BURTON VALLEY RIDGE
DEVELOPMENT
GUIDELINES

This document, consisting of text prepared by the Lafayette Planning Department and Planning Commission and portions of the Burton Valley Ridge Reconnaissance Study Memorandum, is the Burton Valley Ridge Development Guideline, a planning and design guide for the development of the Burton Valley Ridge.

December 14, 1987
PREPARED BY LAFAYETTE PLANNING DEPARTMENT

Memorandum

September 24, 1987

TO: City Planning Commission

FROM: Carlos Anglin, Planning Director

SUBJECT: Adoption of Burton Valley Ridge Development Guidelines - Continued Public Hearing

At its meeting of August 13, 1987, the Planning Commission reviewed a draft of the Burton Valley Ridge Development Guidelines. After hearing comments from the public and Commission discussion, it was determined that portions of the Guidelines dealing primarily with the Sketch Master Plan needed further work and review.

It was felt that the Sketch Master Plan created planning expectations for future development which were not necessarily those of the City and at least required considerable review and technical investigation before they would be acceptable as guidelines.

Staff has taken the Commissions concerns and redrafted the Guidelines. The Sketch Master Plan and any text referring to it has been removed. As a result other portions of the Guidelines text had to be modified to make it go together.

The Guidelines should be read with fresh eyes as a stand along planning document. There may still be modifications which the Commission may desire.

The Parks and Recreation Commission will be reviewing the trail alignment at their meeting on September 23, 1987. Staff should have the results of that meeting for the September 24, 1987 Planning Commission meeting.

Recommendation:

Subject to additional changes by the Planning and Parks & Recreation Commissions, recommend to City Council the adoption of a Negative Declaration and the Guidelines.

CA:lt

9-24cab

BEFORE THE CITY COUNCIL OF THE CITY OF LAFAYETTE
IN THE MATTER OF:

ADOPTION OF THE BURTON VALLEY)
RIDGE DEVELOPMENT GUIDELINES) Resolution 73-87
)

WHEREAS, it was recognized in 1986 that some comprehensive planning was necessary for the Burton Valley Ridgeland because of its common physical relationships and problems; and

WHEREAS, a moratorium upon subdivisions was established to provide time for a study to take place; and

WHEREAS, a development opportunities and constraints study was prepared by a planning consultant which was reviewed, modified and expanded by the Planning Commission, Parks and Recreation Commission, Council and staff; and

WHEREAS, many public hearings were held to review the planning report and its objectives where property owners and neighbors of the area provided input to the process; and

WHEREAS, a planning document called the Burton Valley Ridge Development Guidelines has been developed which is a compilation of ideas resulting from the planning process.

NOW THEREFORE, the City Council of the City of Lafayette, California RESOLVES to:

1. Adopt the Burton Valley Ridge Development Guidelines as a planning and design guide for the development of the Burton Valley Ridge; and

2. Adopt a Negative Declaration of Environmental Effect.

PASSED AND ADOPTED by the City Council of the City of Lafayette at a regular meeting of said Council on December 14, 1987, by the following vote:

AYES: Councilmembers Holmes, Tatzin, Uilkema and Mayor Parti

NOES: None

ABSENT: None

ABSTAIN: Councilmember Wilson

APPROVED

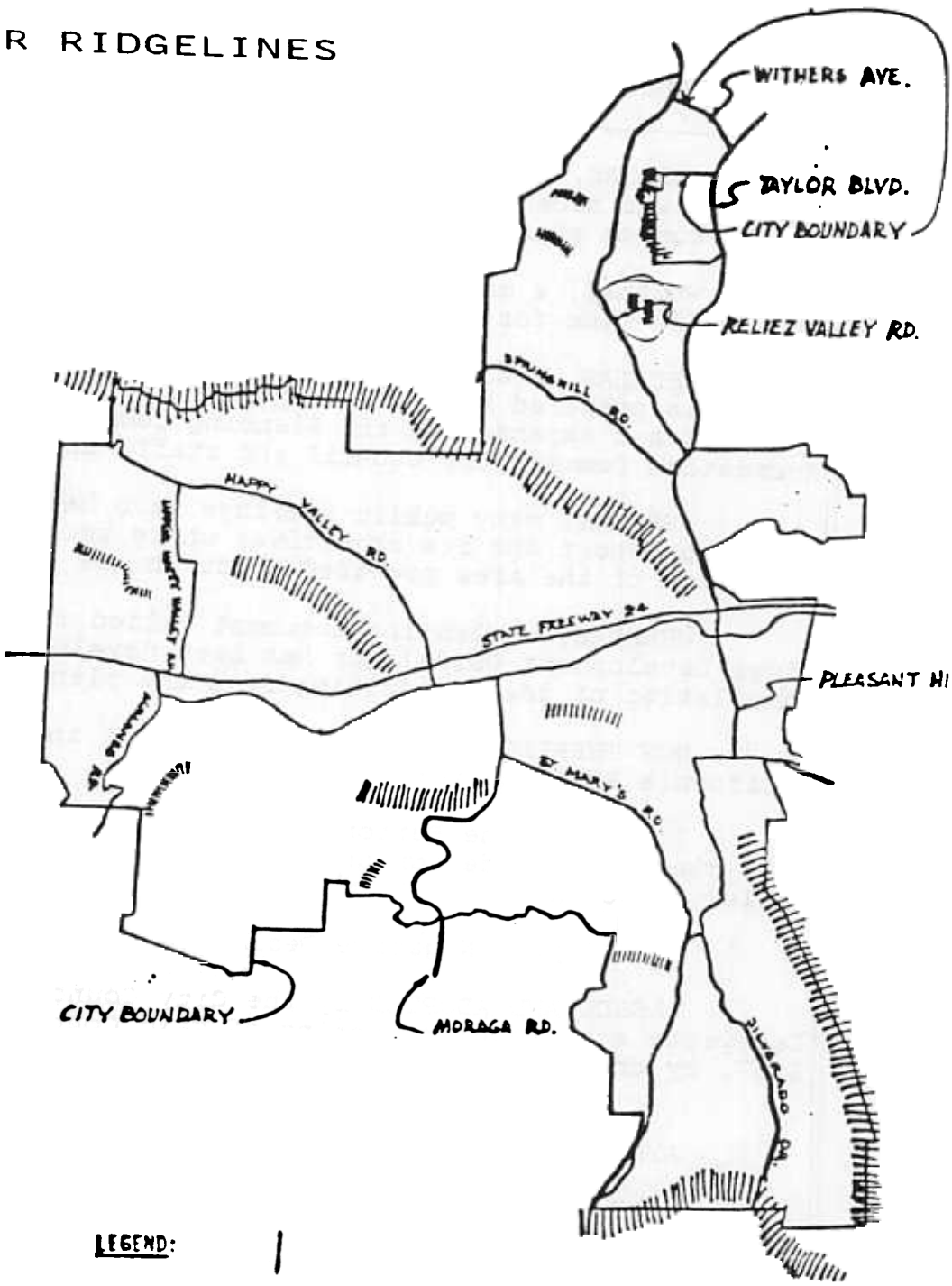
E. M. Parti

MAYOR

ATTEST:

CITY CLERK

MAJOR RIDGELINES



NOTE: THIS MAP SHOWS GENERAL LOCATIONS OF THE MAJOR RIDGELINES BUT IS ONLY AN APPROXIMATE REPRESENTATION OF EXHIBIT A OF ORDINANCE NO. 366 ON FILE IN THE CITY OFFICES.

INTRODUCTION

Resolution 73-87

During the spring and summer of 1987 the Planning Commission, Council, property owners and neighbors of the Burton Valley Ridge have participated in the preparation and review of studies related to the future development of this 220 plus acre territory.

It was recognized in the summer of 1986 that some comprehensive planning was necessary for this area because of its common physical relationships and problems. The City was reluctant to approve various development projects without the understanding of an ultimate plan or at least a guideline or course to be followed which would provide for appropriate development.

After the adoption of a moratorium on subdivisions of the ridge area the property owners commissioned a Reconnaissance Study prepared by a planning consultant. The study addressed various planning issues for the land and took a broad look at the territory's carrying capacity and its inherent opportunities and constraints for public and private uses. As stated in the Reconnaissance Study ...

> "the goals of the Planning Commission, neighbors and property owners, various development/conservation study plans for the area were examined showing developable areas with major road connections, trail and open space opportunities and other public improvement potentials."

As part of the Reconnaisance Study a Sketch Master Plan was developed by the consultant based on a hybrid of these options.

Burton Valley Ridge Reconnaissance Study Memorandum

The product of the consultants' work is a study memorandum originally made up of some 15 pages of text, various maps, charts and diagrams. The most illustrative and important parts of the study memorandum are the Opportunities and Constraints map and the Sketch Master Plan. These maps present the consultant's conclusions of the study for all the properties involved in a single graphic format.

City Review Process

Many study sessions have been held to review the Reconnaissance Study by the Planning Commission and Council with participation of the property owners and residents near the study area.

As a result of these meetings the Planning Commission and Council adopted a process called the Burton Valley Ridge Study Completion Process, dated July 13, 1987. This is a document listing eleven factors relating to the use of the Reconnaissance study as a development guideline and sets forth other associated functions related to the development of the site.

Two ancillary investigations were initially going to be undertaken by the City. One is a traffic generation cummulative impact report item 5 of the Study Completion Process document and is in progress. The other is a storm drainage study which was eliminated by the Council with an expectation that the subject would be explored as parts of the Environmental Impact Reports required for the processing of individual development projects.

The Planning Commission determined on June 11, 1987 that at that time further review of the plan was not necessary except for some special comment about two areas of the site described in the June 11, 1987 staff report. Otherwise the City could adopt various studies and related documents as a development guideline.

At a subsequent meeting, August 13, 1987, the Planning Commission wished further review of the Guidelines in relation to whether the Sketch Master Plan portion of the Reconnaissance Study should be included in the City adopted Guidelines.

It was decided that several design factors of the Sketch Master Plan created planning expectations, in the minds of the public and property owners, which had not been reviewed as thoroughly as would be necessary for the City to accept them as part of the Guidelines and in some instances, ideas which were not acceptable at all by the City.

Additionally, and of particular concern to the neighbors in the Andreasen Dr. area, was any mention in the text or illustration on any drawings that vehicular access to the study area might be provided through the Andreasen Dr. area. The Sketch Master Plan and some text prepared by the consultant indicated a possible access opening onto Olympic Blvd. in this area.

In order to eliminate any expectation that by the adoption of the Guidelines the City endorsed or in any other way promoted this access idea, portions of the text and maps relating to the access have been deleted.

Accordingly portions of the Reconnaissance Study Memorandum (as written by the planning consultant), primarily the Sketch Master Plan and related text, have been deleted from this Guideline. The Study Completion Process document was also dismantled and redrafted and is the basis for the Guideline section called Determinations.

The City considers this Burton Valley Ridge Development Guideline to be a planning tool which gives preliminary direction for the future development of the property. It is generally acceptable as a guideline, however, detailed mapping, architectural, engineering and environmental impact studies will be necessary to demonstrate and substantiate the provisions of the analysis which now stand as unproven, unexamined. It is recognized that all the constraints connected to this property have not been identified and that further detailed review may uncover other physical factors which may effect the ultimate development of the properties. Environmental Impact Reports should be prepared for each

subdivision proposal.

Public Trail Alignment — Exhibit B Public Trail Alignment provides the connection trail alignment of the City Master Trail Plan for these properties. The exhibit is a reduction of the larger scale map also labeled Exhibit B located in the City file.

Terra California (U.D.C. Homes property) Environmental Impact Report.

In 1982 the U.D.C. Homes property, previously owned by Terra California, was reviewed by the City as a planned development and 15 lot subdivision. The project was denied. The following is a list of the environmental effects of the project which were determined by the Environmental Impact Report (EIR).

The full EIR is included as part of these Guidelines by reference

BENEFICIAL EFFECTS

Development of the project would:

1. Provide housing in the Lafayette area

2. Create an economic return for the property owner and the project developers.

3. Create short-term employment opportunities for construction workers.

4 Provide 25 acres of open space per February 27, 1982 revised plan.

5. Provide a 50 foot wide equestrian-pedestrian trail through the property per February revised plan.

ADVERSE IMPACTS

1. There would be a significant short-term impact of noise for homes located at the west end of West Newell Avenue due to their close proximity to the proposed access road off Olympic Drive. To build the road, blasting, grading and construction activity will occur within 120 feet of the nearest residence. This was not included as a point of focus for this report due to the short-term nature of the impact.

2. Proposed residence and roadway grading located along the prominent ridgeline would significantly affect the view from Pleasant Hill Road and surrounding areas. The grass-covered ridge is a focal point of seasonal color amid the evergreen tree cover flanking the ridge. Vegetative screening of houses located on the ridge would interrupt existing views, as would the structures

themselves. The February 27 revised plan has deleted the sites along the ridge and lowered the roadway to the west side of the ridge.

3. The 20-foot inside curve radius shown on the proposed access road fails to meet both County and Fire District standards. This is a significant adverse impact as a safety consideration. This impact no longer applies per February 27 site plan revisions.

4 Visual impact of the access road and its accompanying grading will be significant for uses of Olympic Boulevard and nearby residents.

5. There is a significant possibility of slope failure and landsliding at the site unless detailed soils engineering is conducted as part of the project planning and permit approval processes.

6. Visual aspects of the site will be altered from grass-covered hills to views of partially suburbanized hill areas. The changed topography and proposed structures, streets and other facilities would be visible to residents of Rossmoor, Dianne Court, Richelle Court, Andreasen Drive, St. Mary's Road, Sweet Drive and motorists along Pleasant Hill Road, Olympic Boulevard and State Route 24. as well as hillsides north of S.R. 24.

7. Additional traffic generated by the proposed project will be an increment in the cumulative traffic volume on Olympic Boulevard.

8. Consumption of nonrenewable resources, especially energy resources, will result from construction of houses.

9. Open space options for future land use will be lost.

10. Temporary soil erosion will result from removal of stabilizing vegetation as a result of grading.

11 Temporarily increased siltation of water courses will result from cut and fill for ground preparation of building sites.

12. Increased hazard of fire an associated property damage in hazardous fire areas will result from development.

13. The proposed Project is in conflict with the open space sections of the Open Space, Conservation, Parks, and Recreation Element of the Lafayette General Plan, regarding avoidance of blocking visual open spaces, such as the view corridor of Pleasant Hill Road, Olympic Boulevard and State Route 24.

DETERMINATIONS

1. The Planning Commission & Council may review, amend, accept portions of these Guidelines as appropriate. Other portions could remain unsanctioned but possible, subject to detailed review and action by other persons. Still other portions would be subject to further detailed review at the time of development proposals.

2. As a planning document these Guidelines are not mandatory (except by separate agreement). Development proposals would have to follow the normal zoning, subdivision and environmental review process, and justify and substantiate the validity of the conclusions of the Plan prior to approval of the project.

3. The City could amend associated City policies which can be adjusted as a result of review of the Guidelines, i.e. Master Trail Plan.

4. The City may amend the Hillside/Ridgeline Preservation Ordinance to include limitation on the creation of lots which have building sites of more than 30% slope.

5. That projects for Burton Valley Ridge shall be designed in a manner so that there will not be additional peak time storm drainage runoff. Verification of this criteria being met shall be provided by the Contra Costa County Flood Control District through the review of environmental documents or other project development information.

6. The City would proceed with necessary studies to measure cummulative impacts of traffic and establish mitigation factors

   a. Financial responsibilities including the costs of the studies and, for the installation of improvements would be applied to project developers.

   b. Installation of improvements in proportion to the need would take place through the normal exaction procedures associated with subdivision of the land.

   That the Council would release necessary funds to do the traffic study.

8. The Planning Commission and Council will work with the Parks and Recreation Commission towards a specific alignment for the trail with tolerance towards the location of future dwellings on the Moore and Wang properties.

9. The City determines that portions of the ridgelands should be part of the permanent open-space of residential developments and left in private ownership but protected by scenic easement. Open space area would be included in calculations for purposes of density and other land use provisions of the City zoning and subdivision regulations.

10. That Watershed Management Criteria be developed by the owners of the land so designated and shall be included with other submittal materials for subdivision applications.

11. That a list will be prepared defining the information required to be filed with each development application for the Ridge

BVRDG11.87

BURTON VALLEY RIDGE

RECONNAISSANCE STUDY

MEMORANDUM

Prepared for: Burton Valley Ridge Property Owners
(U.D.C. Homes, B.A.M. of California,
Moore Earth, Inc.)

Prepared by: The Planning Collaborative, Inc.

Submitted to: The City of Lafayette

March 1987

TABLE OF CONTENTS

I. INTRODUCTION

A. History, Purpose and Location

Burton Valley Ridge is located at the boundary of the cities of Lafayette and Walnut Creek. The Ridge is one of seven prominent ridgelines designated for special development considerations by the City of Lafayette General Plan. As such, it has been the focus of considerable discussion between the property owners, the Planning Commission, City Council, and City Planning Staff.

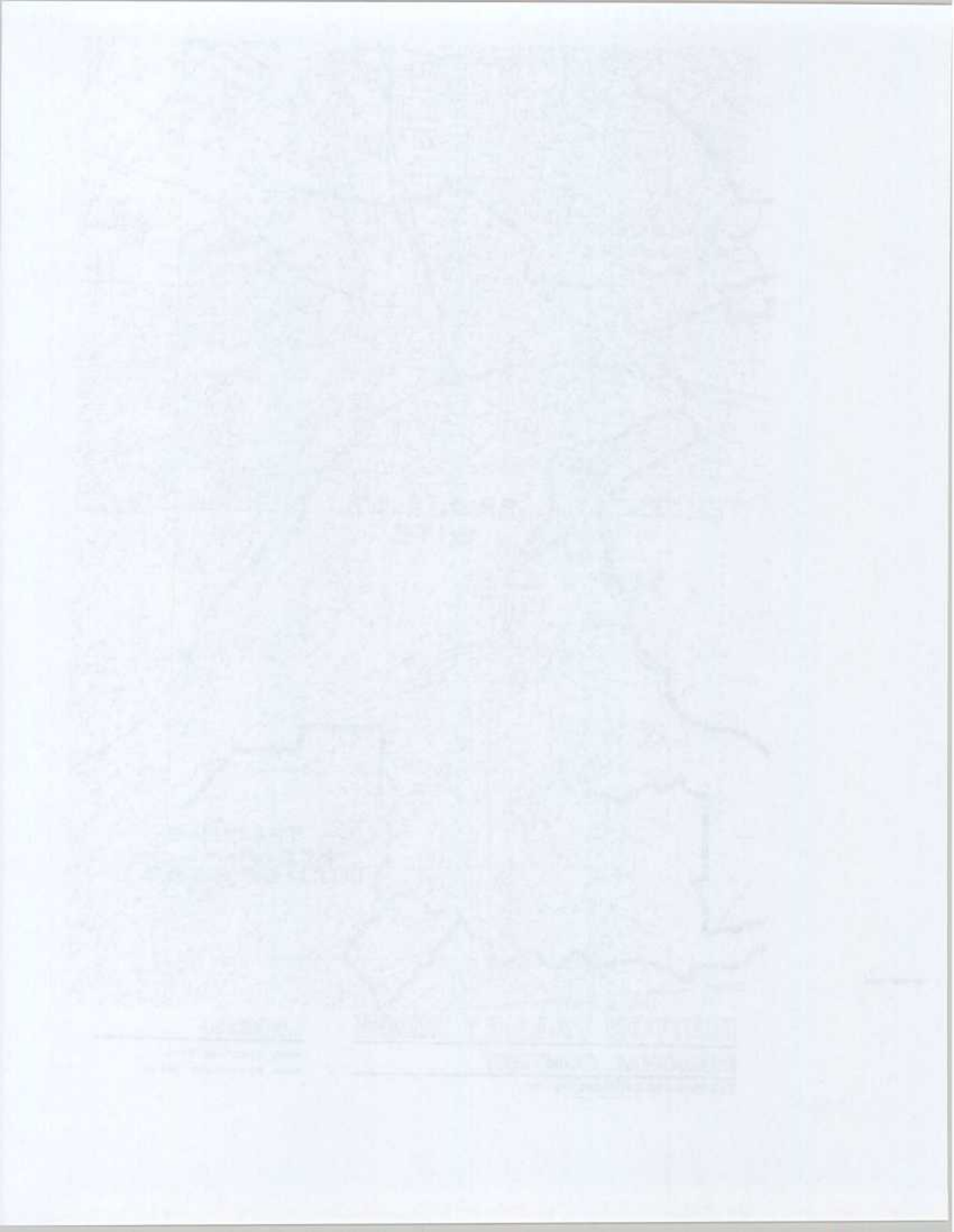
The genesis of this study began several years ago, when property owners on the ridge submitted separate applications for sub-division and residential development of their sections of the study area. Each of the applications was either denied or not acted upon as of August 11, 1986 when the City Council imposed a moratorium on re-zoning and sub-division for the 226 acres making up the ridge and adjoining lowlands. The moratorium was established to allow sufficient time for the preparation of a study which addressed various planning issues for the land.

The purpose of this study is to step back from the specific discussions and problems of each individual land owner and take a broad look at the site's carrying capacity, and its inherent opportunities and constraints for public and private uses. The study area includes the 226 acres of the ridge included in the moratorium, as well as off-site resources and issues affected by potential development of the ridge. Specific site resources were examined in greater detail than surrounding resources. Study area boundaries are Olympic Boulevard on the north, Glenside Drive and Lucas Drive on the west, the edge of Rossmoor on the east, and the terminus of the ridge at the EBMUD water tank on the south (see Figure 1).

B. Study Methods and Limitations

This study is best described as a "Reconnaissance and Sketch Master Plan." It is not intended to provide the detailed mapping, analysis and documentation which typically forms the basis for a Specific Plan. Nor is it meant to provide a completed Site Plan showing location and numbers of units and exact locations of roads and utilities. However, the property owners were given the opportunity to state an approximate unit count for each parcel based on the mapping data generated. These estimates are included. The study is a preliminary opportunities and constraints analysis providing a basis for a sketch master plan for residential development with accompanying public improvements, recreation and open space uses (including trails).

The study focuses on significant resources such as slope, vegetation/habitat, views, and landslides. Hopefully in providing a single unified concept (to which three of five land



II. STUDY AREA CONDITIONS

A. Topography, Soils and Geotechnical Issues

Topography - Elevations on Burton Valley Ridge range from 230 to 760 feet (above sea level). The ridgeline has a north-south orientation and predominantly western aspect with minor knolls and swales. The total land area studied is approximately 226 acres with an overall average slope of 31%. Broken down by properties, the average slopes are as follows:

40.0 acres on UDC	29% average slope
34.8 acres on WANG	28.5% average slope
87.8 acres on BAM	34% average slope
62.8 acres on Moore	28.6% average slope

The site varies substantially between extremely steep slopes within ravines and riparian zones, to gentle slopes in swales and on knolls. The suitability of the topography to support structures and to minimize substantial grading for building pads and foundations, roads, and drainage depends on the degree of slope.

Although the average slope of the ridge is 31%, there are numerous pockets of 0-10% slope, which are potentially developable. There is also a substantial amount of land between 10-30% slope that could allow limited development opportunities.

Working slope maps of critical areas were prepared at 1" = 100' scale and used them to refine the subsequent 1" = 200' scale sketch plan maps. On the Reconnaissance Plan, all areas of 30% slope or greater were defined. Access was carefully sited in areas of 10-30%. Areas under 10% (which met all the other criteria) were considered as most developable.

Soils and Geology - Separate geotechnical investigations have been completed for the Moore property, UDC property (formerly Terra California) and BAM property (see Bibliography). Detailed descriptions of site and regional geology are provided in these documents. Only relevant conclusions are summarized here.

The Western Contra Costa area is subject to seismic-related risks from three major faults (San Andreas Fault - 26 miles west, Hayward Fault - 7 miles west, Concord Fault - 6 miles east). Minor faults nearby include the Lafayette Fault running along the western edge of the study area and the Franklin and Las Trampas faults a short distance to the east and west. The three local faults are considered inactive.

The site is likely to be subjected to ground shaking during future seismic events. The possibility of surface rupture at the site is remote, because it is not located near an active fault zone. However, the site could be affected by secondary seismic affects such as localized sliding, surface sloughing, or

differential settlement (of poorly compacted fills). Liquefaction is not considered to be a secondary seismic hazard at the site due to the stiff and cohesive nature of the underlying soils and rocks.

The chart on the following page summarizes more site specific data on geology and soils from each individual investigation. The landslides which have been identified are mapped on the Opportunities and Constraints map, as are identified springs. Most of these landslides are shallow surficial slides (2-5 feet deep) occurring in the soil mantle overlying the bedrock. The geotechnical investigations describes techniques to stabilize and mitigate slide potentials in these areas.

Zones within, or adjacent to, active landslides are potentially difficult areas for development (requiring extensive grading and engineering for stability). Identified landslide zones served as a major criteria in locating developable areas. Some of the mitigation measures to repair slide areas require major grading and, therefore, potential visual impact.

B. Hydrology and Drainage

Drainage from the steep, primarily north/south trending ridge, is rapid and tends to concentrate in existing swales and creeks. As the Opportunities and Constraints Map indicates, six major swales drain the west face toward Lucas and Glenside drives. The most significant of these drainages is a large sub-watershed in the center of the study area. Flash flooding from this sub-watershed has been observed frequently in the undersized culverts and channels below Glenside Drive. Part of this problem may be accelerated by the lack of vegetative cover on the hillside as a result of heavy grazing.

Several other swales drain to the east toward Rossmoor. These tend to be steep and relatively short and drain much smaller sub-watersheds than the western slope. Two well-defined creek channels drain the UDC property and northern portions of the Moore property.

The swales are significant in several respects. First, development could be used to help improve nuisance flooding downslope of the sub-watershed draining the central ridge. Second, additional grading and impervious surface throughout the site could increase surface runoff from the hillslopes. Many on-site drainage techniques are available to minimize runoff and to improve conditions over the existing grazed hillside. Some illustrative methods are shown in the Appendix of this memo. Additional landscaping in swales and on hillsides can also assist in improving infiltration capacity.

TABLE 1. SITE GEOLOGY SUMMARY

	UDC Property	Moore Property *	BAM
Location on ridge	On an adjacent ridge facing Olympic Blvd.	Center of B.V. ridge off Glenside Drive	Southern B.V. Ridge
Primary Rock Types	Weathered, well-bedded sandstone	Neroly formation (sandstone/mud-stone, stable, high strength) and Lafayette Tuff	Nearby formation (in northern past) Lafayette Tuff Orinda formation (claystone, siltstone - poorly indurated)
Soil Mantle	1-5 feet of soft sandy to clay silt	Black Silty Clay 0-5 feet thick stiff, incompres-sible, expensive	1-3 feet clay underlain by 2-4 of silty clay - bedrock is 3-7 feet down
Presence of fill	none noted	yes-on lower slopes	yes-near end of Lucas Drive - up to 10 feet thick
Presence of land-slides	shallow sliding along western slope; may be deeper sliding along creek edge	several 2-3 foot deep surface slides in sort mantle; no significant or deep-seated slides	Numerous shallow slides on steep slopes and ravines
ground water or springs encount-ered?	none noted	active springs noted	high ground water at knoll area; several springs noted
Source	Moore and Taber 1981; Woodward-Clyde, 1980; Ecumene, 1981	Hallenbeck and Associates, 1984, and 1986	Hallenbeck and Associates, 1985

* No geotechnical investigation has been conducted for the Wang property.

C. Vegetation and Wildlife Habitat

A typical east Bay foothills pattern of open oak woodland, riparian drainages, and grazed grasslands (mostly annual exotics) characterize the vegetation of the Burton Valley Ridge. At the northernmost portion of the site (UDC property), a dense oak canopy dominates the landscape. Here, two creek channels support a relatively healthy riparian community, which does not appear to have been grazed in recent years. The oak woodland and riparian areas are valuable habitat for numerous bird species, deer and small mammals for cover, feeding, and nesting.

Most of the central portions of the ridge are grazed annual grasslands with scattered oaks. Over-grazing appears to be occurring on this part of the ridge. Several of the swales draining the ridge have well developed riparian flora consisting of willow, poison oak, blackberry, baccharis, and other species. These corridors, which offer seasonal moisture, cover and feeding area, are habitat for deer, small mammals and birds. The open ridge itself acts a corridor for wildlife migration between open space lands within the urban areas to the north and south.

Major oak tree masses and riparian vegetation are located on the Opportunities and Constraints Map. Where possible, developable zones were sited to avoid disturbance to these areas. In some instances, existing or enhanced vegetation could help form a visual screen for locating structures.

D. Visual Analysis

A field video recording and photo library were developed for the study area from key viewpoints. Of particular importance was documentation of those portions of the ridge visible from public roadways, public trails and parks and other prominent vistas. The ridge was video taped to document travelling views from all local roadways including Olympic, Reliez Station, St. Mary's, Glenside, Michael, Lucas, Pleasant Hill and various minor roads.

The ridgeline overlooks Walnut Creek to the east and Lafayette to the west and north, with panoramic views to the surrounding regional hills. This distinct topography creates three types of views to the ridge:

Distant views to the Ridge from major circulation routes and residential areas;
Closer views of the knolls, swales, and riparian channels from surrounding neighborhoods and site access roads; and
Closer, filtered views from adjacent roadways and residences.

Distant Views - The ridge is prominent from distant points along major circulation routes, such as Highway 24, and from the Lafayette BART station. Residents on the hillside west of the study area also have views to the ridge. These distant views encompass the entire central portion of the ridge and do not easily distinguish the complex system of swales and knolls, nor do they distinguish clearly between the study area and surrounding ridges. In many cases, development, if not intruding above the ridgeline, need not represent a significant impact to long-range views.

Closer Views from the Road - Views to the ridge from surrounding public roadways are filtered or screened by vegetation. Motorists along Reliez Station cannot see the ridge or its rolling topography because of the woodland masses and roadside vegetation. Motorists on Pleasant Hill Road approaching Olympic Boulevard view the top of the front ridge (which trends northwest-southeast) almost continuously, with relatively little obstruction. However, this portion of the ridge has considerable oak vegetation and locally complex topography which can be used to substantially conceal developed zones. Topography along the south side of Olympic Boulevard successfully screens views of the site for motorists travelling east.

Views from Lucas Drive (and nearby side streets) are moderately screened by existing houses, trees and vegetative massings. However, there are several breaks in the trees where motorists have clear views of the slopes and ridgeline of the central and southern portions of the ridge. The open, treeless grasslands have low visual absorption capacity for development on the west side of the central ridge. For development to be substantially concealed in this area requires that it be sited behind the topographic crest or tucked behind an existing swale or tree line.

Views from St. Marys Road are occasionally screened and filtered by roadside vegetation. Again, however, when there are no visual barriers, the traveller has clear views of the grassland slopes of the central ridge.

Three viewshed zones have been mapped on the Opportunities and Constraints Map. Those areas which are clearly seen from public locations, particularly along the higher elevations on the western face of the ridge, were not considered as developable zones because of their potential ridgeline impact. Zones which are completely concealed from public locations because of topography or vegetation are noted on the map, as well as areas partly concealed at the lower "toe" of the ridge continuous with existing development. The third zone depicts areas which are partially seen with filtered views. Development could be concealed in these zones only with additional landscape plantings and careful building placement.

E. Circulation

Surrounding Roadway System - Major roadways surrounding Burton Valley Ridge include: Pleasant Hill Road, Olympic Boulevard, Reliez Station Road, Glenside Drive, Michael Lane, and Lucas Drive.

Reliez Station, Glenside, Michael Lane and Lucas Drive merge to create a curving, hilly, continuous roadway along the western edge of the study area. Reliez Station Road intersects with Olympic Boulevard and runs along the northwest edge of UDC property, merging into Glenside Drive. It is a steep, hillside road with virtually no shoulder and poor site distances.

Glenside Drive continues north-south and turns sharply to the west as it intersects with Michael Lane. It is a narrow, hilly road with minimal shoulder.

Michael Lane begins at an awkward intersection (with poor visibility) with Glenside and travels north-south, terminating at Lucas Drive. It is a 2-lane road with narrow shoulders.

Lucas Drive runs in a northwest-southeast orientation at the western edge of the property. It is a wider 2-lane road with room for parking on each side and no shoulder. Andrieses Drive, although outside the immediate study area, is also of concern. It intersects Reliez Station Road just south of Olympic Boulevard at an awkward angle while Reliez is at a very steep incline. Turning movements are hazardous. Closure of this intersection would be possible if safer, level access could be provided at Olympic Boulevard/Pleasant Hill Road.

The Site - Burton Valley Ridge has a number of fire roads and jeep trails that traverse the hillside and ridgetop. Based on reports by the Lafayette Police Department and field observation by Omni-Means, Ltd. (Engineering and Planning consultants), there are currently no traffic problems on these roads or at their intersections.

Level of Service - Existing traffic volumes indicate service levels ranging from A-C on all roadways. Therefore, travellers experience little or no delay to short delays on Reliez Station Road, Glenside Road, Michael Lane and Lucas Drive, and average delays on Pleasant Hill Road and Olympic Boulevard.

Previous capacity studies of proposed low-density residential development on the ridge indicated no significant negative effect from additional traffic on these roadways. Typically, low density residential uses generate 10-12 vehicle trips per day. Although this study did not assign unit counts to all of the properties, the three major property owners had their own engineers do preliminary unit studies based on the Sketch Master Plan in this report. Based on these unit number estimates, the UDC Homes property would generate 150-180 daily trips and the BAM

of California property would generate 280-336 daily trips (the Moore property would generate 200-240 daily trips). Typical P.M. peak hour counts from the development proposals would be 10% of total daily trips, or 15-18 trips/hour; 28-34 trips/hour and 20-24 trips/hour, respectively. These trips generated are not likely to significantly effect existing service levels. However, a full traffic and circulation study would need to be prepared to definitively access these impacts.

Access to the Ridge - There are a number of logical access points to the four properties on the ridge, including:

1 Olympic Boulevard/Pleasant Hill Road if access across one or two privately-owned parcels could be secured.
(2) Reliez Station Road at Dianne Court.
(3) Reliez Station Road at North Glenside Drive.
(4) Terminus of Lucas Drive.
(5) Several short spurs off Lucas Drive.

Safety and Problem Intersections - Although basic capacities do not appear to pose a problem for low-density development, there are several key local intersections which already have site distance, turnaround, signage or alignment problems which could be enhanced in conjunction with development of the ridge: Michael Lane/Lucas Drive, Glenside Road/Michael Lane, Dianna court/Reliez Station, Andriesen/Reliez Station, Michael Lane/Reliez Station.

F. Land Uses Zoning and Regulatory Policies

Land uses to the west, north and south are predominantly low-density, single-family residential or open space. To the east is Rossmoor in the City of Walnut Creek consisting of multi-family condominiums and townhouses. The basic zoning pattern is shown on the Opportunities and Constraints Map.

Several existing City regulatory policies directly affect future development options for the ridge study area. The basic zoning for the entire study area is LR - Low Density Residential (zoning code, Article 9). Under this designation, 20-acre minimum lot size is required unless certain criteria are met. To reduce to 10-acre minimum lot size requires that the dwelling units are substantially concealed by existing vegetation and/or terrain and the property provides an easement consistent with the City's trail plan. To further reduce to 5-acre minimum requires two functional accesses and on and/or off-site drainage improvements. To further reduce to 3-acre minimum requires "extraordinary" treatment of earthwork and no dwellings over an elevation of 900 feet.

Chapter 20 (section 6-20001 to 6-20008) of the Lafayette Zoning Code, the Hillside and Ridgeline Preservation ordinance, also applies. This ordinance preserves significant natural

topographic features within the City to retain, as near as possible, the natural, open character of the hill area, and to minimize grading, cut and fill, soil erosion, slides and scaring This ordinance hopes to achieve densities that optimize land value for owners, yet, at the same time, prohibit development from adversely affecting natural features and obstructing views to and from the hills and ridges.

Under Chapter 20:

> structures on "hillsides" (defined as 10% average slope or greater in lower density residential area), cannot "have a substantial visual impact when viewed from areas in or near the City."
> Ridgeline development is prohibited within 100' of the center line of designated ridges.
> "No portion of a structure...adjacent to a ridgeline...may be constructed higher than a plane sloping downward at an inclination of 15 degrees from the horizontal interrupt of the ridge."

Each of these measures may apply to the study area. To account for the provisions, visible zones have been mapped; the 100' line has been mapped and valuable public open space values and potential trail, open space, drainage and access improvements have been discussed in the field.

G. Trail and Park Zones

A major part of this study was to explore options to create a major trail link between the parklands toward the north (Briones Regional Park) and those to the south (Las Trampas Regional Park). The City has long maintained a planned community trail on or near the Burton Valley Ridge.

The currently planned trail alignment is shown on the Opportunities and Constraints Map. Following the highest point of the ridge for most of its length, the planned trail connects to the west down a swale to link up with the soon-to-be built trail along the "neck" property. This trail ultimately becomes part of the Lafayette-Moraga regional trail run by the EBRPD. On the northern end of the ridge, the planned trail tranverses down the hillside in the vicinity of the two "twin creeks."

This "twin creeks" area may also have significant value as a public park and trail terminus, because of its visual, landscape and topographic qualities and its proximity to the City-owned property at Olympic Boulevard/Pleasant Hill Road.

Trail easements or parkland dedication would be required to allow for public use of these areas.

III. SYNTHESIS AND FINDINGS

A. Opportunities and Constraints

Figure 2 on the following page is the Opportunities and Constraints synthesis of study area conditions. The intent of the Opportunities and Constraints analysis is to focus attention on those areas that were not constrained for development by screening out areas which could not be developed because of visual impact, steep slopes, ridgeline impact, presence of landslides, existence of important vegetation or habitat areas or incompatibility with surrounding uses.

Views from public areas is the most significant limitation on developable area in terms of acreage. Small pockets of hidden zones occur on the western side of the ridge; several of which would be substantially concealed with mitigation (e.g. landscape planting). Larger hidden areas are located on the east side of the ridge; within the oak forest off Olympic Boulevard and in lowland pockets near the end of Lucas Drive.

The second most significant constraint in terms of area are steep slopes. The primary concern was to exclude any areas greater than 30% slope as undevelopable at any density. Slopes from 10-30% might be developable given specified site engineering and grading practices. Slopes under 10% are relatively less impacting and expensive to develop. Zones which are hidden and less than 30% slope are shown.

Vegetation and wildlife habitat areas were considered in screening out areas with low suitability for development. Mature oak trees, riparian corridors and areas where springs have increased the amount of shrub and tree vegetation was mapped. In several instances, oak wooded areas formed the basis for visual screening of development. It is presumed that there would be no removal of major vegetation.

Known landslide areas are also mapped and used to screen developable zones, except where mitigation could be accomplished without severe visual impact. The generally shallow slides can either be avoided by site-specific design or mitigated by grading and site work.

Landslide areas have been drawn somewhat larger than the actual identified slippage, since landslide areas tend to expand the lower slope becomes over-steepened.

Also depicted on the Opportunities and Constraints Map are the existing and planned trails and park opportunities found in the area. The existing Lafayett-moraga trail along St. Marys Road is shown, as well as the planned connections along Burton Valley Ridge to connect Los Trampas Park with Briones Park.

BURTON VALLEY RIDGE

OPPORTUNITIES & CONSTRAINTS

The Planning Collaborative, Inc.
PLANNING and LANDSCAPE ARCHITECTURE

12/22/86

LEGEND

- POTENTIAL DEVELOPMENT ZONES
- MITIGATION SITES
- SLOPE UNDER 30% WITHIN LOW or NO VISIBILITY ZONE
- IDENTIFIED LANDSLIDE
- OAK TREE MASSING (WILDLIFE HABITAT AREA)
- SPRING (WILDLIFE HABITAT AREA)
- RIPARIAN ZONE
- PROPOSED RIDGE TRAIL (CITY TRAIL PLAN)
- RIDGELINE CORRIDOR (100' FROM CREST)
- ZONING DISTRICT
- REGIONAL TRAIL CONNECTIONS

This analysis highlights those areas that are most constrained from development, those which have minor constraints or constraints that are easily mitigable through engineering or landscape treatment, and those areas in which there are few if any constraints. The mitigation programs for the "middle category" might include grading to mitigate slope or soil stability problems, landscaping to mask and area which now may be only partially hidden from public view, or on-site drainage improvements such as those found in the Appendix.

B. Alternative Concepts

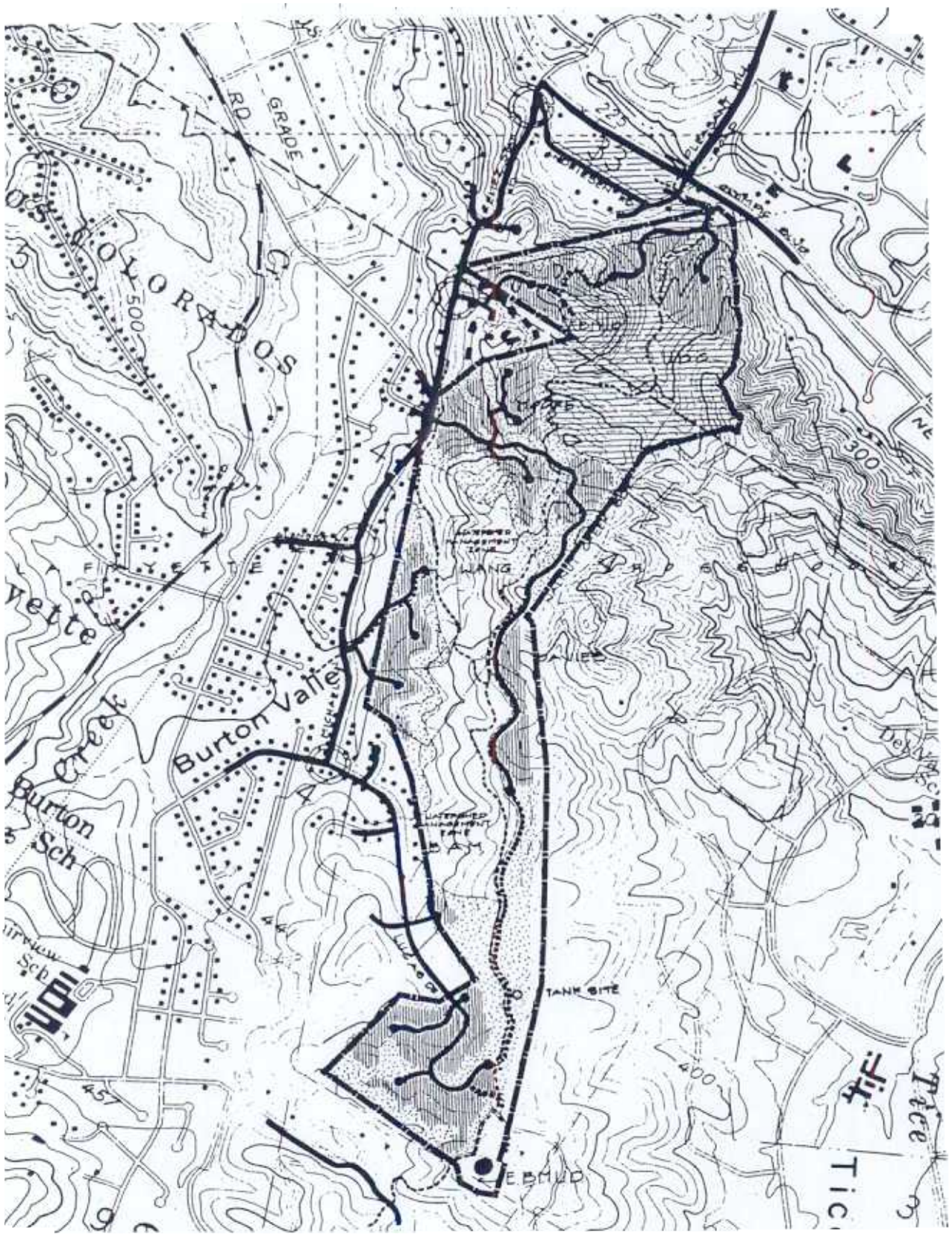
Several alternative sketch plan concepts were studied by the planning team and land owners. Each was based on the opportunities and constraints analysis and several key principles:

Areas of high constraint were eliminated from consideration, while areas of low constraint were given highest priority for residential cluster development.
Development areas were chosen where possible, which were contiguous with existing development and within proximity to adequate circulation and utilities.
Public opportunities for a park, and trails and access, drainage and utility improvements were sought.
Development uses were clustered to maximize the open space potentials and visual prominence of the ridge.
Development areas include some lands which have constraints such as steep slopes, but in which there is sufficient space to site buildings on unconstrained property.

C. Sketch Master Plan

The resultant Sketch Master Plan (Figure 3) tries to minimize conflicts with public values and maximize private development interests of the landowners. Figure 3 shows both the private residential opportunities and the public opportunities presented by the plan. Its key features are:

Clustered residential development zones which are logical extension of the existing residential pattern, in most cases.
A simple circulation network which links potential developable zones to existing roadways with minimal road lengths.
A regional ridgeline trail connecting to the Lafayette-Moraga trail on the west, to the City's property at Olympic Boulevard on the north (and on to Briones at some future date) and to a potential alignment toward Las Trampas to the south.



BURTON VALLEY RIDGE

SKETCH MASTER PLAN

The Planning Collaborative, Inc.
PLANNING and LANDSCAPE ARCHITECTURE

LEGEND

- PUBLIC PARK
- RESIDENTIAL DEVELOPMENT ZONE
- SCENIC or OPEN SPACE EASEMENT
- WATERSHED MANAGEMENT ZONE
- PUBLIC TRAIL/ TRAIL EASEMENT
- FIRE/SERVICE ROAD
- PROPOSED ACCESS ROAD

This analysis highlights those areas that are most constrained from development, those which have minor constraints or constraints that are easily mitigable through engineering or landscape treatment, and those areas in which there are few if any constraints. The mitigation programs for the "middle category" might include grading to mitigate slope or soil stability problems, landscaping to mask and area which now may be only partially hidden from public view, or on-site drainage improvements such as those found in the Appendix.

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A community open space park which takes advantage of the oak woodland, twin creeks, "grotto," and vistas of the hillside at the northern end of the study area.
Potential drainage improvements to culverts, swales and landscaping within the central ridge watershed to protect downstream properties and roads from chronic storm flooding.
Potential access improvements (e.g. signage, guard rails, minor widening or site distance improvement) to key local intersections.

The total acreage in the Study Area is 226 acres. The acreage shown in potential development zones totals 55 acres (or 24%), although only portions of these zones would actually be covered by developed uses. Based on this analysis, the property owners engineers estimated a unit count for single-family residential use within the proposed zones: U.D.C. Homes - 15 units, B.A.M. of California - 28 units, Moore Earth - 20 units. These figures should be regarded as preliminary only, subject to more refined study.

D. Where Does the Process Go From Here?

A reconnaissance study is only a first step. To accurately locate buildable areas and to begin to design a project (or projects) which meets public and private needs requires considerable more detailed site planning, engineering and technical analysis. In addition, to implement the relatively complex public-private trade-offs will require careful study of institutional options, financing and assessment procedures and public trail/park feasibility. The vehicle(s) for further study may involve a PUD or a series of PUD proposals, a Specific Plan with or without Development Agreements, land transfers or development rights negotiations or other options. Decisions on where to go from here must rest in the hands of the Planning Commission, Council and landowners in cooperation with neighbors and citizens.

One option would be for each property owner to file separate tentative maps which reflect the developable zones, preferred trail locations and other elements described in this plan. A second option would be a joint Specific Plan prepared by all the owners.

IV. APPENDIX

A. Bibliography

The following sources were used:

City of Lafayette City Council Ordinance No. 355 of August 11, 1986, "Imposing a Moratorium on Re-zoning and Subdivision of Certain Properties on Burton Valley Ridge."

City of Lafayette City Council Resolution No. 41-83 Master Trails Plan Amendment to the General Plan.

City of Lafayette, General Plan, various elements, 1974, including Geologic and Seismic Safety Element and Supplement.

City of Lafayette Hillside and Ridgeline Preservation Ordinance

City of Lafayette Zoning Code, Article 9 (Low-Density Residential District).

Ecumene Associates, Draft Focused Environmental Impact Report, Lafayette Triangle, Subdivision 5806, 1981.

Geotechnical Study Proposed Subdivision 6569 (BAM - Mazin Al-Mufti) March 18, 1985.

Hallenbeck & Associates, Addendum to Geotechnical Report, April 7, 1986.

Hallenbeck & Associates, Preliminary Soil and Geologic Reconnaissance Proposed Four Lot Subdivision - Moore Property, May 14, 1986.

Hallenbeck & Associates, Soil and Geologic Study Proposed 32 Lot Subdivision - Glenside Drive and Reliez Station Road, September 20, 1984.

Moore & Taber, Preliminary Geologic Investigation, Base Map Compilation from Leo Schell, 1985-1986 topographic work.

Omni-Means Ltd., Traffic Analysis for Lucas Drive - 24 Unit Subdivision, 1985.

Pacific Aerial Surveys, Aerial Photographs, April 20, 1986.

Tentative Subdivision #5906, April 9, 1981 (Terra California).

TJKM Consultants, Traffic Study Subdivision 5806, Walnut Creek, 1980.

Transportation/Circulation Section of the Draft Environmental Impact Report on "The Neck Property - Tract 6511."

U.S.G.S. Quad Maps for Las Trampas and Walnut Creek.

Various Memoranda from the Lafayette City Traffic Engineer to the Lafayette Traffic Commission, June 4, 1985, regarding Michael Lane.

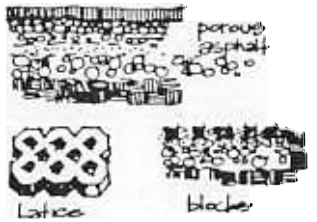
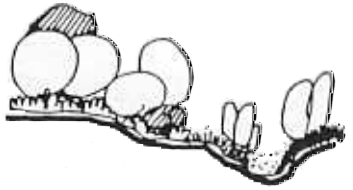
Various staff reports to the Lafayette Planning Commission on each property owner's individual applications.

Various Tentative Maps, Subdivision Proposals and Engineering Drawings for past applications of property owners on the ridge.

Woodward-Clyde Consultants, Preliminary Geotechnical Investigation: Proposed Roadway Across Gennette Property, April 14, 1980 (Terra California).

B. Selected On-Site Drainage and Runoff Control Measures

The following drawings are based on work conducted by Planning Collaborative for the Monterey Bay Association of Governments Aquifer Recharge Protection Program in the Carmel Valley. The measures are primarily designed to retain surface runoff on site of residential development. They are presented here as potential design options for the Burton Valley Ridge property owners.

SYSTEM/COMPONENT	DESCRIPTION	GUIDELINES
2.10 RETENTION GRADING 	Grading ordinances conventionally provide for rapid drainage of storm water from developed land, rather than allowing for natural runoff or retention of storm water on developed sites. The purpose of retention grading would be to provide shallow ponds and depressions in lawns and portions of a site to permit retention of overland flow and enhance infiltration values. Swales, terraces, diversions, and spreaders may also be used to slow runoff and increase infiltration. Increased overland flow time can reduce storm peaks and reduce downstream drainage facilities. Erosion control, slope detection, and improved water conditions for site vegetation are also benefits. Mostly applicable to large site uses or developments where porosity of soil is appropriate. If soils are poorly drained, however, mosquito nuisances and vegetation damage from waterlogged soils may result.	1) Changes to local grading ordinances should be encouraged to permit on-site retention or storm water through simple grading procedures. 2) Design criteria should be developed to relate lot size to runoff and recharge retention. 3) Grading techniques may be integrated with other measures which provide for infiltration after preliminary concentration of rainwater. 4) Retention grading standards should be designed to increase infiltration prior to concentration of runoff. Use of runoff spreaders may be included to disperse runoff where concentration has occurred and reestablish sheet flow and infiltration in undisturbed areas.
2.20 PERVIOUS PAVEMENT 	Pervious pavement materials can increase at-source infiltration and reduce off-site runoff and flood peaks by reducing a percentage of the displacement associated with standard pavement. An added benefit is a reduction of skidding of vehicles on wet pavement and puddles for pedestrians, and reductions in the overall paving, curbing and storm sewer facilities. Techniques include use of porous, aggregate and asphaltic materials, porous pavers, precast concrete, lattice blocks and bricks or on-bound gravel services. Filtering properties will vary with material; some have on-proven filter value. Where water table is high, auto pollutants could infiltrate groundwater.	1) Pervious pavements may be appropriate for many roadway and pavement needs, for overflow parking areas, or for other pavement needs. Although the cost initially may be higher than conventional pavement, the added expense may be offset by reduced runoff facility investments. 2) Because porous paving is a relatively new development, few local regulations may recognize their use. Regulations may also not recognize savings in storm drain sizing.
2.30 VEGETATION MANAGEMENT 	Vegetative cover affects the speed of surface water runoff and moderates the flow of water through the watershed. Vegetation management can control downstream concentration of runoff, promote upstream retention, and sustain streamflow over a longer period. Considerations include the proper management of wildland vegetation to maintain stable streamflow conditions, revegetation of areas where losses from fire or development have resulted, and restoration of special vegetation types, such as in riparian areas. Associated benefits include erosion control which reduces non-point source pollutant loads at surface waters.	1) Minimize disturbance of natural vegetation in development areas. 2) Encourage improved development standards which provide for temporary cover for erosion control during construction and permanent revegetation to stabilize developed sites.

GROUP 2.00

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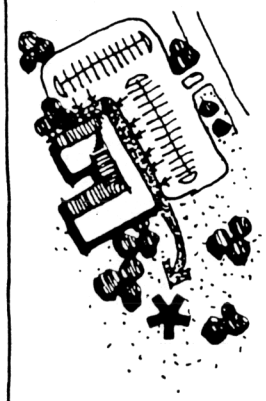
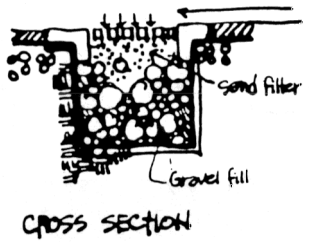
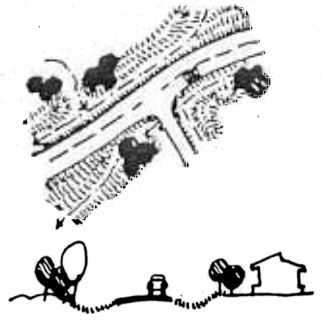
SYSTEM/COMPONENT	DESCRIPTION	GUIDELINES
3.10 PAVEMENT COLLECTION AND RECHARGE SYSTEM 	The system collects runoff normally displaced by impervious pavement via swales or dutch drains to one of three on-site recharge facilities: seepage pits, stormwater leachfield,or recharge ponds. The runoff is collected and allowed to infiltrate into the soil on site before reaching a significant degree of concentration. The discharge as well as the conveyance components of this system provide for infiltration and slowing and storage of storm runoff. As a result individual elements function more efficiently, each element providing for some degree of recharge; thus reducing the sizing of any individual element. Pervious pavement material may also be employed as part of the system. Seepage pits and leachfields are best to handle water with a minimum of concentration; recharge basins providing for larger, more concentrated quantities of runoff. System efficiency is generally a function of soil permiability. Consequently, these methods are not applicable in areas with standing water, poorly drained soils, flood plains. or marshes.	1) Provides for on-site infiltration of runoff and improved recharge. 2) Reduces the total volume of runoff and can reduce "peaking" effect of local floods. 3) Improve quality of vegetation on site by increasing available water in the ground. 4) Will result in a reduction in the size of storm drains required downslope of the facility. 5) System cost is considered less than conventional drainage techniques; should provide overall savings. 6) Unless "at source" seepage facilities are either designed for large storms or incorporate some method of controlled runoff release, they may not effectively reduce flood peaks during extended periods of high runoff. 7) Where soil saturation creates standing water in open ponds, mosquito nuisances can increase. 8) Applicable to all land uses having parking or paved area.
3.11 DUTCH DRAIN  CROSS SECTION	Dutch drains provide stormwater conveyance from parking areas and buildings to recharge facility; may also collect roof runoff for roofs without gutters where runoff may fall directly onto surface of drains. Designed to receive runoff at edge or between areas of impermiable or porous pavement. Gravel-filled ditches with optional drainage pipe in base. Can be topped with: granite, brick, or concrete blocks on 4" of sand, perforated concrete slats set on "web" or lattice concrete slab with 2" of sand, grass and 6-8" coarse sand or metal grate. Generally, the individual cost of dutch drains will be more than the cost of storm sewer and runoff storage. However, there will be situations where the use of dutch drains will result in a saving. May be used on any site where premiability of soil is sufficient or where seasonally high water tables are not anticipated.	1) Provides for combination of storage, infiltration, and transfer capabilities. Because of the variety of possible covers for dutch drains, they can be easily integrated into a number of residential land uses: paved for use in driveways, covered with brick for patios, with grass to blend with landscaping, etc. 2) Size is dependent on whether drains used as the only measure or as a supplementary measure. Minimum size must insure the infiltration of at least as much precipitation as before development. Because the drains store precipitation, an increase in size allows a corresponding reduction in the size of basin leachfield or pond. Half the capacity of dutch drains may be credited against runoff storage requirements. Typical min. porosity, .12 ft./day. 3) Typical cost factors for 3' wide, 3' deep dutch drain: excavation, $2.50; materials, $5.00; paving, $7.50; total per cu. yd., $15.00.
3.12 SWALE 	Swales are the man-made equivalent to natural drainage channels. The channels have open tops, natural bottoms and sloping sides generally planted with sod or other vegetation. Used along the edge of roads, driveways and other paved areas, under eaves of roofs without gutters and between areas of runoff collection and discharge. Swales allow natural processes to continue and, like natural channels, provide a means for both infiltration and transfer of water. Because of their relatively large open tops, swales are not as easily integrated into surface areas (such as patios) as are dutch drains. Their character does lend them to low profile use in areas left in a predominately natural state.	1) The swale should be run relatively flat and should not exceed about 5% slope on normal soils. Provision should be made for a good sod cover. It is critical to avoid high water velocities that erode the bottom of the swale. 2) Where water velocities will be higher than the absorption capacities of the soil, rip rap, concrete bottoms, or aprons should be used. 3) When swale channels replace curbs and gutters, gravel should be brought out 18" to 24" beyond the edge of the roadbed to stabilize the paving edge. In a well-designed swale system, the bottom of the swale should be lower than the bottom of the gravel base supporting the road so that no surcharging is possible. 4) Low initial development costs, higher maintenance costs.

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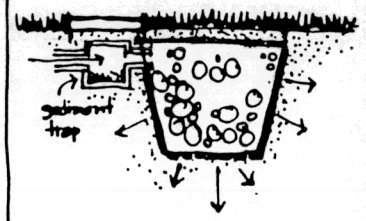
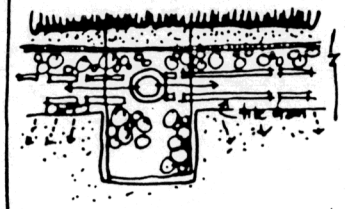
SYSTEM/COMPONENT		DESCRIPTION	GUIDELINES
3.13 SEEPAGE BASIN		Seepage basins (dry well) receive runoff and store it untill it percolates into the soil. Pits are usually filled with aggregate or gravel and occasionally lined. May be used on all sites where permiability of soil is sufficient (over 0.15 ft./day), and where seasonably high water tables are not anticipated. (Areas such as marshes, areas of standing water, poorly drained soil, etc.) With sufficient soil permiability, a seepage basin will provide for significant increases in infiltration. However, unless very large, it may not result in a reduction of flood peaks. Seepage pits are more liable than dutch drains to clogging by sediment as runoff has more chance to collect solids before reaching pit. Where table is in contact with basin, "non-point" source pollutants may collect and contaminate groundwater unless filter trap included in design. Under normal conditions, pollutant problem should be insignificant. May be sized for individual house (such as in roof collection) or larger system. Should not be constructed where the water table is less than 48" below the basin in all seasons. Only paved areas or roofs should drain into basins.	1) Unless the basin designed to take the total amount of runoff for a design storm, some provision for overflow must be made. In order to have maximum benefit in controlling runoff peaks and related infiltration rates, basins should, in fact, overflow during intense storms before capacity is reached. 2) The ratio of the bottom area to side area should not exceed ½. Should incorporate sediment trap or filter of sand. 3) Seepage pits should have a minimum percolation rate of 2' per 24 hours. 4) The minimum size of a basin should be sufficient to maintain infiltration at predevelopment levels. This depends on the porosity of the soil, and number of falls of rain per year, and the average amount per fall. The minimum size recommended is 1" of rainfall over the entire area served; the maximum size should be to take the runoff of the maximum design storm for a 24 hour period.
3.14 STORMWATER LEACHFIELD		Leachfields or seepage beds dispose of runoff by infiltration into the soil via systems of drains set in ditches of gravel. These systems only reduce speed and volume of runoff and require an overflow system. By increasing time of concentration, they may slightly reduce floodpeaks. May be used in all sites but those with periodically high water tables (marshes, flood plains, standing water) or where drainage of soil is poor. Used where percolation rate does not allow use of seepage pits. Distribute water over a wider area than seepage basin. Less clogging problems; if fields eventually clog, replacement of system is necessary. Maintenance must be frequent and increases expense. Shallow depth of beds makes them more flexible than pits; allows placement under paved areas if bearing capacity of pavement is not affected. No filtering effect of the topsoil although there will be some improvement of water quality as infiltration takes place.	1) Depth and spacing depends on the porosity of the soil. Should not be closer than 10'. Trenches should be at least 48' deep with a maximum width of 18". 2) Total storage volume is calculated by subtracting 60% for granular material from total volume. Design policy will vary, but capacity would not be less than 1" x runoff coefficent of all areas drained. 3) Prior to passing runoff into seepage ditches, water should be run through a sediment trap and distribution box. 4) System should be designed to overflow prior to capacity in order to lessen runoff peaks. 5) To increase efficiency in seepage ditch, percolation trenches may be intersected by a continuous 12" gravel bed. 6) Cost guideline (1972 estimate) for gravel beds 3' deep below parking area: excavation, $2.00/cu. yd.; gravel, $6.00/cu. yd.; tile field, $.50/sq. yd.; total, $9.35/cu. yd. storage (includes 10% for sediment trap).
3.15 RECHARGE PONDS		Relatively large, open basins with sloped sides which collect and store water until it percolates into the soil; function on a larger scale-handling runoff water from large stretches of highway or groups of residences. Used best where the aquifer is at or near the surface (i.e., high aquifer recharge areas). An effective, economically attractive method to conserve groundwater resources. Can be constructed as a borrow pit for highway or housing construction, but method loses advantage of the filtering effect of soil and, as a result, poses a risk of pollution where recharge water is of variable quality (e.g., storm runoff). Susceptible to clogging unless runoff water is fairly free of sediment and maintained frequently. Can be integrated into development project landscaping in attractive manner.	1) Sizing is based primarily on service area. 2) Prevent runoff entering basin prior to completion of construction, establishment of vegetation, etc.; could cause detrimental build-up of fine sediments on bottom of basin. 3) Maintenance problems reduced if scour at the inlet is prevented. 4) Runoff from surrounding land should be intercepted by diversions. Dense turf on side slopes prevents erosion. Basin floor should be kept clear of all vegetation.

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