts for the fluctuation in the water table, which is the top of the zone of saturation. Perched water tables may occur where ground water collects on top of a layer of rock with very little permeability that is above the main water table.

If a zone of saturated rock is porous enough and permeable enough to yield usable amounts of water to wells or springs then it is called an aquifer. Impermeable zones are called aquacludes.

Unconfined water exists at atmospheric pressure and will not rise above the point at which it is encountered. Artesian water is ground water confined in the saturated zone by an overlying layer of imperable rock such as clay. Where the confining layer is penetrated by a well the water will rise above the point at which it is encountered, and in some cases it may flow out on the surface of the ground.

Alluvium

Lenses of clean sand and gravel in the Alluvium have intergranular porosity and permeability, but clay is impermeable. Some homes in the southern part of the Study Area are supplied with water from a well outside of the Study Area along Green Valley Creek.

Merced Formation

The Merced is the principal aquifer in the Study Area. Wells that penetrate a few tens of feet below the water table usually yield enough water for domestic use. Reported yields range from less than one to a high of 40 gallons per minute. Large drawdowns are the rule, which means that the specific capacities (gallons per minute per foot of drawdown) are very low.

Several wells are reported to be troubled with sand coming in, and this is probably the loose dune sand. Standard well drilling practice has been to seal off identifiable beds of quicksand with blank casing, but thin beds could pass unnoticed during the drilling.

Aquifers in the Merced are beds of clean sandstone, quicksands, and gravelly beds. These have intergranular porosity and permeability. Clays and clayey sandstone have little permeability.

Franciscan Formation

The Franciscan rocks generally have very little primary, or intergranular, porosity and permeability owing to their highly-consolidated nature (a result of deep burial over a long period of time), and thus yield little water to wells. Successful wells in the Franciscan have penetrated zones of the harder and more brittle rock types, such as sandstone, greenstone, and chert, in which faulting and/or fracturing have created a certain amount of secondary porosity and permeability in the form of small open fractures. The yield of such a well depends on the number of fractures penetrated, on how open the fractures are, and on how interconnected they are.

Shale and serpentine are usually non-water-bearing because their semi-plastic natures cause the fractures present in them to be squeezed shut by the weight of the overlying rock.

Recharge, Movement, and Discharge

Recharge occurs after there has been sufficient rainfall to restore the soil moisture. As the ground water reservoir is recharged, water levels in wells begin to rise and the flow of seeps and springs increases. Movement of the water in the Merced is obstructed by impermeable beds and faults in the formation itself, and by buried ridges of the underlying Franciscan rock. Direction of movement of the water is generally downhill towards the nearest stream or spring, or into the Alluvium in the valleys. Many of the seeps and springs are concentrated along the Merced-Franciscan contact.

Depth to the water table averages about 20 feet, and the seasonal fluctuation measured in several wells varied from 0 to 3 feet over the past fall-to-spring cycle.

Water Supply Paper 1427 describes a recharge test conducted on an area underlain by the Merced, and it estimates that the maximum recharge is about 25% of the precipitation that falls on it. As normal precipitation is about 40 inches per year, it seems that about 8 inches of this (2/3 of an acre-foot) percolates down to recharge the ground water in the Merced. Percolation in the Alluvium is probably about as good, if not better, as in the Merced; but average percolation in the Franciscan would be much less.

The Merced and the Alluvium in the eastern portion of the Study Area receive some recharge from the flow in Green Valley Creek.

Storage Volume

The volume of ground water stored in the Study Area is basically the volume of water contained in the Merced Formation. To compute this amount (expressed in acre-feet), it is necessary to multiply the area (acres) by the saturated thickness (feet), times the specific yield. Specific yield is defined as the ratio of the volume of water that will drain by gravity flow from a saturated rock to the total volume of the rock, expressed as percentage. Based on estimates contained in Water Supply Paper 1427, an arbitrary specific yield of 4 has been assigned to the Merced as an average for the whole.

It is estimated that about 300 acres of the Study Area are underlain by 50 or more feet of Merced rock, and that the average thickness of saturated rock is about 50 feet. With a specific yield of 4, this 300 acres of Merced would have a storage capacity of 600 acre-feet of water, or about 3 times the normal annual recharge. This constitutes the main body of ground water. Perhaps there is half again as much water in the Franciscan Formation and in the thinner portions of the Merced.

GROUND WATER QUALITY

Chemical Quality

All ground water contains various chemical elements in solution. In small amounts these dissolved solids are harmless, but in large enough concentrations they can cause problems. Concentrations of dissolved mineral constituents are often reported in parts per million (ppm). The U.S. Public Health Service recommends that the dissolved solids in drinking water should not exceed 500 ppm.

Dissolved calcium and magnesium ions cause what is called "hardness" in water, and this can cause a build-up of carbonate scale in wells and pipes. Soft water contains less than 60 ppm of magnesium or calcium carbonate; moderately hard water contains between 61-120; hard water 121-180; and water with over 180 ppm is very hard. Water in the Study Area ranges from soft to very hard, and much of the hardness can be associated with beds of sea shells, which are composed of calcium carbonate. Most well users do not have problems with hardness.

Iron in water begins to cause problems with staining when concentrations exceed 0.3 ppm. While water with a high iron content may be objectionable in color and taste, it does no harm to the human body. Portions of the Merced were deposited under reducing conditions, such as in quiet lagoons and bays, which allowed the mineral pyrite (FeS_2) to form in the sediments. Since the area was raised above sea level, some of this pyrite has been leached from the rock by oxygen-rich ground water. But, in zones of the Merced where oxidation is still taking place, ferrous ions are going into solution in the water, and when this water is pumped to the surface the ferrous iron oxidizes to insoluble ferric iron. About one in four of the well users reported slight to high concentrations of iron. Sulphur is present in some wells, and this is probably derived from the pyrite.

Most well users are content with the chemical quality of the water.

Bacteriological Quality

Contaminated surface water purifies itself as it percolates through rock. Of course, the distance and the rate of percolation are critical in determining the degree of elimination of the bacteria. A standard method of judging whether or not water could contain harmful bacteria is to test for coliform bacteria, as they live in the intestinal tracts of warm-blooded animals. It is known that on a county-wide basis as many as 40 percent of the wells contain coliform bacteria during the winter rainy season.

A properly installed well seal of sufficient depth will prevent surface water from entering a well too quickly, but it is only recently that the County has required minimum standards for sealing of wells, which require that at least the upper 20 feet of rock be sealed-off with cement or clay. Information on well seals in the Study Area is very sketchy, but it may be that about a third have either no seal or less than 20 feet of seal. From these figures it follows that a large number of the unprotected wells must contain polluted water, or be potentially pollutable. Hand-dug wells are particularly subject to pollution.

Iron-bearing waters favor the growth of iron bacteria. These organisms can change dissolved iron to the insoluble ferric state. The insoluble iron is deposited in the sheath of the organism, or in voids in the water-bearing formation. The sheath is a jelly-like slime that can clog the rock, the perforations in the casing, and pipes. This type of bacteria is believed to be spread by contaminated drilling equipment, as the bacteria are not subsurface dwellers.

GROUND WATER USE

Domestic

Estimated ground water use for domestic purposes is estimated at 100 acre-feet per year. This figure is based on a population of 450 persons using 200 gallons per day per person. (This is higher than the average for Sonoma County, but most families in the Study Area have large gardens and some livestock.)

Agricultural

Ground water use for agriculture is not large, but spraying of orchards, watering of dairy herds, and some irrigation of pastures may approximate 20 acre feet per year.

WELL DRILLING & MAINTENANCE

Basically, a well yields water because it has penetrated one or more zones of permeable rock below the water table and usable amounts of water flow through the rock and into the well. However, the methods used in drilling, equipping, developing, sterilizing, and maintaining the well are important in determining its yield, its efficiency, its lifespan, the quality of the water, and mechanical problems. It is safe to say that a number of the wells in the Study Area that are unsatisfactory for reasons of inadequate and/or poor quality water, or the entry of sand, need not be in this condition.

The entry of sand can be explained either from the standpoint of inadequate development work, or because of improper perforation sizes in the casing, coupled with the wrong size gravel pack. What is called quicksand is a loose sand having a median diameter of 0.006-inch, and it cannot be kept out of a well with the 0.125-inch perforations surrounded by an envelope of 0.250-inch gravel that are rather standard in gravel-packed wells. Although no well screens have ever been used in the Study Area, it is known from their use in other areas underlain by the Merced Formation that 0.025-inch slot screen with 0.040-inch gravel pack will keep quicksand out of a well.

Entry of sand will fill pipes and the well, and it will cause the pump to wear out. Its abrasive effects will widen perforations, which in turn admit ever more sand. In time, the well can become completely unusable.

Initial well yields are often below their maximum potential because of:

1. Compaction of loose water-bearing material due to the pounding of a cable tool, plus the forcing of mud into the formation.

2. Plugging of water-bearing zones with bentonite drilling mud in the course of mud-rotary drilling.

3. High turbulence, with resulting entrance velocity losses, caused by the very low percentage of open area (usually between 1-3 percent) in perforated casing.

4. The sealing-off of known quicksand zones with blank casing to avoid sand problems.

5. Inadequate development to remove both drilling mud and the finer-grained

material in the formation close to the well in order to improve the permeability. (Chemicals and high-pressure jets are better than mere bailing.)

6. Perforations in the wrong place. (Electric logging would give mud-rotary drillers a better idea of where the water-bearing zones are located.)

Water in the Merced varies in quality from good to poor, and it is often possible to encounter more than one type of water in a well. By bailing and testing the water at frequent intervals a driller can locate the various zones of water and then seal-off that of poor quality with blank casing. Unfortunately, most wells are not bailed until they are completed, and the resulting mixture of waters may be of poor quality.

Most water is more or less either corrosive or incrustating, and therefore the life of a well can be extended through equipping it with perforated casing or well screen of a metal that will resist either the corrosive attack of the water or the corrosive attack of the acid needed to dissolve the mineral crusts that precipitate from the water. By calculating the Ryznor Stability Index Number (derived from the tests of pH, total dissolved solids, calcium ion concentration, and a methol orange alkalinity test) for a water, it can be determined if it is corrosive or incrustating. Much of the Merced water is corrosive enough to warrant the use of 304 stainless steel. PVC casing can also be used.

Wells infected with iron bacteria are likely to remain so, as it is impossible to kill them off completely. Contaminated drilling equipment is usually instrumental in introducing bacteria into a well, but a good flushing with chlorine during and after the drilling will keep the bacteria from becoming established. As the bacteria thrive best in water containing at least one ppm iron, problems can be avoided by sealing-off iron-bearing zones of water in the well.

Like any other piece of equipment, a well needs a certain amount of maintenance to keep it in good operating order, although few well owners realize this. A diminishing yield is often blamed on the water table going down, but the true reason may be pump wear caused by sand, or the plugging of perforations and the formation by calcium and iron deposits.

POTENTIAL FOR GROUND WATER DEVELOPMENT

It is calculated that there may be about 900 acre-feet of ground water in storage in the Study Area, most of which is contained in the thicker portions of the Merced Formation. The scant amount of data on recharge, pumping, and the water table suggest that the system is about in equilibrium. However, a combination of a series of dry years, coupled with increased pumping for domestic and agricultural uses could create serious problems for at least some of the existing wells.

Artificial recharge methods, such as ponding of surface water, could be used to increase the amount of recharge.

SUMMARY & RECOMMENDATIONS

The Study Area is underlain by 3 geologic formations, of which only the Merced is an important aquifer; however, the Merced is not present in many places, and in others it is too thin to provide much storage capacity. Because of the moderate permeability of much of the Merced, it is generally capable of yielding suitable amounts of water for domestic and small-scale agricultural uses. The thinness of the Merced precludes the development of high-yield wells, although more efficient wells are possible.

The ground water information presented in this report is not too precise because of the scarcity, or lack of, data in many areas. More precious figures could be obtained by measuring the rainfall, the streamflow, and the water table levels on a regular basis, and these would identify trends and allow predictions to be made with a greater degree of confidence. A number of representative wells should not only have their water levels recorded, but also samples should be taken to be tested for chloride, nitrate, and total dissolved solids. This would be of particular importance in areas with the densest concentrations of homes. Checks should also be made on pesticide buildups.

In order to prevent ground water mining, lot size should be kept large enough so that pumpage does not exceed annual recharge to the ground water reservoir. A sizeable safety factor should be included ot keep the recharge well above the pumpage in order to maintain enough ground water discharge to streams to prevent a buildup of total dissolved solids from septic tank effluent. It should be kept in mind that each additional home that is build creates about 7,000 square feet of impermeable area, meaning more water running off instead of recharging the ground water.

A family of 4 persons using 200 gallons per day per person would use about 0.9 acre-feet of water per year. As the annual recharge per acre in the Merced is about 0.6 acre-feet, this family would need 1.5 acres of recharge area to supply its well--this during years of normal precipitation. As a safety factor, and to provide water for natural ground water discharge for flushing action, perhaps a 3-acre minimum should be imposed for lots on flat to gently sloping land underlain by at least 50 feet of Merced rock, with higher minimums in steeper terrain where the runoff would be greater. Minimum lot size in the areas where there is less than 50 feet of Merced, or where there is only the Franciscan to serve as a reservoir, should be well above the minimum for the most favorable geologic situation because of the difficulty in finding water and the small amount of storage capacity.

It has to be remembered that drilling of new wells that would intercept water moving toward and now supplying marginal wells could very possibly dry up these marginal wells.

Eugene H. Boudreau
Registered Geologist #3000
May 16, 1977

INITIAL STUDY OF CUMUL. .VE EFFECTS CHECKLIST

File No. _____ Date 27 DECEMBER, 1977

EXTENT OF SIMILARLY CONSTRAINED SURROUNDING LANDS: BOUNDARY OF STUDY AREA (page 2)

	Boundary of Effect	Yes	Maybe	No	Reference
1. Land Use.					
a. Will the proposal result in a land use inconsistent with any of the following General Plan maps or policies?					
(1) Land Use Map	Study Area			X	
(2) Open Space Map	Study Area			X	
(3) Resource and Undeveloped Areas Map	Study Area			X	
(4) Goals and Policies	Study Area			X	
b. Will the proposal result in a land use inconsistent with any of the following Specific Plan maps or policies?					
(1) Land Use Map	Not Applicable				
(2) Open Space Map	Not Applicable				
(3) Goals and Policies	Not Applicable				
c. Will the proposal result in a land use inconsistent with any City General Plan?	Not Applicable				
2. Earth. Will the proposal result in significant:					GREEN VALLEY STUDY Page:
a. Removal of suitable soils from potential agricultural production?	Ag. soils in Study Area			X	7-14; 32-35
b. Increase in water erosion of soils, either on or off the site?	Study Area			X	15, 32-35
c. Grading, fill, excavation or change of topography?	Study Area		X		15, 37-38
d. Exposure of people or property to earthquake hazards?	Study Area			X	36-38
e. Exposure of people or property to landslide or mudslide hazards?	Study Area		X		15, 36-38
f. Exposure of people or property to ground failure or liquefaction hazards?	Study Area			X	36-38

	Boundary of Effect	Yes	Maybe	No	Reference
3. Air. Will the proposal result in:					
a. Deterioration of ambient air quality?	Air Basin			X	14
b. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	Air Basin			X	2
4. Water. Will the proposal result in:					
a. Changes in absorption rates in an aquifer recharge area?	Study Area			X	14 (Appendix B)
b. Changes in the amount or rate of surface water runoff?	Study Area			X	14 (Appendix B)
c. Change in the amount of surface water or stream flow in any water body?	Green Valley Creek			X	14 (Appendix B)
d. Any alteration of surface water quality, including temperature, dissolved oxygen, or turbidity?	Green Valley Creek		X		14 (Appendix B)
e. Change in the quantity of groundwaters through direct withdrawals?	Study Area	X			14 (Appendix B)
f. Exposure of people or property to flooding?	100 year flood plain		X		15
g. Exposure of people or property to tidal waves?	Not Applicable			X	Not Applicable
5. Plant Life. Will the proposal result in:					
a. Significant reduction of the numbers of any unique, rare or endangered species of plants?	Green Valley Creek Green Valley Marshes Other Riparian Areas		X		7, 31
b. Significant reduction in extent of any unique biotic habitat (i.e., riparian, marshes, estuaries, beaches, vernal pools)?	Green Valley Creek Green Valley Marshes Other Riparian Areas				7, 17, 31

	Boundary of Effect	Yes	Maybe	No	Reference
5. Plant Life (continued)					
c. Removal of significant amount of natural vegetation?	Study Area			X	31
d. Conversion of vegetation type?	Study Area			X	31
e. Introduction of additional non-native vegetation?	Study Area		X		14
f. Reduction in acreage of orchard, vineyard, or other intensive agricultural uses?	Study Area			X	6, 7-14, 32-35
g. Reduction in acreage of grazing land or other extensive agricultural uses?	Study Area			X	6, 7-14, 32-35
6. Animal Life. Will the proposal result in:					
a. Significant reduction in the extent of any unique wildlife habitat such as marshes, estuaries, beaches, riparian corridors, or ecotones?	Green Valley Creek Green Valley Marsh Other Riparian Areas			X	7, 17, 31
b. Significant reduction of the numbers of any unique, rare or endangered species of animals?	Green Valley Creek Green Valley Marsh Other Riparian Areas			X	7, 17, 31
c. Introduction of new species of animals into a non-urban area?	Study Area		X		14, 31
7. Noise. Will the proposal result in:					
a. Increases in existing day noise levels?	Study Area			X	14
b. Increases in existing night noise levels?	Study Area			X	14
c. Exposure of people to severe noise levels?	Study Area			X	14

	Boundary of Effect	Yes	Maybe	No	Reference
8. Resources. Will the proposal preclude current or future production or enjoyment of:					
a. Agricultural resources?	Study Area			X	7-14; 32-35
b. Timber resources?	Study Area			X	15
c. Energy resources?	Study Area			X	14
d. Fisheries resources?	Study Area			X	7, 14, 31
e. Scenic resources?	Study Area			X	7, 10, 17
f. Soils resources?	Study Area			X	7-14; 32-35
g. Mineral resources?	Study Area			X	NA
h. Wildlife resources?	Study Area			X	7, 17, 31
i. Water resources?	Study Area			X	14, Appendix B
Will the proposal result in the wasteful or inefficient utilization of:					
a. Agricultural resources?	Study Area			X	7-14; 32-35
b. Timber resources?	Study Area			X	7-14
c. Energy resources?	Study Area			X	14
d. Fisheries resources?	Study Area			X	7, 14, 31
e. Scenic resources?	Study Area			X	7, 10, 17
f. Soils resources?	Study Area			X	7-14; 32-35
g. Mineral resources?	Study Area			X	NA
h. Wildlife resources?	Study Area			X	7, 17, 31
i. Water resources?	Study Area			X	14, Appendix B

	Boundary of Effect	Yes	Maybe	No	Reference
9. Growth Induction. Will the proposal have significant growth-inducing impacts?	Study Area			X	14
10. Housing. Will the proposal result in:					
a. A reduction of the existing housing stock?	Study Area			X	6
b. Housing not suitable for identified needs?	Study Area			X	6
11. Transportation/Circulation. Will the proposal result in:					
a. Generation of substantial additional vehicular movement?	Study Area			X	6, 14, 25
b. Substantial impact upon existing transportation systems?	Study Area			X	6, 14, 25
c. Alterations to present patterns of circulation or movement of people and/or goods?	Study Area			X	6, 14, 25
d. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	Study Area		X		6, 14, 25
e. Need for maintenance or improvement of existing public roads?	Study Area		X		6, 14, 25
f. Construction of new public roads?	Study Area			X	6, 14, 25
12. Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:					
a. Fire protection?				X	24
b. Police protection?				X	24
c. Schools?					14, 24
d. Parks or other recreational facilities?					NA
e. General governmental services?					14

	Boundary of Effect	Yes	Maybe	No	Reference
13. Utilities. Will the proposal result in a need for new public systems, or substantial alterations to the following utilities:					
a. Power or natural gas?	Study Area			X	14
b. Telephone system?	Study Area			X	14
c. Water?	Study Area			X	14, 26, Appendix B
d. Sewer?	Study Area			X	14, 36
e. Storm water drainage?	Study Area			X	14
f. Solid waste and disposal?	Study Area			X	14
14. Human Health. Will the proposal result in:					
a. Location of septic systems in unsuitable areas?	Study Area			X	32
b. Exposure of people to existing potential health hazards?	Study Area			X	10, 7
15. Aesthetics. Will the proposal result in:					
a. The obstruction of any scenic vista or view open to the public in a designated Scenic Area or Community Separator?	Study Area			X	7, 10, 17
b. The creation of an aesthetically offensive site open to public view?	Study Area			X	7, 10, 17
c. Development aesthetically incompatible with surrounding land use?	Study Area			X	7, 10, 17
16. Archaeological/Historical. Will the proposal result in:					
a. Development in archaeologically or historically sensitive areas?				X	31

	Boundary Effect	Yes	Maybe	No	Refer
17. Mandatory Findings of Significance. Does the project have the potential to:					
a. Degrade the quality of the environment?	Study Area			X	14
b. Substantially reduce the habitat of a fish or wildlife species?	Study Area			X	7, 14, 31, 17
c. Cause a fish or wildlife population to drop below self-sustaining levels?	Study Area			X	7, 14, 31, 17
d. Threaten to eliminate a plant or animal community?	Study Area			X	7, 14, 17, 31
e. Reduce the number or restrict the range of a rare or endangered plant or animal?	Study Area			X	7, 14, 17, 31
f. Eliminate important examples of the major periods of California history or prehistory?	Study Area			X	31
g. Achieve short-term, to the disadvantage of long-term, environmental goals?	Study Area			X	14
18. Additional Mandatory Findings of Significance. Does the project have environmental impacts which:					
a. Are individually limited, but cumulatively considerable?	Study Area			X	14
b. Will cause substantial adverse effects on human beings, either directly or indirectly?	Study Area			X	14

DISCUSSION OF INITIAL STUDY

1. LAND USE: The Green Valley Study as proposed is consistent with all aspects of the General Plan, and the environmental impacts and mitigations described in the General Plan EIR are applicable to this study area.

2. EARTH: One of the predominant goals of the Green Valley Plan is the preservation of agricultural uses. This goal is clearly reflected in the proposed distribution of residential densities in the Plan's Land Use Element as well as the requirement for residential setbacks from agricultural uses.

   Erosion as a cumulative impact has been mitigated by the low residential densities proposed for steep and highly-erodible areas. Additional specific mitigations should be required as conditions of project permits including Use Permit, Building Permits, Grading Permits, and land division permits.

   Geologic hazards are mitigated by establishing low residential densities in potentially hazardous areas. Slope stability hazards should be evaluated in conjunction with each project specific permit in the area.

3. AIR: The air quality evaluation conducted as part of the General Plan is applicable to this area. No development is proposed in excess of that evaluated and found to have insignificant air quality impact.

4. WATER: Residential densities proposed by the land use plan will result in insignificant areas of impervious surfaces relative to the total area of the Green Valley Study. Consequent increases in runoff and decreases in groundwater recharge will also be insignificant. Individual projects should be reviewed for possible implementation of silt trap/recharge storm water retention basins for both water quality and ground water recharge benefits.

   Surface water quality will be protected by the proposed riparian setback. Additional mitigation should be required of individual projects--particularly engineered drainage control and re-vegetation of disturbed areas. Agricultural uses experiencing erosion problems should consult with the Federal Soil Conservation Service for soil management advice.

   On the basis of the ground water study (appendix B), residential densities have been adjusted to a level that should not result in annual use of ground water in excess of average recharge. Monitoring of the water level in area wells would be necessary to substantiate this conclusion for long-term ground water uses.

5. PLANT LIFE: The Green Valley Creek and Green Valley Marsh are recognized in the Open Space Plan. Protection of these unique areas must be accomplished at the individual project level. The limited additional residential development resulting from the Plan will not result in removal or conversion of significant amounts of natural vegetation. Introduction of non-native vegetation will be similarly limited. Impacts on agricultural vegetation are covered in No. 2 above.

6. ANIMAL LIFE: See No. 5 for discussion of habitat of unique and rare and endangered animal species.

7. NOISE: Major noise sources will continue to be traffic and agricultural equipment. No significant change in either will result from the Plan.

8. RESOURCES: Limited additional residential development will result in minimum conflict with resource production and enjoyment. Road setbacks will protect scenic corridors. Stream setbacks will protect wildlife and fishery resources. Water resources protection is covered in No. 4.

   Water and energy conservation can best be accomplished at the project level or by voluntary efforts. Minimal residential growth and continued agricultural production limits energy required by commuter trips.

9. GROWTH INDUCTION: No new public service or road facilities are proposed by this Plan. Additional development resulting from the Plan is minimal and will not result in any significant change in demand for commercial goods and services.

10. HOUSING: Housing promoted by the Plan is agricultural associated or rural residential, and is consistent with General Plan goals and policies providing for a diversity of housing opportunities in rural areas.

11. TRANSPORTATION: No new public road construction will be required to accommodate the level of development provided for by the Plan. Some minor increase in demand for road maintenance and improvement can be expected as additional planned growth in the area occurs.

12. PUBLIC SERVICES: Demand for additional public services will occur but will not occasion significant change or increased expenditures for fire or police protection. Effected schools are experiencing declining student enrollment and can accommodate planned growth within the Study Area. Limited population and large parcel size eliminate need for neighborhood recreation facilities. Regional recreational facilities will

not be impacted by the planned growth within the Study Area. General governmental services including Building Inspection, Public Health, Social Services, etc., will not experience significant change in demand from the limited population growth projected for the area.

13. UTILITIES: The development proposed by the Plan will not require new or substantially altered public utilities.

14. HUMAN HEALTH: Proposed residential densities reflect relative soil suitability for septic/leachline disposal systems. Public health hazards resulting from agricultural activities are mitigated by the required residential setbacks from agricultural uses.

15. AESTHETICS: Proposed land use is similar in type and intensity to that existing. Building setbacks as well as other requirements of the Open Space Plan will assure minimum AESTHETIC impact.

16. ARCHAEOLOGICAL/HISTORICAL: Archeologically sensitive stream corridors are protected by required setbacks. Site specific investigation and mitigation of archaeological impact will have to occur at the project specific level.

17. MANDATORY FINDINGS OF SIGNIFICANCE: The Green Valley Plan provides for a minimum of additional rural residential development with maximum retention of long-term agricultural potential. The environmental impacts are limited by the limited amount of additional development proposed for the area.

* *

LIST OF ORGANIZATIONS & PEOPLE CONTACTED

STAFF	SONOMA COUNTY ADVANCED PLANNING DIVISION
BILL STILLMAN	SONOMA COUNTY WATER AGENCY
	SONOMA COUNTY PUBLIC WORKS
WALT LAABS	SONOMA COUNTY ROAD DEPARTMENT
HAL WOOD	SONOMA COUNTY SANITATION
DON SMITH	SONOMA COUNTY HEALTH DEPARTMENT
	SONOMA COUNTY ASSESSOR OFFICE
BOB SISSON	SONOMA COUNTY FARM ADVISOR
	SONOMA COUNTY SHERIFF'S DEPARTMENT
	GRATON FIRE DISTRICT
	OAK GROVE SCHOOL DISTRICT

DAVE FREDERICKSON - PROFESSOR, DEPARTMENT OF ANTHROPOLOGY
SONOMA STATE UNIVERSITY

BETTY LOVALL - CALIFORNIA NATIVE PLANT SOCIETY (MILO BAKER CHAPTER)

GREEN VALLEY STUDY

May 1978

ATTACHED ARE CORRECTED PAGES 1, 8, 9, 10, 12, 14 & 30.

INTRODUCTION

The Green Valley Study is perhaps one of the longest running land use studies ever conducted by the current Planning Division of the County Planning Department. The study originally commenced in October of 1974 at the request of the Green Valley Community Club and a petition signed by many property owners in the area. The Board of Supervisors created the "S" Study District and approved a zoning of S-A-B5 (Study-Agricultural Base Zone - 2 acre minimum lot size). Just two months later in December of 1974, again in response to a petition from area residents and request by the Green Valley Community Club, the Board attached a "J" Mobile Home Exclusion district to the S-A-B5 zoning for the study district. In February of 1975 the study district was extended. In addition, in the course of the public hearings, area residents requested that the minimum lot size be increased, thereby causing the Board of Supervisors to initiate a 5-acre minimum lot size. The study district and the 5-acre minimum were in effect until October of 1976 when the "S" district lapsed. It since has reverted back to the original zoning of A-1 (primary agricultural) zone.

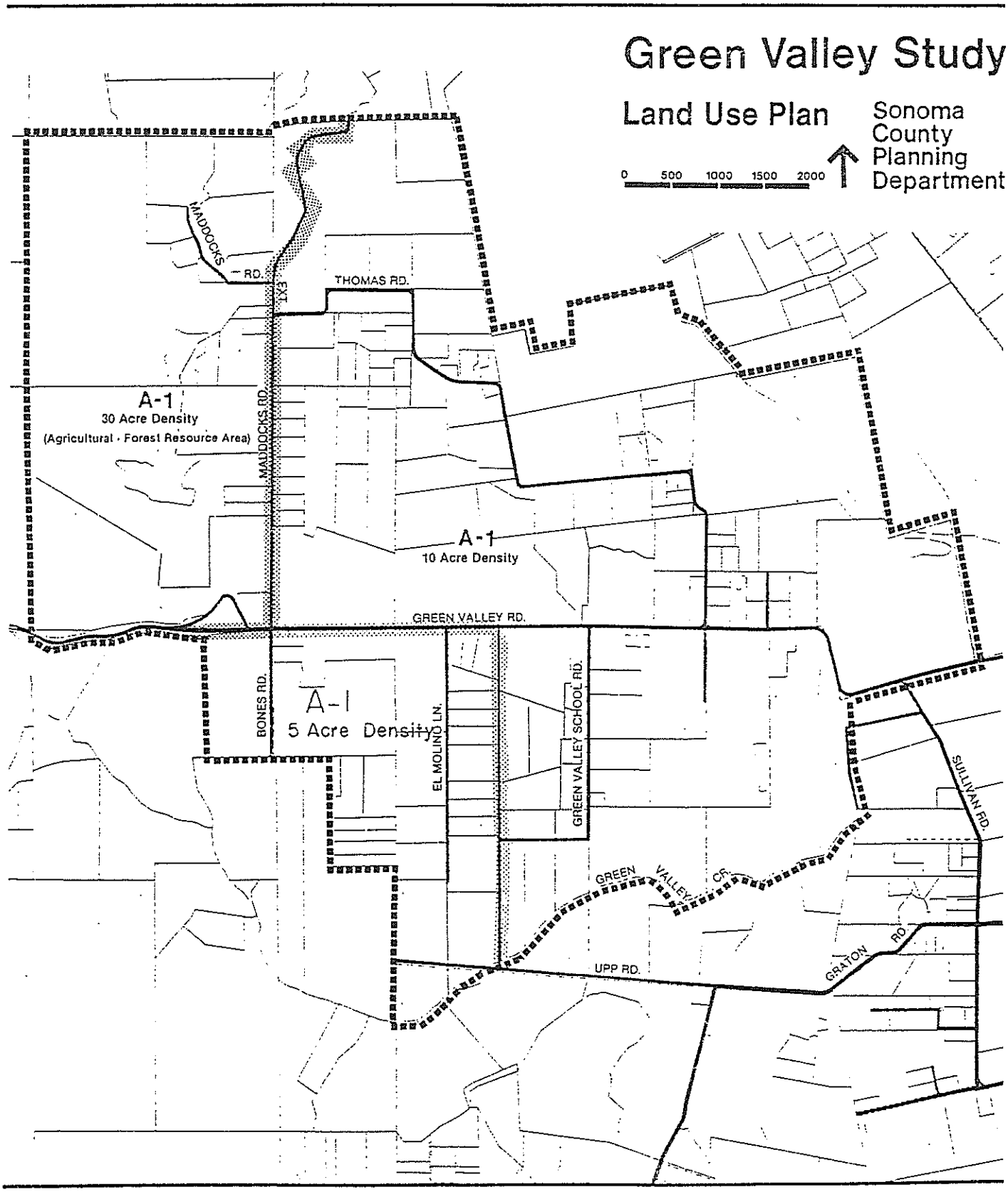
Green Valley is a serene, rural country setting, which has in the past been a community of first and second generation orchard farmers. However, due to its natural beauty, rural character and yet accessibility to urban communities, Green Valley, like similar areas of western Sonoma County, has become a "desirable place to live". In the last six years more change has taken place in the Green Valley area than ever before in its history. Although this change is not unique to Green Valley alone but to all the western Sebastopol area, it has brought about a need and desire from each community for study and controlled planning. Planning which would check uncontrolled speculative lot splitting and land development and retain the existing life style.

Significant problems in the Green Valley area include the impact of future development on the area's water supply. All water is presently supplied by wells. As increasing development has occured over the last few years so has the impact upon the area's wells. There are, in fact, some areas of the study which must truck-in water during summer months, and with the added condition this year of a drought situation, some wells have reportedly gone dry.

Accompanying the concerns of water, area residents have also become increasingly concerned about the area's ability to further accommodate development on septic systems. Due to geology and soils composition in Green Valley it has been noted that many locations in the area have not passed percolation tests. The areas which seem not to have problems (passing perc tests) are unfortunately agricultural areas which brings up a third concern stressed by many Green Valley residents; the consequences of lot-splitting and subsequent development by in large removing productive agricultural lands from production and in addition creating land uses not compatible with agricultural uses.

The study uses the desires and goals of the community coupled with existing development patterns and "carrying capacity" of the land to achieve a specific land-use plan, a plan which will act as a future planning, zoning and policy direction guide for future development of the Green Valley Area.

▪▪▪▪▪▪ Study Area Boundary



ZONING

The proposed zoning plan recognizes the desire to retain agricultural viability of Green Valley, yet uses combining zone designations to allow flexibility.

The base zone recommended is "A-1" (Primary). Five combining zone categories are included for application to specified areas. They are:

A-E - Agriculture Exclusive (20-acre minimum)
A-B-5 - 5-acre minimum - Agriculture - 5-acre minimum
A-B-5 - 10-acre minimum - Agriculture - 10-acre minimum
A-B-6 - 30-acre density - 10 acre minimum
P.A. - 15-acre density - 3-5 acre minimum

The zoning map (page 10) reflects these designations upon the study area.

Also combined with the base agricultural zoning is the "J" district designation. This zoning district is provided at the request of the area residents who wish to prohibit permanent use of mobile homes (trailers) and thus preserve the aesthetic and economic integrity of the Green Valley area.

Setback Requirements

Agricultural Areas - In an effort to avoid conflict between residential units and agricultural uses, such as spraying of orchards, a 200 foot setback is recommended to separate agricultural activity from housing development.

Waterways - To preserve the riparian vegetation and prevent further erosion of the Green Valley Creek, a setback of 100 feet is recommended from the stream bed.

Visual Corridors - A building setback of 120 feet has been recommended along Green Valley Road in order to implement its designation as a scenic highway by the County General Plan. Also recommended as a visual corridor for scenic travel is Thomas Road and Maddocks Road. A setback of 20% of lot depth is recommended here.

Unique Biotic Area

Green Valley Creek Marsh is pointed out as being an area of extreme ecologic sensitivity. Hopefully, through identifying this habitat, efforts can be made to study and minimize impact upon this unique wetland.

Study Area Boundary

A-I-B5-B6 Primary Agricultural District Special Building Site Area Regulations

A-I-PA Primary Agricultural, Planned Area Combining District

AE Exclusive Agricultural District

SETBACKS

Agricultural Areas - 200 ft. setback from dwelling to intensive agricultural area.

Waterways - 100 ft. setback from centerline of creek.

Visual Corridors - 120 ft. setback along Green Valley Road. 20% of lot depth recommended along Thomas and Maddocks Roads.

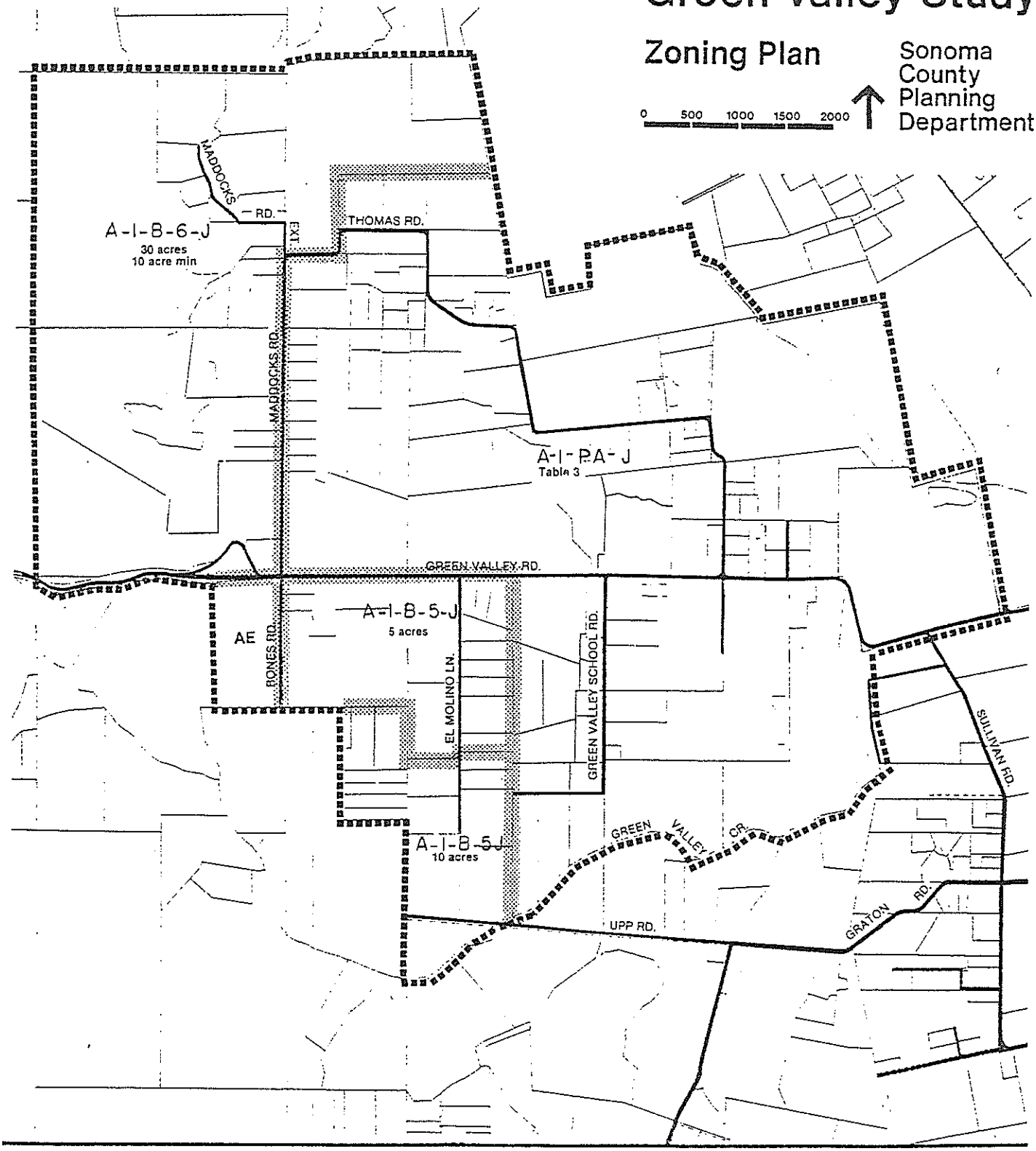
J MOBILE HOME EXCLUSION

Green Valley Study

Zoning Plan

Sonoma County Planning Department

0 500 1000 1500 2000



A-P.A. Zone, Table 3 - The remaining land, which comprises land along Green Valley School Road, land north of Green Valley Road, and land along Thomas Road east of Maddocks Road, is proposed as Agriculture - Planned Area Zone, Table 3. (Table 3 follows below). The basic criteria for this zoning follows the desire to retain agriculture yet to allow some property parcelization to occur.

The majority of the property in this zoning category contains producing apple orchards. Other large parcels are planted in vineyards, used for cattle grazing, or lie within the flood plani area of Green Valley Creek. A few smaller parcels exist along the roadways (the majority of which were created many years ago). Due to the limitations of water availability and septic conditions the small parcels are of inadequate size to be self-supporting and if perpetuated would have adverse results.

In order to preserve agriculture and promote new agricultural uses, a minimum lot size of ten acres is needed. According to the Ag Commissioner's Office and knowledgeable persons, ten acres is the smallest unit viable to sustain an economically productive agricultural use.

"PA" TABLE 3

PLANNED AREA COMBINING DISTRICT

Base Parcel Size of Record (acres)	0 - 14.9	15 - 29.9	30 - 44.9	45 - 59.9	60- 74.9	75 - 89.9	90 - 104.9
Maximum Permitted Residential Development Area	0	3	6	9	12	15	18
Maximum Number of New Parcels Permitted	0	1	2	3	4	5	6

Application of "PA" Zone

Item 1. Base parcel size of record shall be that as shown on the adopted Zoning Map of the Green Valley Plan.

Item 2. The residential development area (exclusive of the residual) permitted by the adopted "PA" table shall not exceed a denisty of 3 acres per dwelling unit. In all cases, the residual parcel shall be rezoned to a "B-5" designation as a condition of subdivision approval.

Item 3. New parcels in addition to the residual, not less than 20 acres in size, shall also be permitted provided that any such additional parcel not less than 20 acres in size shall be rezoned to a "B-5" designation or similarly restricted as a condition of subdivision approval.

Item 4. All land divisions within the adopted "PA" Zone shall conform to the Adopted Open Space Plan for that area.

TABLE I

EXISTING DENSITY IMPACTS

Number of Ex. Parcels	Number of Ex dwell un.	Existing Population	Existing School Enr.	Existing Auto Trips	Water Usage	Sewage Disposal
156	118	304	65	1062	45,600	15,200

TABLE II

ADDED POTENTIAL DENSITY IMPACTS UNDER EXISTING ZONING

Parcel Size	Added Parcels 1 du/parcel	Population	School Enroll.	Auto Trips	Water Usage	Sewage Disposal
2 Ac	360	928	198	3280	139200	46400
	478	1233	262	4302	184800	61600
5 Ac	144	371	79	1296	55650	18550
	262	675	144	2358	101250	33750
10 Ac	72	185	39	648	27750	9250
	190	489	104	1710	73350	24450

TABLE III

PROPOSED ZONING PLAN IMPACTS

Parcel Size	Added No. of Parcels	Added Population	Added School Enr.	Added Auto Trips	Added Water Usage	Added Sewage Disp.
5 Ac	6	87	47	306	13,050	4,350
10 Ac	0					
PA Zon.	23					
30 Ac	5					
TOTAL	34					
CUMULATIVE TOTAL	190	489	112	1368	58,650	19,550

Household Size = 2.58 persons per household (1970 Census Tract 1537)
School Enrollment = .55 children/household, average school district
Auto Trips = 9 average weekday trips per dwelling
Water Usage = 150 gallons per day per person (Sonoma County Health Dept.)
Sewage Disposal = 50 gallons per day per person (Sonoma County Health Dept.)

AGRICULTURE CROP REPORTS, SONOMA COUNTY (in $1000)

REVENUE

Fruit Crops	1965	1970	1972	1973	1974	1975	1976
Apples	3,528	5,163	7,132	11,353	9,760	8,604	7,838
Grapes	3,470	4,817	3,012	21,692	12,268	9,486	13,354
Pears	833	768	700	841	764	713	725
Prunes	4,302	4,575	4,082	5,136	5,862	3,818	2,578

Apple producers in the Green Valley area, as well as many in the greater Sebastopol area, report that it is becoming unfeasible to continue in apple production. "Skyrocketing production costs and low income received from the market" say these producers, is driving them out of the business. Many of these orchardists are second generation apple producers, having inherited the family farm along with the business. Many are now approaching an elder age where hard work with decreasing return and increasing operating expense begin to not hold much of a future especially in an industry which has not been mechanized and must still be done through individual labor.

For several years the County has been planning to conduct a study evaluating the viability of the apple industry in Sonoma County. However, to date this has not taken place. When and if such a study does take place, perhaps many questions can be answered and new methods established that will help the apple producers. Such analysis is not within the confines of this study, but should be undertaken soon by the County.

Underlying these existing economic concerns present today is the committment by the County, in its prepared General Plan, for retention and preservation of agricultural lands. The committment to agriculture simply means assuring that there will be agricultural land available for cultivation and food production in the future. In this respect the County should strive to maintain the viability of existing agriculture or to encourage the production of alternative crops. Ways and means must be found by government and property owners working together to continue this most important industry in Sonoma County. One very important and big step which must be taken is the consideration by tax assessors of agricultural areas and uses as permanent uses and not their developmental potential.