would provide all of the benefits of alternative (1), plus improved fire flow capacity throughout the system and a guaranteed noninterruptible water supply source.

(1) MMWD Annexation Initiatives. For the reasons summarized above, alternative (2), *an upgrade of the Wolfback Ridge Water System and annexation to the MMWD, is recommended.* The project sponsor should formally request that the area serviced by the Wolfback Ridge Water System be annexed into the Marin Municipal Water District. Payment of a deposit would be needed to initiate a facility inventory, the first step toward annexation. Upgrading of the water system and inclusion in the Water District should be made a condition of project approval. No project homes should be allowed to be occupied before MMWD service can be provided.

(2) Assessment District Initiatives. Efforts should also be initiated to form a *utility assessment district* to fund construction of the water system improvements needed for annexation. To initiate an assessment district under California law, property owners representing over 60 percent of the land area within the proposed district boundary must petition to the local jurisdiction (the city) for district formation and must approve the property tax surcharge necessary to pay back the construction bonds.

(3) System Improvement Needs. System improvement needs warranted to mitigate project impacts--i.e., necessary to allow MMWD annexation--include: (a) acquisition of additional area to accommodate a 25-foot-wide tank and replacement of the existing three 10,000-gallon storage tanks with one 50,000 gallon steel tank, (b) installation of a larger pump to pump water from the Beacon Hill tank, (c) installation of six- and eight-inch distribution pipes, and (d) installation of individual water pressure improvement systems for all homes located at elevations less than 70 feet below the top of the tank. If required fire flow capabilities of 1,000 gpm with 20 psi residual pressure cannot be obtained with these improvements, water storage may be required at a higher elevation (e.g., a new tank at a higher elevation on GGNRA lands). Also, if the applicant is unable to secure the necessary space for the 50,000-gallon tank, this may also require securing a higher site on GGNRA lands. If such a proposal were made to the GGNRA, it should include provisions for visual screening of the proposed tank. This proposal could also offer concessions to the GGNRA related to the visual impacts of other project aspects. Although a connection moratorium has been enacted by the District in response to current water supply limitations, the applicants could still initiate the necessary steps to prepare for annexation when the reclamation plant currently under construction is completed and the moratorium is lifted.

2. SEWAGE DISPOSAL

a. Setting

(1) Existing Septic Systems. All of the existing homes on Wolfback Ridge presently dispose of their sanitary sewage via individual onsite septic tank and drainfield systems. No municipal sewer is currently available on Wolfback Ridge. There are three septic systems presently located on the relatively undeveloped southeastern end of the ridge, the location of the proposed project. One of these systems serves the duplex on the project site itself (currently situated on proposed lots 4 and 5). Its septic tank and drainfield are on the eastern slope below the homesite, above Wolfback Terrace. The other two systems serve the two homes enveloped by the project boundaries at the end of the ridge (see Figures 5 and 7). The Deaton home, located between proposed lots 7, 10, and 13, also has its drainfield on the eastern slope above Wolfback Terrace. The drainfield for the Butz home is situated on the more gently sloping southeastern end of the ridgetop. The Marin County Department of Health Services has indicated there are no reported problems with these or any of the other existing septic systems on Wolfback Ridge.

(2) Septic Suitability of Site Soils. Generally, soils on the site can be characterized as clayey loam. Soils on the ridgetop are shallow and are composed of weathered chert and shale. The eastern slopes of the site contain more clayey soils derived from weathered greenstone, while the western slopes are covered with a much deeper (up to 12 feet) colluvial accumulation and eroded materials from the exposed chert and shale ridgetops.

The soil types found on the project site, and their suitability for onsite wastewater disposal have been addressed in a report prepared for the project sponsors by Questa Engineering. These Questa Engineering findings have been considered by the EIR authors in evaluating the impacts of the waste disposal systems proposed for the project site. The conclusions of that evaluation are described in section b below.

(3) Nearest Municipal Sewer. The closest connection into the city of Sausalito's sewage collection system is opposite the fire house on Spencer Avenue, on the other side of Highway 101. The city's system transports wastewater flows to the Sausalito/Marin City Sanitary District's trunk line that runs along Bridgeway and the Bay. Final disposition is made into the Sanitary District's treatment plant located just south of the city limits.

b. Project Impacts

(1) General Sewage Disposal Proposal. The applicants have proposed that the project be served by additional onsite septic systems. Each of the 13 homes would have an individual septic tank and drainfield. The proposed sewage disposal areas for each lot are shown on Figure 8. As shown on Figure 8 and Table 2, some of the drainfields would be located on separate parcels removed from the actual residential lot.

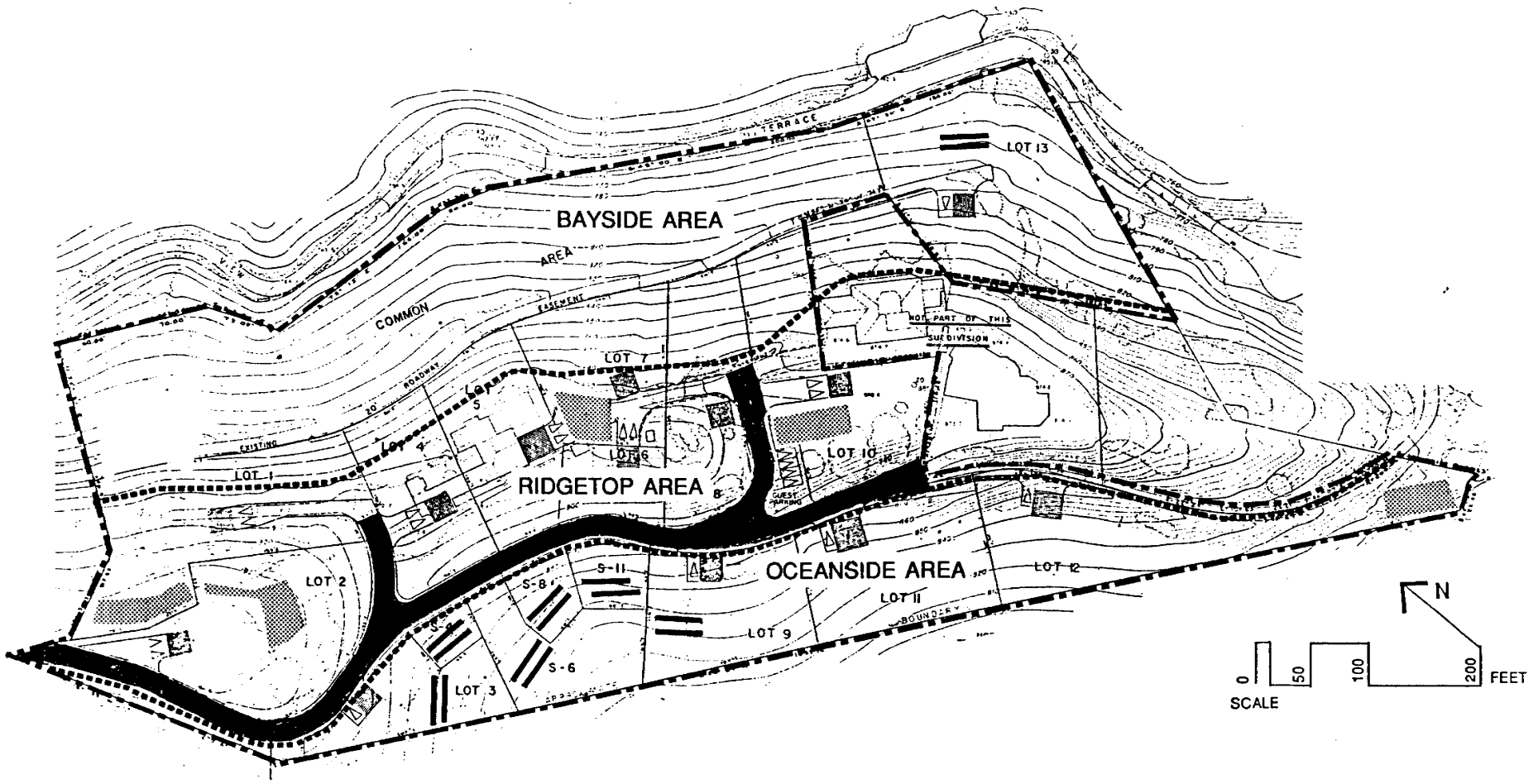
(2) Project Wastewater Flows. County Health Department regulations specify that the design wastewater flow rates for three- and four-bedroom homes shall be 150 gallons per day per bedroom (this rate represents the maximum flow expected).

(3) Proposed Project Wastewater Disposal Subareas and Anticipated Impacts. The study performed for the applicant by Questa Engineering in fulfillment of city subdivision requirements examined the feasibility of locating additional drainfields within the boundaries of the 7.84-acre project site. The Questa study divided the site into three topographic subareas: the oceanside area, the ridgetop area, and the bayside area. These subareas are illustrated in Figure 26. The proposed septic system design approach and anticipated impacts for each of these site subareas are described below:

The Oceanside Area. The oceanside area lies on the steeply-sloping western side of the ridge, between the Wolfback Ridge Road extension and the project boundary.

Soil Suitability. Questa performed 12 percolation tests in the "bowl" portion of this oceanside area, between proposed lots 3 and 9 (see Figure 26). The measured perc rates here were all extremely fast, with 9 of the 12 tests indicating a perc rate of more than one inch per minute. These results indicate that the site's soils can easily absorb the effluent from the proposed additional septic tanks, but at a rate that is actually faster than County Health Department regulations will allow. The design objective of a typical septic system drainfield is to use the small particles (silts and clays) in the soils surrounding a drainfield's rock-filled leach trenches to trap any remaining organic pollutants before the effluent reaches groundwater (or reaches rock strata through which it can rapidly flow to reach groundwater). When sewage effluent is able to pass through the soil too rapidly, this filtration objective, the final step in the treatment process, is not adequately achieved. For this reason, the Health Department requires that there be a minimum of three feet of natural soils between the bottom of the leach trenches and the highest seasonal water table elevation.

Proposed Design Approach. Questa reports that the relatively high percentage of fine particles (clays, etc.) within the site's natural soils, combined with the substantial depth to bedrock, can provide the needed level of filtration in the oceanside bowl area. In addition, the absence of wells in this area, and the limited development potential downslope within Rodeo Valley, would minimize the impact of any sanitary effluent flows that may conceivably not be fully treated before reaching groundwater aquifers. Given these conditions, Questa has proposed installation of standard leachfield trenches within the site's oceanside area. Nevertheless, because of the high perc rate readings here, these conventional drainfields would not conform to standard Health Department regulations, and so would require Health Department variances that must ultimately be approved by the Regional Water Quality Control Board.



SEWAGE DISPOSAL AREA

ROADWAY

S-6 INDICATES DISPOSAL AREA FOR THE NUMBERED LOT

PROPOSED LEACH LINES

Figure 26

PROPOSED SEPTIC SYSTEM

Questa Engineering concluded that six conventional dual drainfields could be accommodated in the "bowl" portion of the oceanside area, just below Wolfback Ridge Road. Two would be on residential lots 3 and 9 at either end of the bowl. The other four would be remote drainfields for lots 4, 6, 8, and 11 (indicated as areas S-4, S-6, S-8, and S-11 on Figure 26). Each of these remote drainfield areas would be owned in combination with the corresponding main residential lot on the opposite side of the road. Individual effluent lines would carry wastewater from the septic tank at the house to the drainfield. These parcel configurations represent preliminary layouts prepared to demonstrate the feasibility of concentrating several drainfields within this small bowl area. According to the Questa report, final parcel configuration would have to meet all County Health Department downslope property line setback requirement, and final drainfield design would require that the two trenches of each dual system be situated approximately 12 to 15 feet apart, due to the steep slope of the natural ground.

Oceanside System Adequacy. County regulations stipulate that each trench of a dual drainfield must be able to handle 100 percent of the average daily wastewater flow of the associated system. With appropriate valving, flow can be periodically switched from one trench to the other to prevent one part of the drainfield from becoming too saturated. Questa used a sewage loading rate of 1.3 gallons/square foot/day (based on the area of trench wall below the drainfield pipe) to calculate that each trench for a three-bedroom home would have to be 40 feet long, with an effective trench depth (below the pipe) of 50 inches. Current county regulations specify a maximum loading rate of 1.2 gallons/square foot/day, meaning that this trench would have to be either 5 feet longer, or approximately 6 inches deeper to meet county standards. However, given the very high measured perc rates in this area, the Health Department may agree to a slightly higher loading rate when the previously mentioned minimum perc rate variance is being considered.

Drainfield Vegetation Impacts. The proposed oceanside drainfield areas would also be located in a fairly heavy stand of mature eucalyptus trees. Questa Engineering proposed that the actual trenches be located so as to minimize the disturbance of these trees, and that all excavation and drainfield construction be performed by hand.

Drainfield Access. Future access to these oceanside drainfield sites would be restricted by the steep, wooded terrain.

Drainfield Soil Stability. The proposed concentration of six drainfields within little more than one-half of an acre at the top of a steep slope could feasibly cause the hillside to become saturated and unstable. However, the area's very high perc rates reduce this impact concern.

Approximate Costs. Questa estimates an average cost of $15,000 per lot for the construction of these oceanside septic systems.

The Ridgetop Area. The ridgetop includes the crest of the ridge, as shown on Figure 26. Slopes are much less steep in this area, but the depth of natural soil to bedrock is shallow.

Soil Depth Limitations. Health Department regulations define both the minimum depth of native soil needed between the bottom of a drainfield trench and the water table or bedrock, and the minimum height of cover required above the drainpipe. Added together, these values yield a minimum soil depth of 6.5 feet, in addition to the effective depth of the leach trench.

Proposed Design Approach. County Health Department regulations provide for "Alternative Designs" where site constraints may prevent standard drainfield designs. Given the inability of ridgetop area soil depths to meet these Health Department minimums, Questa Engineering has proposed in its report that "Alternative Design" drainfields be constructed in the ridgetop area. These would include conventional leachfield trenches, but the drainfields would be situated in imported soil materials. For each drainfield, an area would be excavated in the fractured and weathered bedrock, refilled with an imported loamy soil, and then excavated to create the trenches. The imported soil would extend a minimum of 3 feet below the bottom of the trenches to provide the filtering action needed before the effluent enters the fractured bedrock.

Ridgetop System Adequacy. Nine percolation tests were performed by Questa Engineering in the ridgetop area. If two very low, anomalous readings are discarded, the average perc rate was computed to be just over 30 minutes per inch. According to Health Department criteria, this perc rate would permit a maximum sewage loading rate of 0.56 gallons/square foot/day. Questa determined that a minimum of 1,750 square feet would be needed for the total excavated drainfield area for a three-bedroom house. If it is assumed that the bottom of the excavation is the effective drainfield area, this would result in a loading rate of 0.26 gallons/square foot/day; i.e., well within (about one-half of) the maximum loading rate allowed under Health Department criteria. The required total drainfield area would also depend on the perc rate of the imported soil material (see *Proposed Design Approach*, above), and the resulting length and effective depth required for the dual leach trenches. These details would be resolved when the individual testing and design work is performed for each individual system, but it appears that the 1,750 square foot drainfield area figure represents a conservative design that should adequately allow for the drainfield requirements of each ridgetop lot.

Questa Engineering concluded that the project's proposed lot layout and preliminary building locations would permit the construction of four "Alternative Design" (imported soil) drainfields, on ridgetop lots 1, 2, 7, and 10. They also proposed that a fifth imported soil drainfield be constructed in the *oceanside* area, at the far southeastern end of lot 12 (see Figure 26). Soil depths were found to be very shallow in this vicinity also, and the proposed drainfield is on a relatively level spot more similar in steepness to the ridgetop than the rest of the oceanside area. However, the proposed drainfield location would be constrained by the end of the Wolfback Ridge Road cut, an existing PG&E transmission tower, and the project boundary. The suitability of this site, and the possibility of finding an alternate drainfield location on lot 12, if necessary, have not been fully demonstrated by the studies completed to date.

The location of the drainfield for lot 7 also raises questions of compatibility with the residential development configuration proposed for lots 7 and 5. The drainfield is presently shown underneath the driveway easement for lot 5. Questa personnel indicate that such a drainfield could not be driven on, as this would overcompact the soil and reduce the perc rate. They suggested that a wooden deck could be constructed on posts above the drainfield to carry traffic, but that this might not be the most desirable solution. Such covering of the drainfield would prevent vegetation growth on its surface, eliminating potentials for effluent absorption through plant growth.

Variance Requirements. The drainfields proposed for the ridgetop have been referred to as "Alternative Designs" in conformance with Health Department guidelines. Such designs that do not conform to the standard leach trench parameter, or to the modifications normally permitted in areas of shallow cover, can only be permitted under Health Department variance procedures. The Department's regulations also specifically state that "under no circumstances shall alternative system designs be used to justify the creation of new lots or parcels," as is being requested for the proposed project. The county Health Department official in charge of individual, on-site treatment systems indicated that this provision can also be waived as part of the variance procedure, but only after approval is first granted by the Regional Water Quality Control Board.

Both the County Health Department and the Regional Board have stated their willingness to consider alternative designs which can be adequately documented as technically sound by a qualified sanitary engineer.

The Bayside Area. As shown on Figure 26, the bayside portion of the project site, lies on the eastern slope of the ridge, between the ridgetop and Cloud View Trail. The natural terrain is steep here, reaching a 70 percent slope on lots 4, 5, and 7. The area is somewhat flatter on the lower portion of lot 13, between Wolfback Terrace and Cloud View Trail.

Soil Suitabilities. Questa Engineering's soil samples indicate that the area is overlain by clayey loam soil only one to one-and-one-half feet thick above the fractured chert/shale bedrock.

Proposed Design Approach. This combination of steep slopes and shallow soils render most of the bayside area unsuitable for even "Alternative Design" drainfields. However, the soils on lot 13 were found to be nearly five feet thick on the uphill side of the Wolfback Terrace road cut. Questa personnel estimate that the soils may be up to three feet deeper than actually measured. For this reason, the Questa study recommended that a conventional dual leach trench drainfield could be constructed on the downhill part of lot 13, between the end of Wolfback Terrace and Cloud View Trail.

Questa Engineering has estimated from its perc tests that the average perc rate in native soils for lot 13 is two minutes per inch. This would permit use of the Health Department's maximum sewage loading rate of 1.2 gallon/square foot/day. Based on their evaluation of the soils in the vicinity, Questa recommended that 2,560 square feet of drainfield would be needed for a three bedroom house on lot 13.

Similar to the other two site areas, no groundwater was encountered in any of the Questa excavations on the bayside portion. There was, however, a small amount of seepage noted in a trench excavated on Wolfback Terrace, just below the existing drainfield for the existing duplex on proposed lots 4 and 5. Although this seepage was not identified as septic leakage, it emphasizes the need for careful routine evaluation of these bayside slopes before they are judged suitable as potential drainfield locations.

c. Impacts of Possible Project Sewer Service Alternatives

(1) Extension of City Sewer Service. The other wastewater treatment option for the proposed project is connection to the city of Sausalito's municipal collection system for treatment and disposal by the Sausalito/Marin City Sanitary District. As mentioned above, the closest existing connection point to the city system is opposite the fire house at the end of Spencer Avenue below the freeway. The City Engineer has indicated that there are presently no significant additional residential capacity limitations within this system, but that any extensions would have to be designed to city specifications, and completely constructed and paid for by the user.

(2) Sewer Line Routing. Any sewer line extension routing would have to begin at Spencer Avenue and run up the landscaped overpass embankment to the beginning of the bridge over the freeway. Design specifications for this bridge show that no utility sleeves were installed at the time of construction, so a new sewer line across the freeway would have to be bored through the bridge abutments and suspended from the superstructure. CALTRANS personnel indicate that this modification is often made to their bridges, but,

again, all construction would have to be performed to their specifications. This requirement would dictate that the sewer line would have to be installed within a larger steel casing, which, when added to the general complexity of working on an existing bridge above a busy freeway, would make this portion of the line very costly. These cost implications are summarized below, following discussion of the various alignments that a new sewer line might take.

From the end of the bridge, the sewer could then take one of two routes. The most straightforward would follow Wolfback Ridge Road to its high point opposite the water storage tanks. Since the ridge slopes down into the project from this point, a pump station and force main would be needed to transport sewage up into the end of the gravity sewer line at the water tanks.

An alternate route from the bridge would be to run a sewer line straight up the hillside, across private property, to Cloud View Trail adjacent to the Beacon Hill water tank. The sewer line would then follow Cloud View Trail for approximately 450 feet before turning to run straight uphill, again to the northern end of Wolfback Terrace. It would continue in Wolfback Terrace up to the intersection with Wolfback Ridge Road, where the gravity portion of the system would end.

An examination of the Wolfback Ridge area shows that there are many other possible variations upon these two routes, depending on the availability of easements across privately-owned land and the feasibility of running sewer lines down very steep slopes. An in-depth analysis of the most feasible, cost-effective route for a gravity sewer to serve the project site is beyond the scope of this EIR. Since the two routes identified above appear to represent the "worst-case" extremes from a cost perspective, they have been used to develop rough cost estimates for installation of the entire system.

Within the project site, sewage would have to be directed downhill to the lowest collection point, probably the end of Wolfback Ridge Road at lot 12. (It appears at this point that it might be more cost-efficient to either leave lot 13 on a septic and drainfield system, or provide it with a separate holding tank, pump, and force main into the larger public system.) A sewage pumping station would have to be constructed at this lot 12 location, and a force main installed between lot 12 and the end of the gravity system on Wolfback Ridge Road. There would also be at least one tributary branch of the onsite gravity system needed to service lot 7 on top of the ridge.

The estimated cost of each segment of these sewer system improvements can be summarized as follows:

Offsite System

- *Segment A* (across freeway to end of city system)

6-inch sewer main		
150 feet @ $40/foot (no rock)		$ 6,000
6-inch sewer main & 10-inch casing across bridge		
350 feet @ $125/foot		35,000
2 manholes @ $1500/each		3,000
	Total	$44,000

- *Segment B: Alternate 1* (in Wolfback Ridge Road)

6-inch sewer main		
2750 feet @ $60/foot		165,000
17 manholes @ $1,500/each		25,00
	Total (Alt. 1)	$190,500

- *Segment B: Alternate 2* (overland to Wolfback Ridge Road)

6-inch sewer main up steep slopes		
600 feet @ $100/foot		60,000
6-inch sewer main		
625 feet @ $60/foot		37,500
6-Manholes @ $1,500/each		9,000
	Total (Alt. 2)	$106,500

Onsite System

- *Segment C: Alternative 1*

6-inch sewer main (through unimproved streets)		
1,050 feet @ $50/foot		52,500
7 manholes @ $1,500/each		10,500
1 sewage pumping station		50,000
4-inch force main		
725 feet @ $40/foot		29,000
	Total (Alt. 1)	$142,000

- *Segment C: Alternative 2*

6-inch sewer main (through unimproved streets)		
1,050 feet @ $50/foot		52,500
7 manholes @ $1,500/each		10,500
1 sewage pumping station		50,000
4-inch force main		
325 feet @ $30/foot		13,000
	Total (Alt. 2)	$126,000

Total Cost, Segments A plus B plus C

Total Cost - Alternate 1	$376,500
x 133 percent for unanticipated construction, engineering, bonding, permits, and contingencies	**$502,000**
Total Cost - Alternate 2	$276,500
x 133 percent for unanticipated construction, engineering, bonding, permits, and contingencies	**$368,650**

If these figures are added to the Sausalito/Marin City Sanitary District's $2,750 connection charge and capacity fee, the approximate cost per lot to provide city sewer service would range between $31,100 and $41,400.

The calculations performed above are based on the conservative assumption that only the 13 lots on the project site would connect to the extended city system. If other homes along the offsite portions of the sewer line also connect to the extended city system, or the project was expanded to include additional units in light of the municipal sewer service extension, the costs could be spread over a wider base, thereby lowering the cost per home. Conceivably, the system could also be expanded to serve the entire ridge, a prospect involving a more extensive system, but at a lower per unit cost. These options would depend on the degree to which the ridge's existing homeowners are dissatisfied with their septic systems, and would be willing to participate in an improvement district.

Although the $31,000 to $41,000 per project lot cost of this system may appear high, it does not compare too unfavorably with the $15,000 (oceanside area) to $22,000 (ridgetop area) figures that Questa Engineering estimates for design and construction of the proposed septic tank and drainfield systems.

Municipal sanitary district customers would also be required to pay a $102 yearly treatment fee that is collected as part of the county tax bill. The sewer collection option is also strongly preferred by the Regional Water Quality Control Board.

d. Sewer System Mitigations

As presently proposed, it does not appear that the subject project would cause any significant adverse environmental impacts involving the disposal of its sanitary wastes. There are, however, a number of design and permitting issues that must be carefully considered throughout the design process. Following is a list of mitigation actions that could be taken to minimize possible project impacts:

(1) Project approval must be contingent upon:

- County Health Department approval of the proposed sewer system designs, including all necessary variances, and
- Regional Water Quality Control Board approval of all necessary variances.

(2) The final disposition of wastewater effluent from the drainfields proposed for the oceanside area would be determined as part of the normal permitting process of the county Health Department. Design precautions should be included to ensure that water percolating into the soil in this area of very high perc rates does not follow the underlying bedrock to resurface a short distance downslope. The filtration capacity of the native soils should be thoroughly demonstrated. The project drainfields should be designed to reliably prevent any future contamination of surface waters flowing to Rodeo Lagoon.

(3) The stability of the existing hillside downslope from the oceanside drainfield area should be specifically addressed by the project engineer prior to city approval of the Final Map. Oversaturation of this slope, particularly during the rainy season, could become a limiting factor in the siting of the proposed drainfields. If, possible, the drainfield for lot 11 should be located adjacent to the proposed home rather than at the proposed S-11 location, if such a relocation would reduce the risk of oversaturating and destabilizing slopes in the bayside "bowl" of the area. The trenches in the bowl area should also be sited and constructed to ensure long-term, maintenance-free operation.

(4) The trench locations in any oceanside drainfields should be located so as to minimize disturbance of the heavy stand of eucalyptus trees in this area. As suggested by the applicant's engineer, Questa Engineering, all drainfield excavation and construction in this area should be performed by hand to minimize damage to the trees.

(5) The location of the drainfield for lot 7 should be relocated to remove it from beneath the lot 5 driveway easement to avoid overcompaction. The use of a wooden driveway deck at this location should be avoided, since such a solution would prohibit absorption of

effluent by vegetation. Alternatively, the driveway access to lot 5 could be relocated to avoid the proposed drainfield. If the overcompaction problem cannot be avoided, one of these two lots should be removed from the plan.

(6) The suitability of the proposed drainfield on lot 12, and the possibility of finding an alternative drainfield location for lot 12, should be more fully demonstrated by the project engineer.

(7) Permanent, non-revocable utility easements should be recorded for the effluent line that would connect each remote drainfield to its individual septic tank.

(8) Consideration should also be given to siting any drainfields that are to be located on the same lot as the house within areas proposed for future landscaping or flower gardens. This would maximize the absorption of effluent by plants (reducing percolation into the soil), and would reduce future domestic water supply demands for irrigation.

(9) Although this EIR indicates that the proposed septic system approach could be implemented without significant environmental impacts, the report also indicates that connection to the city's sewer system, although more costly ($9,000 to $26,000 more per unit), would be the preferred approach in environmental terms. In this light, the engineering and economic feasibility of connecting the project into the city's sewage collection system should be more fully considered. Engineering investigation could include selection of a preferred route for the offsite portions of the sewer line, the preparation of more complete cost estimates for construction of the entire system, and the assessment of support among existing Wolfback Ridge homeowners for participation in a ridgetop sewer district.

3. STORM DRAINAGE

a. Setting

(1) Project Site Drainage Patterns. Situated at the top of a ridge, the relatively long and narrow (just over 400 feet wide) project site has no well-defined, concentrated drainage pattern. Stormwater runoff presently sheet flows down the sides of the ridge with few actual points of concentration along the hillsides. This natural drainage scheme is utilized as the drainage approach for homes and roads throughout the already developed northwestern end of the ridge; i.e., for the most part, no curb-and-gutter or common, subsurface drainage facilities are provided in these existing residential areas. The only common drainage facilities in the Wolfback Ridge area are a few small asphalt berms that direct runoff across Wolfback Ridge Road, and a single storm drain line that connects the northern end of Wolfback Terrace to Cloud View Trail and Highway 101. The lower portion of this line was installed by CALTRANS along the southerly edge of the 1982 landslide scar (see the Geology and Soils section of this EIR).

Runoff along the eastern side of the ridge is eventually collected in existing surface gutters along the southbound side of Highway 101 between Spencer Avenue and the Waldo Tunnel. It is then channeled into one of three stormdrain crossings (two 24-inch and one 18-inch diameter culvert) underneath the freeway for conveyance into the city of Sausalito's storm drainage system at either Sausalito Boulevard or Hecht Avenue. These underground systems follow the upper contours of the broad valley before converging in the city's Main Street storm drain. The Main Street line then runs straight down Main Street to its discharge point into San Francisco Bay, east of Front Street.

Runoff on the western side of the ridge flows down the steep natural hillsides into an intermittent stream that originates at the eastern end of Rodeo Valley. The streambed follows the floor of the valley west into Rodeo Lagoon before disappearing into the sand dunes at the edge of the Pacific Ocean.

Both of the watersheds affected by the project site are far larger than the subject property. The Main Street drainage includes approximately 159 acres of developed residential areas that are served by tributary stormdrain branches of the major trunk line. Rodeo Valley is a 1,104-acre drainage basin that joins with the 1,142 acre Gerbode Valley drainage before entering the lagoon. These valleys are primarily undeveloped, with only a few clusters of military buildings located along Bunker Road and at the old barracks of Fort Cronkite.

The project site is largely undeveloped at present. Of the approximately 5.02 acres that drain to the Main Street line and the Bay, approximately 0.67 acres are covered by impervious surfaces (paved areas and building envelopes as well as the unpaved, rock access road and driveways). The 3.66 acre western side of the ridgetop, draining to Rodeo Valley, contains 0.29 acres of impervious road, driveways, and a compacted building pad.[1]

The single existing drainage improvement on the project site consists of a small, hand-excavated ditch that drains the first few hundred feet of Wolfback Ridge Road (which is crowned into the hill) along the hillside below lot 2. This ditch, which appears to have been recently excavated, crosses the proposed lot 1 driveway, and flows freely down the hillside toward Wolfback Terrace.

2. Current Project Site Contribution to Offsite Drainage. The Rational Method is a generally accepted means of calculating the flow of water expected within a storm drain system (either natural or man-made) during a rainstorm of given intensity. This flow, expressed in cubic feet per second, is obtained from the following equation:

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[1]The drainage computations in this EIR also include the two homesites at the extreme southeastern end of the ridgetop. This area of approximately two acres lies outside the project boundary, but also drains directly down either the eastern or western hillsides.

Q = CIA where: A = acres of the contributing drainage area
I = rainfall intensity in inches/hour
C = runoff coefficient (the proportion of rainfall estimated to run off the land into the drainage system, instead of percolating into the ground)

As can be seen in the equation, for a given value of I, the flow at any point within the system is directly proportional to both the size of the upstream drainage area and the runoff coefficient. This simple relationship has been used to illustrate the contribution of the project site within both the eastern and western drainage basins.

Using rough estimates of the size of the eastern drainage basin, its topography and its level of development, it was determined that the project area contributes 2.29 percent of the total runoff within the eastern drainage basin.

Because the western basin is so much larger, the project site is estimated to contribute only 0.16 percent of the peak stormwater runoff expected to reach Rodeo Lagoon.

b. Project Impacts

(1) Proposed Drainage System Design. The extension of Wolfback Ridge Road is shown as crowned away from the hillside, with no swale or other means of collecting runoff on the downhill side. Generally, this design would allow stormwater to sheetflow off the roadway and directly down the hill, without being concentrated in swales, pipes, or drainage channels. Given the very steep natural topography surrounding the ridgetop, this natural method would probably offer the best protection against runoff-induced erosion or scouring of the hillsides.

It appears that, in general, the site's existing natural runoff patterns would remain almost unchanged following construction of the proposed project. However, the proposed roadway design could result in some minor drainage problems in the vicinity of the four lots proposed on the downhill side of Wolfback Ridge Road. Unless their driveways are raised above the road, stormwater would run into the garages and down around the building foundations. This condition could be prevented with some minor grading modifications in front of the houses, but these provisions could then result in the concentration of runoff around the house perimeter. On most of these lots, such resulting perimeter flows would be insignificant. However, perimeter flows could become significant at lot 9. The roadway that branches up to the lots on the ridgetop intersects Wolfback Ridge Road directly across from lot 9. Runoff from the paved and built-up areas on top would flow down this road, across Wolfback Ridge Road, and onto lot 9.

Stormwater runoff from the proposed access road for lots 1 and 4 could cause a similar problem on the other side of the ridge, where an existing ditch presently drains runoff from Wolfback Ridge Road. There are no buildings proposed for construction in this drainage path, but such a concentration of flow could eventually begin to erode both the hillside and the Wolfback Terrace embankment.

No design has been presented for the extension of Wolfback Terrace, but it is assumed that it would also be crowned away from the hill. Water flowing down the hillside above this existing roadway could eventually begin to weaken the already steep uphill cut slopes. A prolonged, heavy rainy season could cause small swales to form on the hillsides above Wolfback Terrace, which could in turn concentrate runoff onto isolated sections of the embankment. These sections would then become more susceptible to erosion and bank failure. This condition could also result on Wolfback Ridge Road if the homes proposed for construction on lots 4, 6, 8, and 10 concentrate their stormwater runoff onto the embankment above the roadway.

The concentration of roof runoff from all of the homes proposed for construction could potentially be the most erosion-inducing aspect of the proposed project. If discharged directly onto natural or landscaped ground, these flows would eventually create their own channels down the hillsides. These unstabilized channels would be prone to rapid erosion during heavy rains, particularly on the deeper soils of the western slopes.

(2) Project-Related Increases in Offsite Drainage. As described earlier, the project site's present contribution to the watersheds on the eastern and western sides of the ridge is relatively small. The level of development proposed by the project sponsors would have the following estimated impacts within the respective drainage basins:

Main Street Basin. The ridgetop area draining into this basin would be reduced slightly (by approximately 0.4 acres) with the proposed regrading of the first approximately 400 feet of the Wolfback Ridge Road extension. The construction of the proposed roads, driveways, and eight homes would increase the existing impervious areas by 0.55 acres, and the area of steeply sloping natural ground would decrease by 0.47 acres. These changes would result in an insignificant 0.3 percent project-related increase in runoff into the Main Street Basin.

Since south Sausalito is nearly built out, it is unlikely there will be major future cumulative changes in the stormwater runoff characteristics within the Main Street Basin. According to the City Engineer, this system functions adequately at present. It appears that the development of the project site would not significantly impact the future operation of the city's storm drain system.

Western Drainage Basin. The total ridgetop area draining to the west would increase by the 0.4 acres gained from the Bay side. In addition, there would be 0.69 more acres of

impervious area, and 0.21 less acres of steeply sloping natural ground. These changes would result in an insignificant .05 percent increase in the Western Drainage Basin area.

The relative impact of the proposed development would be even smaller on this side of the ridge. Also, because this area is for the most part undeveloped park land, project impacts on buildings or roads would be negligible.

Stormwater runoff from the project would flow over large expanses of open ground before reaching natural channels or pipe systems. Although the ground is steep, the heavy vegetative cover would greatly slow the water's descent down the slopes. This factor would increase the likelihood that much of the project runoff would percolate into the ground, or at least be temporarily detained on the hillsides. The peak rates of runoff within many downstream portions of the drainage system would pass before flows from the ridgetop would begin to reach the lower elevations. As a result, the impacts calculated above probably overestimate the actual conditions that would result from project development.

b. Storm System Mitigations

The following mitigation measures are suggested to minimize the potential for erosion of the steep slopes surrounding the project site, and to prevent minor, localized flooding of the proposed homesites.

1. The road design for the extension of Wolfback Terrace should crown the roadway away from the hillside (as proposed for Wolfback Ridge Road), so that stormwater runoff is not concentrated into discrete, erosion-inducing points of discharge.

2. The design cross section of the Wolfback Ridge Road extension should be refined to direct stormwater runoff away from the driveways, garages, and building foundations of the proposed homesites on lots 3, 9, 11, and 12. This modification should also be designed to prevent significant channelization of runoff around the perimeters of these homes.

3. The proposed roadways should be designed to evenly distribute runoff from the access driveways for lots 1 and 4 and for Lots 5, 6, 7, 8, and 10 (and the one existing home) evenly across downslope hillsides. This would be of particular concern around lot 9 (runoff from the driveway of lots 8 and 10) and around lot 3 (runoff from the driveway of lots 1 and 4).

4. The project engineer should demonstrate the long-term stability of the steep road cuts above Wolfback Terrace and Wolfback Ridge Road in areas where stormwater runoff might be concentrated by the topographic contours of the completed project.

5. Roof leaders from the proposed homes should be placed so that stormwater runoff is not channelized into a few discrete discharge points. One design alternative would be to

run the leaders into a long perforated pipe placed across the slope below the home. The runoff would then be evenly distributed on the vegetatively stabilized ground surface to flow down the hillside.

6. An erosion and sedimentation control plan should be prepared in conformance with city of Sausalito standards for implementation during project construction. At a minimum, the plan should include the following provisions:

- Existing vegetated areas should be left undisturbed until construction of site improvements is actually ready to commence. This particularly applies to lots that are being developed for speculative sale at some time in the future. Where possible, these areas should be left in their natural state until individual building permits are obtained.
- All disturbed areas should be immediately revegetated or otherwise protected from both wind and water erosion upon the completion of grading activities.
- Runoff should be directed away from all areas disturbed by construction.
- Eroded soils should be trapped in sedimentation basins to prevent their discharge off-site.

E. EMERGENCY SERVICES

The status of existing emergency service provisions (police and fire) and associated project generated needs are evaluated in this chapter.

1. FIRE PROTECTION SERVICES

a. Existing Setting

(1) Vicinity Fire Service. Fire protection services are provided to the Wolfback Ridge area by the Sausalito Fire Department. Fire Station No. 2 is located just east of the freeway across from the Wolfback Ridge area at 300 Spencer Avenue. Response times to the project site from this station are two to three minutes. However, this station is manned only at night and on weekends. Fire Station No. 1, which is located at 333 Johnson Street, has a nine- to eleven-minute response time and is manned at all times.

Access to the site on Wolfback Ridge Road is not considered to be a problem for Fire Department vehicles.[1]

(2) Existing Fire Hazards. In general, the project site is not considered by the Sausalito Fire Department to be highly vulnerable to wildfire hazards, since the area is subject to heavy fog and moist sea breezes. These natural protections are not effective, however, during short periods in the hot, dry fall season. The steep slopes and winds surrounding the site would encourage the spread of fires, should one start in the area during this period.[2]

b. Impacts

The introduction of 13 project homes (11 additional dwelling units) on the site would increase the likelihood of wildfires in the ridge area due to the introduction of approximately 30 percent more human activity, related vehicle movements, etc. On the other hand, construction of the proposed project water system improvements would also provide (1) 10,000 to 16,000 gallons of increased water storage and improved water supply pumping,

[1]Telephone conversations with Sausalito Fire Chief, March 1989.

[2]Ibid.

resulting in improved fire flow capacity (duration) to all existing system connections, (2) increased water pressure to certain portions of the ridge, and (3) the provision of additional fire hydrants on the site itself. Nevertheless, the principal fire protection concern regarding Wolfback Ridge would still be the substandard water pressure levels provided by the existing Wolfback Ridge water system storage and water main facilities. As discussed in the Water, Sewage, and Storm Drainage section of this EIR, the system does not provide adequate storage tank elevations or adequate distribution main sizes to supply adequate fire flow pressure to a number of existing homes on the ridge.[1] More specifically, the minimum acceptable standard is 1,000 gallons per minute (gpm) at 20 pounds per square inch (psi) of residual pressure in the main. Current Wolfback Ridge pressure levels of less than 10 psi have been identified at the existing hydrant closest to the three existing Wolfback Ridge water storage tanks.[2] This indicates a systemwide lack of adequate water pressure for fire fighting and fire sprinkler operation, a condition that places homes on the ridge at significant fire hazard risk. The project would add to these significant existing fire protection inadequacies.

Emergency access to the site on Wolfback Ridge Road and Wolfback Terrace would be improved and would be adequate for lots 1 through 12. However, the 160 degree turn in Wolfback Terrace could provide access problems to lot 13 for Fire Department vehicles.

c. Mitigations

(1) Water System Improvements. As suggested in this EIR under Water, Sewer, and Storm Drainage, the Wolfback Ridge water system should be improved to provide the project with a fire-flow of 1,000 gallons per minute, while maintaining 20 pounds per square inch residual pressure in the main. Alternatively, the system should be designed to provide adequate individual fire sprinkler system fire flow pressure and duration.

The size and design of the various water supply system upgrades necessary to achieve these minimum standards (and the location of associated fire hydrants) would be subject to the approval of the Sausalito Fire Department.[3]

(2) Residential Sprinkler Systems. Automatic residential sprinkler systems should be required in all project homes and garages.[4]

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[1]Storage tank elevations too low to provide adequate "head" to some higher homes; water main sizes too small to provide adequate pressure at some locations.

[2]Telephone conversations with Sausalito Fire Chief, March 1989.

[3]Ibid.

[4]Ibid.

(3) Access to Lot 13. The access road design for lot 13 (i.e., offsite road improvements to Wolfback Terrace) should be subject to the approval of the Sausalito Fire Department. Lot 13 should be labeled on the Tentative Map and Final Map as unbuildable, unless such approval can be secured.

2. POLICE PROTECTION

a. Existing Setting

Police protection is provided to the project vicinity by the city of Sausalito Police Department. The one issue of concern identified by the Police Chief for the project area is the limited, single-route access condition in the Wolfback Ridge area. If Wolfback Ridge Road was blocked, access to the site would be limited to four wheel drive vehicles via dirt roads from the north.

b. Project Impacts

The 13 project homes (11 additional dwelling units) which would be added to the ridge would increase the number of residents subject to the risks associated with single access by approximately 30 percent.

c. Mitigation

No feasible secondary access route to the Wolfback Ridge residential neighborhood appears to be available.

F. NOISE

This EIR chapter describes the existing noise environment on the site, with particular consideration of Highway 101 traffic noise, and related impacts on the proposed project homes. The chapter also describes potential project construction period noise impacts on existing Wolfback Ridge homes. Finally, this chapter recommends several measures warranted to mitigate identified noise impacts.

1. EXISTING SETTING

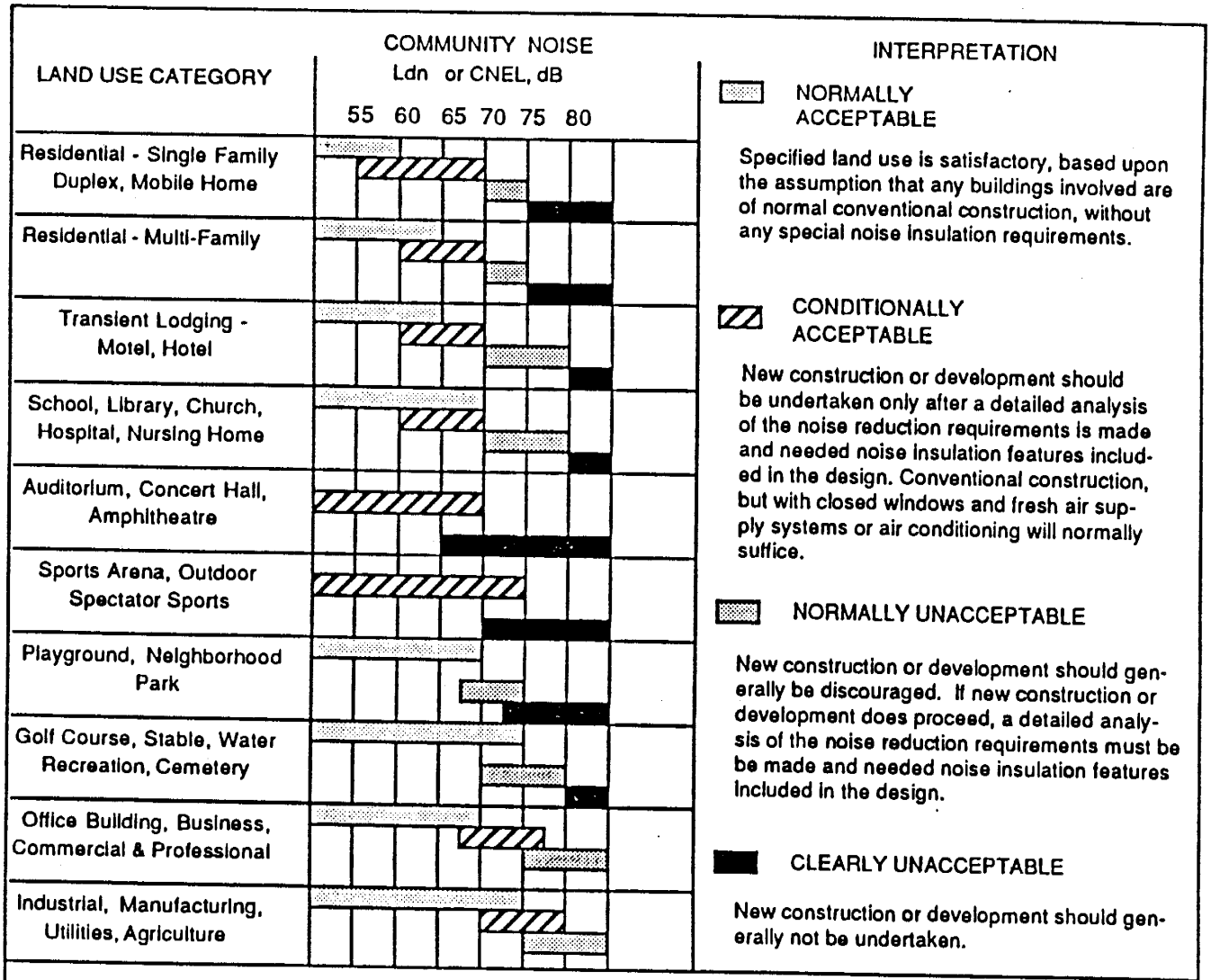
The upper ridge of the project site is approximately 400 feet to the west of, and approximately 340 feet above Highway 101. Obviously, the highest noise levels are on the east-facing slopes directly above the freeway. Highway-generated noise levels on this ridge portion of the site have been estimated in the past to range from 65 to 75 dBA.[1]

The Sausalito General Plan Noise Element states that development should be avoided in areas subject to 65 dBA average 24-hour noise levels, except as infill of already developed areas, and then only after a detailed analysis of noise reduction requirements has been completed and noise reduction measures have been incorporated into building design. Such noise levels (65 dBA, 24-hour average) are characterized by the State Office of Noise Control as "conditionally acceptable" to "normally unacceptable" for single-family residential land uses (see Table 7).

Noise levels are significantly less at those locations on top of the ridge which are set back from the top of the east-facing edge, out of the freeway line of sight. Onsite observation by the EIR consultant indicated that ambient highway noise on the site falls to acceptable residential levels (i.e., below 65 dBA average 24-hour levels) at locations on the ridgetop set back far enough from the east-facing slope to break the line of sight from the freeway.

[1]Based on noise contours prepared by State of California Transportation Agency, Department of Public Works, Division of Highways, September 5, 1969, which have since that time been adopted as part of the Sausalito General Plan Noise Element.

Table 7
LAND JSE/NOISE LEVEL COMPATIBILITY STANDARDS



Noise Source Characeristics

The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft or railroad noise is normally made up of higher single noise events than auto traffic, but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment.

Suitable Interior Environments

One objective of locating both single and multi-family residential units relative to a known noise source is to maintain a suitable interior noise environment no greater than 45 dB CNEL or L_{dn}. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

Source: State of California, Office of Noise Control, 1975.

2. IMPACTS

a. Impacts of Existing Noise Levels on Proposed Homes

Again, since noise exposure is primarily linked to line of sight between the source and the receiver, those project homes located an adequate distance away from the ridge of the east-facing slope would be shielded from excessive noise levels. However, examination of the proposed project homesite layout indicates that the west-facing exterior walls of homes on lots 1, 5, 7, and 13 may be exposed to noise levels in excess of typical single-family residential land use standards.

b. Construction Noise

Construction of project roads could result in a significant temporary increase in noise levels for houses adjoining the construction activity. Typical construction equipment noise levels are shown in Table 8. In particular, the use of earth-moving equipment, including pavers and trucks, would be anticipated during the roadway construction period. Material handling equipment, including concrete mixers and concrete pumps, and other equipment such as saws would temporarily increase noise levels in the near vicinity of each individual home construction site. Onsite construction period noise impacts would primarily affect the adjacent Deaton, Butz, and Johnson residences. However, construction period traffic noise, as well as any required offsite road improvements, could affect the other residences on Wolfback Ridge Road.

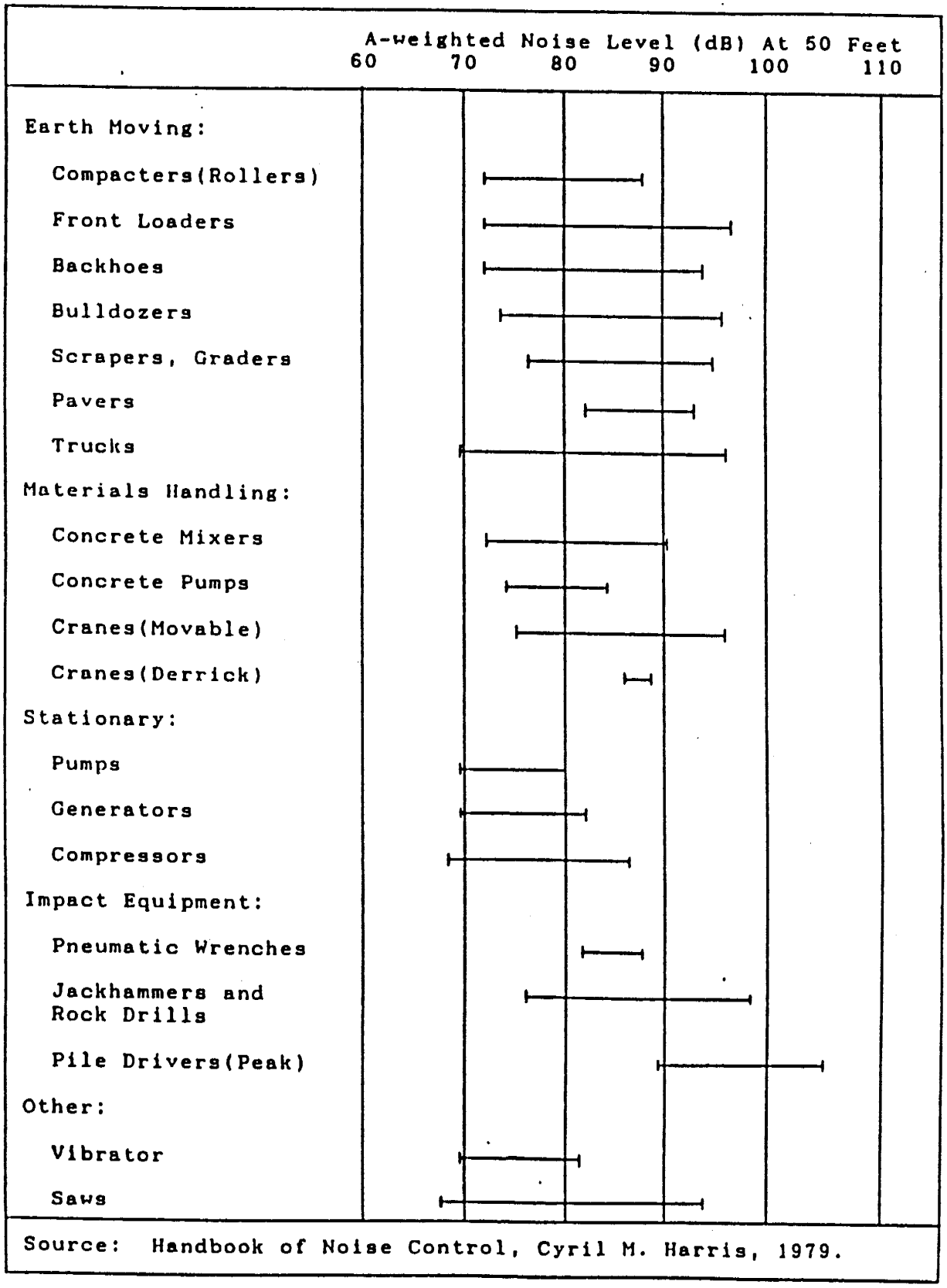
3. MITIGATION MEASURES

a. Long-Term Mitigations

It would not be practical to mitigate noise levels below typical standards (60 dBA) for all outdoor areas along the east edge of the project ridge. However, outdoor living spaces at these homesites should be designed to be shielded from Highway 101 noise through the use of courtyards, sound walls, or by locating most of these areas on the west side of the proposed homes.

Project homes, especially those on lots 1, 5, 7, and 13 should be designed to include sufficient noise insulation and other conventional noise mitigation construction techniques to maintain indoor 24-hour average noise levels at or below 45 dB.

Table 8
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVEL RANGES



Source: Handbook of Noise Control, Cyril M. Harris, 1979.

b. Construction Period Mitigations

There would be significant, unavoidable, temporary adverse noise impacts on adjacent homes during the project roadway and individual residence construction periods. These short-term impacts could be reduced by implementing the following:

(1) Limiting noise-generating construction activities, including truck traffic coming to and from the project area, to daytime weekday (non-holiday) hours (8 AM to 5 PM).

(2) Properly muffling and maintaining all construction equipment powered by internal combustion engines.

(3) Locating all stationary noise-generating construction equipment, such as air compressors, as far as is practical from existing residences.

(4) Utilization of the quietest construction equipment, particularly air compressors, whenever possible.

G. GEOLOGY AND SOILS

The following chapter describes existing geologic and soil conditions on the project site, possible impacts of the project in light of these conditions, and measures warranted to mitigate related significant environmental impacts.

1. SETTING

a. Topography

The 7.84-acre project site is situated on top of the southeast-to-northwest trending ridge that separates the western end of the Rodeo Valley from the bayside portions of the Marin Peninsula. Locally, this ridge falls in a southeasterly direction, beginning at the 1,100 foot elevation of Richardson East Peak (see Figure 2, Local Topography). This peak is located just west of the saddle where Wolfback Ridge Road crosses from the eastern (bay) side of the ridge to the western side. From this saddle, the ridge and road both climb slightly before beginning a long, gradual 200 foot decline to another small saddle at the southeastern end of the project site (see Figures 2 and 5).

Cross-sections of the site are shown on Figure 6 of this EIR. On the two sides of the site's relatively narrow ridgetop (50 to 200 feet wide) are steep hillside slopes. The east-facing slopes drop away from the edge of the existing leveled building pads at slopes of 60 to 100 percent down to Wolfback Terrace, continue at slightly less slope to Cloud View Trail, and then drop more steeply down to Highway 101. This approximately 340-foot grade change occurs in little more than 400 feet of horizontal distance.

A natural fold in the ridgeline on the western side of the ridge has created a shallow bowl along the middle third of the project's westerly boundary. This area, which is also discussed in the Water, Sewer, and Storm Drainage section of this EIR, breaks the steep natural drop to Rodeo Valley below, and has trapped eroding soils from above. Slopes in this bowl area are around 35 percent; slopes quickly increase to 100 percent or greater at each end of the project site, beyond the limits of the bowl. This rate of descent continues down the hillside to the eastbound entrance to the Fort Cronkite Tunnel, nearly 500 feet below.

The embankment slopes immediately above and below all of the road cuts on the project site are considerably steeper than the natural ground. These cut and fill slopes exhibit some signs of instability, particularly where the uphill embankments are undercut and beginning to

erode.

b. Bedrock Geology

Wolfback Ridge, as well as the entire southern end of the Marin Peninsula, is part of the altered volcanic Franciscan Assemblage. This formation is composed primarily of greenstone and chert.[1] These bedrock materials are exposed in the road cuts on the project site, and along Cloud View Trail on the ridge's eastern slope.

The chert overlies the greenstone on the top and western side of the ridge to a depth of approximately 125 feet, as estimated by Questa Engineering in its 1987 report prepared for the project sponsors.[2] The "clean and tight" contact observed by Questa between the chert and greenstone on Wolfback Terrace represented "a change of lithology during deposition rather than a postdepositional tectonic feature (faulting)." The Wolfback Ridge Road cut also clearly exposes the highly fractured nature of the chert, and the thin layers of shale that are interbedded throughout, as well as the entire formation's 20 degree dip to the southwest. (See Appendix D for geologic cross-sections of the site.)

Access drive road cut on lot 1 showing highly-fractured thin layers of chert and shale at the top of Wolfback Ridge.
SOURCE: Wagstaff and Associates

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[1]Preliminary Geologic Map of Marin and San Francisco Counties and Parts of Alameda, Contra Costa, and Sonoma Counties, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-574, by M. Blake Jr., et al., 1974.

[2]Questa Engineering Corporation, "Sewage Disposal Evaluation for Subdivision, Marin County APN-200-13-10, 33 and 200-20-14; Sausalito, California; June 3, 1987.

c. Soils and Groundwater

Natural soils on the ridgetop are very shallow, composed primarily of weathered chert and shale. Lower down on the eastern slopes, more clayey soils derived from weathered greenstone are evident, while the western slopes are covered with a much deeper (up to 12 feet) colluvial accumulation of eroded materials from the exposed chert and shale on the ridgetop. These western slope soils were generally characterized as clayey loam in the Questa report.

The project site also has deposits of imported fill material and organic topsoils. The fill material is primarily found exposed along the downslope edges of the road cuts. The topsoils have been placed around the three existing homesites. Neither of these imported materials, nor the site's natural soils, appear to contain sufficient clay to create the expansive conditions that would make them difficult for building foundation design.

The Questa Engineering site investigation found groundwater in only one of its subsurface explorations. This consisted of minor lateral seepage in a trench excavated on Wolfback Terrace below the existing home on lots 4 and 5. Although the Questa investigation was undertaken under drought conditions, groundwater in significant quantities is nevertheless not anticipated on the project site, given its location atop a steep ridge.

d. Seismicity

The risk of onsite ground rupture appears to be low, since no active faults have been identified within the project site, or on other areas of Wolfback Ridge (although several small fault traces have been mapped in the surrounding area). However, in a regional context, there is a high probability that strong ground shaking will occur. The Marin Peninsula is part of the seismically active Coast Range Province, and is located between the San Andreas and Hayward faults.

Because of the site's close proximity to both of these faults (less than 20 miles), the potential for earthquake damage is significant, based not only on the peak ground movement expected, but also on the repeated cycles of less intense shaking that can precede and follow the peak.[3] These lower intensity oscillations are frequently more structurally damaging than the actual peak, and so should be considered in all foundation designs.

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[3]Regional Slope Stability Map of the Southern San Francisco Region, U.S. Geological Survey Paper 944, by T. Nilsen, et al., 1979.

e. Landsliding and Slope Stability

The northwest-to-southeast trending ridgetop within the project site appears to be fairly stable, due to its gentle slope and thin depth of soil over bedrock. The slopes on both sides of the ridge, however, are much steeper and exhibit some signs of old, localized landsliding and soil creep. These conditions are relatively common on the steep hillsides of the Marin Peninsula, which have been characterized by the U.S. Geological Survey as either "generally unstable to marginally unstable" or "unstable" on the USGS Regional Slope Stability Map of the Southern San Francisco Bay Region.[4]

Although there are no signs of significant slides in the immediate project vicinity, a major landslide originated approximately 500 feet east of the project site in 1982. This slide began just below Cloud View Trail and took an entire section of hillside down across Highway 101. Within a few days, the embankment on the downslope side of the highway also failed, sending a mudflow into the more developed areas of Sausalito that destroyed several homes and resulted in one fatality. Located at the top of the ridge, the project site is not considered to be similarly vulnerable, but this occurrence does illustrate the fragile stability of the hillside soils within this steep terrain.

The thin layer of soil on the top and western side of the ridge is also susceptible to erosion if stormwater runoff is allowed to collect and flow down the slopes in a concentrated stream. There is presently one significant point of runoff concentration on the project site; a small, hand-excavated ditch that carries runoff from Wolfback Ridge Road around the base of the slope below lot 2. This ditch discharges freely down the eastern slope above Wolfback Terrace after crossing the proposed driveway (and existing road cut) for lot 1. Although the age of this ditch is uncertain, there are no apparent signs of significant downstream erosion. Nevertheless, the erosion impacts of this ditch during a prolonged rainy season or severe storm could be significant.

2. PROJECT IMPACTS

a. Project Layout

The proposed project would create 13 homesites on the subject property. As shown on Figure 7, five of these sites would be on the portions of the ridgetop that have already been graded flat (lots 4, 5, 6, 8, and 10). One would be on the relatively flat natural knoll at the northwest end of the project (lot 2). The remaining seven sites would be located on the steeply sloping hillsides--four below Wolfback Ridge Road on the western side (lots 3, 9,

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[4]Repeatable High Ground Accelerations from Earthquakes, California Geology, 1974, by M. Ploessel and J. Slosson.

11, and 12), two above Wolfback Terrace on the eastern edge of the graded ridgetop area (lots 1 and 7), and one at the southeastern end of Wolfback Ridge above the end of Cloud View Trail (lot 13). Wolfback Ridge Road would provide access to all but lot 13. Lot 13 would be located at the end of Wolfback Terrace. This existing lane would become a long, private driveway, extending nearly 1,600 feet beyond the present end of the pavement to a point approximately 200 feet northwest of the project boundary.

b. Foundation Impacts

The graded ridgetop appears to be generally suitable for conventional foundation designs, although the areas of lots 4, 6, and 8 may require certain special foundation design considerations. Imported or native fill material has recently been spread in the proposed building footprint area for lots 4 and 6, and the grades on lot 8 are irregular. In addition, since the level portion of lot 6 is fairly narrow (approximately 30 feet wide), it appears likely that the building foundation could extend onto the steep slopes at the edges of the existing level pad.

The homesites indicated on Figure 7 for lots 1, 3, 7, 9, 11, 12, and 13 are all located on the steeply sloping hillsides below the ridgetop. Although these locations would require special foundation designs and construction techniques, the problems presented are common to developed hillside areas throughout Marin County and in the Oakland/Berkeley Hills. The stability of the underlying bedrock, combined with the relatively shallow soil cover (7 to 9 feet maximum in the areas proposed for development) should be suitable for drilled-pier and/or grade-beam foundations. Additional lot-specific borings and design work would be required as a part of the city's building permit application process to ensure that each home is constructed in accordance with the constraints of each particular site.

c. Road Grading Impacts

Access to 12 of the proposed homesites (all but lot 13) would be provided by improving Wolfback Ridge Road along its existing alignment. The Tentative Map shows that this private road would have 18 feet of pavement width, which is 30 to 50 percent wider than at present. As mentioned above, the steep uphill embankments are already undercut in many locations along this road, and fill has been pushed out on the downhill side, increasing the already steep natural slope. In addition, the first 400 (±) feet of the existing road is closely bordered on both sides by two rows of cypress trees, one located just above the toe of the uphill slope, and the other just below the top of the downhill embankment. It is expected these trees are playing some role in stabilizing the existing embankments, and it appears that at least one row would have to be removed to widen the road to 18 feet.

The initial 400 feet of Wolfback Ridge Road on the project site is also presently crowned into the hillside. Stormwater runs along the toe of the road cut and into the small ditch (described above) that discharges across the future driveway of lot 1. In order to crown the

roadway away from the hillside so runoff is not concentrated to a single discharge point, this entire section of the road would require substantial regrading.

The long extension of Wolfback Terrace to provide access to lot 13 would also require the existing road cut to be slightly widened. The uphill embankment, in particular, is presently very steep, so a widening to 12 feet (assumed) could encounter constraints similar to the Wolfback Ridge Road widening.

An existing residence, the Warren home, is located at the end of Cloud View Trail below the proposed lot 13 road. No other existing or anticipated future structures are located directly below the roads and houses proposed for construction. However, Wolfback Terrace is immediately below lots 1, 4, 5, and 7, and Cloud View Trail is below Wolfback Terrace. Disturbance of the existing ground surfaces along the Wolfback Terrace road cuts could significantly increase the potential for localized landslides, particularly if project stormwater runoff is concentrated onto unstabilized slopes, or if downslope embankments are pushed out to widen the road cut, further steepening the natural contours. Project stormwater runoff erosion impacts and related mitigation needs are more thoroughly addressed in section IV.D.3 of this EIR.

The Golden Gate National Recreation Area lies downslope of Wolfback Ridge Road and the proposed lots along the project's southwesterly boundary. A project-induced landslide in this area would probably cause little property damage, but visual impacts on Rodeo Valley vantage points could be significant, and the mature stands of cypress and eucalyptus trees that cover some of the upper portions of this slope could be threatened by any project-induced ground failure. In addition, the four remote sewage leach fields proposed for installation in this area, as well as the fields for lots 3 and 9, could be damaged by a slide originating at the downslope edge of a widened Wolfback Ridge Road.

c. Seismicity

As discussed earlier, the absence of active fault traces and the generally shallow depth to bedrock should generally limit any project site-specific vulnerabilities to seismically-induced structural damage. However, like other residential development locations throughout the region, the strong ground shaking expected during a major earthquake would require special design precautions. Landslides occurring on the hillsides below the project would represent the greatest earthquake threat with or without the project, particularly if the soils on the ridge's lower slopes are saturated at the time.

3. MITIGATIONS

There are no major geotechnical constraints that would prevent development of the subject property substantially as proposed. Past experience with similar residential development on

Wolfback Ridge and elsewhere in Sausalito indicates that through normal local subdivision review procedures, Final Map engineering requirements, and the corresponding application of proven road and foundation engineering practices, the site's steep topography and its proximity to major earthquake faults can be adequately addressed in the design of roadways and individual homesites. To further ensure against significant impacts, it is recommended that the following general mitigation measures be incorporated into any conditions of approval for the proposed project:

a. Site-specific geotechnical investigations routinely required by the city prior to Final Map and Building Permit approval for each homesite should identify the specific roadway design and foundation design specifications necessary to ensure against ground failure (landslides and/or erosion) and related impacts.

b. The proper placement of fill on natural slopes below the proposed homesites, or the excavation of cut slopes above them, should be thoroughly addressed in each required geotechnical investigation. Any proposed change in the natural or existing topography should be evaluated by a certified soils engineer, and related recommendations should be included in the site preparation specifications, to ensure that adjacent slopes remain at least as stable as in their present condition.

c. Under normal city development review procedures, the design of the extension and improvement of both Wolfback Ridge Road and Wolfback Terrace must be based on the results of a detailed geotechnical analysis of each proposed alignment. In meeting such city geotechnical engineering requirements, the final road designs should incorporate the construction measures needed to protect the long-term stability of uphill cuts and downhill fills (e.g., retaining walls or other methods of embankment stabilization should be employed as recommended by a certified soils engineer).

d. All disturbed slopes should be planted, mulched, and/or hydroseeded immediately upon the completion of construction. These areas should be maintained by the developer until they are fully revegetated.

e. Areas to be disturbed by construction should be confined as closely as possible to actual building footprints and pavement alignments.

f. As routinely required by the city and as described in the Drainage section of this report, an erosion control plan must be prepared by a certified civil or soils engineer. This plan should be implemented and monitored throughout all project construction phases.

H. VEGETATION AND WILDLIFE

The following chapter describes existing vegetative and wildlife values on the project site, project effects on those values, and mitigation measures warranted to mitigate any identical significant impacts.

1. EXISTING SETTING

a. General Vegetation

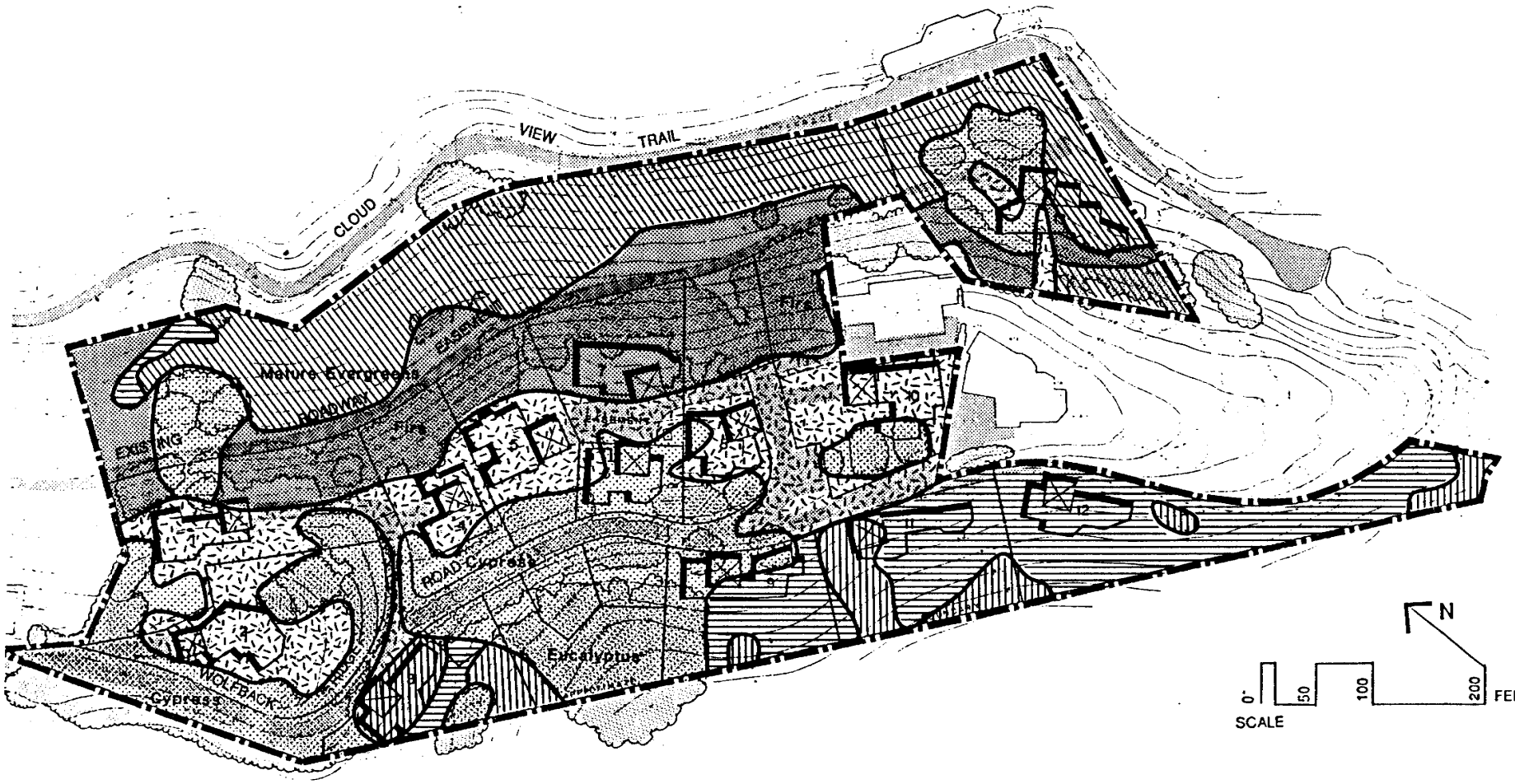
The existing vegetative pattern on the project site is mapped on Figure 27.

(1) Ridgetop. The ridgetop portion of the site includes the existing residential structure and related yard areas. Other disturbed ridgetop portions of the site include the roadways and graded areas described earlier. The intervening ridgetop areas support a mixture of introduced, "escaped," and natural vegetation. The ridgetop area is extensively covered by planted natives (monterey pine and cypress rows, redwoods, etc.) and assorted ornamentals (acacia, eucalyptus, etc.).

2) Sideslopes. The site's west-facing slopes are not developed and contain open rocky grassland (dominated by *Achillea, Erodium, Plantago, Stipa, Calystegia, Bromus, Elymus, Zygadenus,* etc.), small scattered stands of brush (*Baccharis, Lupinus, Artemisia, Diplacus),* and planted or "escaped" stands of eucalyptus and cypress. The open grassland on the west slope contains a relatively high proportion of native herbs and grasses, plus a component of introduced species (e.g., *Cirsium, Rumex, Cynosurus, Briza,* etc.) typical of the area.

The east-facing slopes are steeper and more protected and are densely wooded with such native species as coast live oak, madrone, douglas fir, coast redwood, coyote bush, and bush monkeyflower. The east slopes are also heavily invaded by planted and "escaped" trees (pine and cypress) and shrubs (*Cytisus, Rubus),* mixed with several ornamental tree species (acacia, eucalyptus, and others).

The site itself has lost much of its natural character, as it has been subject to substantial grading, many years of residential use, and the invasion of non-native species. The site supports a typical pattern of disturbed vegetation, including non-native grasses, weeds, and trees, plus scattered native herbs and shrubs. Woody vegetation is relatively abundant, but much of it



ROCKY ANNUAL GRASSLAND

WEEDY HERBACEOUS COVER
INCL. ROADSIDE WEEDS, HERBACEOUS LANDSCAPING, LAWNS, NON-NATIVE GRASS, DISTURBED GROUND, ROADS

COASTAL SCRUB

COYOTE BRUSH SCRUB
WITH SCATTERED TREES

INTRODUCED TREES
AND ESCAPED ORNAMENTALS

MIXED EVERGREEN FOREST
OAK, REDWOODS, MADRONE, DOUGLAS FIR, PLUS
PLANTED AND ESCAPED PINE, FIRS, CYPRESS, REDWOOD

Figure 27

SITE VEGETATION

SOURCE: Charles M. Patterson, Consulting Biologist

is not native. The site is bounded to the north and east by existing development (relatively low density, large-lot homes with cleared areas and landscaping). To the west and south are the extensive open grass and shrublands of the GGNRA.

b. Sensitive Habitats and Plant Communities

According to records of the California Natural Diversity Data Base (CNDDB)[1] and the California Native Plant Society (CNPS),[2] there are no sensitive plant species of *high concern* (rare and endangered species or species about which little information is available) known to occur on or very near the project site. Most of the site is heavily disturbed and supports non-native vegetation. There are no significant hydrologic or riparian features, nor are there any unusual rock types or other unique substrate conditions. There is serpentine in the general region, but the site itself consists mainly of chert, shale, and greenstone, all relatively common substrates. Remaining natural habitats and plant communities are limited to a small area on the western slope (mixed grass and shrub vegetation) and the middle part of the east slope (mixed brush and trees). In scientific terms, neither of these areas are biologically significant.

There are shallowly exposed rock outcrops in the general area of the site (in the GGNRA area to the west and north), but these do not appear to be of a particularly unusual mineral type (such as serpentine).

Although no sensitive species are known to occur on the project site, several are present in the general region (see in Appendix E for a CNPS Sensitive Plant Inventory). Most of these are found on specific substrates such as serpentine or other ultramafic (iron or magnesium rich) rock, in more mesic (protected) or wetter habitats (around springs and seeps), and in coastal habitats such as dunes, strand, and exposed sea bluffs. The closest known occurrences of sensitive plant species include several on the Tiburon Peninsula, primarily at Ring Mountain approximately four miles to the northeast, and numerous species of serpentine and other rocky habitats around Mt. Tamalpais, approximately eight miles to the north.

One sensitive plant of *lesser concern* (a species of limited distribution) which is reported as occurring throughout the general region is Tiburon buckwheat (*Eriogonum caninum*), an annual buckwheat typically found on rocky serpentine ridges and slopes. This species is mapped by CNPS as occurring in the project area, but the available mapping data does not allow for precise location of colonies or populations. Another sensitive species which could be expected in this area is California snakewood (*Guterrezia californica)*; however, this plant

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[1]CNDDB 1988.

[2]CNPS ongoing, Smith and Berg, 1988.

has recently been dropped from the CNPS inventory because of its relative commonness. Neither of these species would pose any significant constraint to development if found on the project site. Most of the other sensitive species are restricted to certain specialized habitats (e.g., rock outcrops, meadows, and wet places) which are not found on the project site.

While the Tiburon buckwheat could be present, its confirmed presence would not pose a significant constraint to development because of its low status, and local and regional abundance. No rare, endangered, or otherwise sensitive plant species were found on the project site by the EIR biologist (including the Tiburon buckwheat), and no particularly suitable habitats for such species were identified. Given the common substrates and highly disturbed character of the site, it is not likely that any other sensitive plant species are present. The local habitats have been extensively altered and disturbed, and the native plant species encountered during the field survey are common, abundant species.

d. Wildlife

The project area contains limited natural habitats for wildlife. The open grassland on the west slope provides a limited amount of seeds, insects, and possibly small mammal populations which may provide a food source for a few larger species of wildlife (such as raptors, skunks, raccoons, and foxes). However, wildlife use of this specific area is likely to be limited because of its disturbed character, its proximity to homes and roads, and the presence of greater and more isolated grassland areas west of the project (Rodeo Valley). The site's food and cover resources generally do not exist in their natural state, and use of the site as a permanent home is probably confined to limited smaller animals (e.g., insects, snakes, lizards, rabbits and songbirds).

Species which do utilize the site are common in the region and are well adapted to urbanized settings. Larger animals such as skunks, raccoons, predatory birds, foxes, and deer are probable occasional visitors to the site, utilizing the area for various forage and seed crops or to hunt for small animals.

One onsite habitat which may be of notable value is the heavily wooded east slope which provides limited cover and nesting sites for birds (including owls and other raptors). As described above, this area contains some native plants (oaks, madrone, redwood, douglas fir, and extensive brush) and provides partially natural cover. However, this area is relatively small, surrounded by homes and roads, moderately disturbed, and does not constitute a highly significant habitat resource. The woody vegetation provides some value to transient wildlife (such as birds flying over the site), but is not a unique habitat resource in the local context. Similarly, the open grassy slope on the west side of the site has limited forage value because of its steep, rocky nature. The EIR biologist found little evidence of any burrowing animals such as gophers, ground squirrels, or small rodents. Of much greater importance to wildlife is the vast open country of the GGNRA to the west

(Rodeo Valley) and south.

While the disturbed project site may have relatively little overall value, it does have some value as an occasional resting or cover area for raptors (owls, kestrels, and red-tailed hawks) using the more open lands to the west, and for birds travelling along the ridgeline. It may also serve as a temporary stopping place for birds during movements in the east/west direction. In summary the degree of site disturbance is relatively high due to past overgrazing on the west slope, partial grading of the ridgetop and east slopes, the introduction of exotic plants throughout the site, and the current residential use. Overall, the site constitutes a relatively low-quality habitat which has been, and continues to be, degraded and disturbed, and is adjacent to existing Wolfback Ridge residential uses and associated human activity.

2. IMPACTS OF THE PROJECT

a. General Vegetative Impacts

Completion of the proposed residential development would have little direct impact on *natural* vegetation. Most of the proposed actual building sites currently support non-native (or at least disturbed) vegetation, the loss of which would be biologically insignificant. The main impact of the project on local vegetation would be a minor loss of some existing woody vegetation to accommodate road widenings and homesites, plus the introduction of additional ornamental species as landscaping. Although the possible loss of some existing cypress and pines could have significant visual impacts, as explained in the Visual Factors section of this EIR, the loss of specific trees and brush at the project roadways and building sites would not be significant on a local biologic level (i.e., no significant species or population impacts would occur), and the cumulative biologic impact of removing this vegetation would be similarly insignificant.

b. Impacts to Sensitive Habitats and Plant Communities

It appears that no highly significant habitats or plant communities would be lost or adversely affected by the project. The loss of small amounts of woody vegetation would have a minor adverse impact on the area's overall habitat value, but would not be expected to result in any significant impacts on specific populations or species. The actual amount of vegetation to be lost would be minor, and no unusual habitats or plant communities would be affected.

c. Sensitive Plant Species

No rare, endangered, or otherwise sensitive plant species would be significantly affected by the project, and no suitable habitat for such species would be lost. The site's dry, common

substrates, and extensive disturbance results in a low quality habitat for any of the known sensitive plants in the region, and no such species would be expected to occur on the project site in the future. While there could be a small number of low priority plants present that could be affected (e.g., Tiburon buckwheat), no such species were observed on the site.

d. Impacts on Wildlife

Development of the site would have little impact on wildlife. Since the project site provides little foraging or nesting habitat for raptors or other mammals, no significant wildlife resources would be expected to be lost because of development. A limited number of small mammals, songbirds, lizards and snakes that may live on the site could be lost, but most of the resident animals would have the opportunity to move short distances into adjoining open space areas of similar or better habitat conditions. In particular, there are substantial areas of open space and protected public land to the west and south of the site in the GGNRA for any displaced wildlife to find available foraging resources and escape cover nearby. In summary, direct adverse project impacts on wildlife would be minimal, and long-term or indirect impacts would also be minor.

3. MITIGATION MEASURES

Because the impacts to biotic resources would be minor, no extensive mitigation measures are warranted. However, in order to minimize the impacts that would occur, and to enhance the project's overall effect on the natural environment, several measures are recommended. These should be incorporated into the project design or as conditions of project approval.

1. A specific *tree removal plan* should be submitted for review by the Planning Department prior to the approval of the Final Map and the Conditional Use Permit. Cutting of mature woody vegetation should be prohibited except as necessary to construct proposed structures and driveways. This includes both native trees and brush, as well as planted and "escaped" trees, since these all provide some resting and cover resources to wildlife. In particular, the densely wooded east slope cover should be preserved.

2. A *specific landscaping plan* should be designed and implemented, subject to the approval of the Design Review Board prior to the approval of the Final Map and the Conditional Use Permit. Native plants should be used in the site's landscaping program. Numerous native trees, shrubs, and groundcovers are available which are attractive, drought resistant, valuable to wildlife, and low maintenance. Landscaping should be planned to utilize a variety of species which would, to some extent, replace the vegetative values to be lost, and provide additional enhancement of the area.

3. Areas which are neither built upon nor filled should be required to be designated on the PUD plan as natural open space. This designation should require general cleanup of existing trash and debris, planting of native plants in disturbed areas, and the placement of restrictions on the planting of ornamentals, use of pesticides, and general human use.

4. Individual lot owners should be encouraged to utilize native plants for individual landscaping. Homeowners should be informed in their sales agreement of the availability and value of using native plants.

I. ARCHAEOLOGY

Possible project impacts on archaeological and historical values are described below, followed by recommended measures to mitigate these potential impacts.

1. SETTING

Numerous prehistoric and archaeological sites have been identified along the shore of the San Francisco and Richardson Bays, and on the alluvial plain adjacent to creeks which flow into the bays. However, the project site location on top of a steeply sloping ridge reduces the possibility of cultural resource occurrences on the site. According to the staff of the Regional Office of the California Archaeological Inventory at Sonoma State University, no archaeological sites have been recorded on the project site.

The site is located in proximity to Forts Baker, Barry and Cronkhite, all of which are listed on the National Register of Historic Places. However, local historical maps do not show the site as ever having been within the boundary of any of these three forts.[1] No cultural resources on the site are listed on the National Register of Historic Places; or the California of Historic Resources, Historical Landmarks, and Points of Historical Interest.

A literature review by the California Archaeological Inventory staff indicated that historic activity began in the area in the 1820's when whaling vessels used the Sausalito waterfront for anchorage, and that the first homes in the area were built in the 1860's. Because this early development activity was concentrated on the waterfront, the possibility of related historical resources on the site is relatively low.

2. IMPACTS

The grading required for road widenings, the undergrounding of utilities, and the installation of septic systems, could disrupt or destroy currently unidentified archaeological sites. *Prehistoric resources* which could be found include chert or obsidian flakes, mortars, and pestles; dark soil containing shell and bone debris; or human burials. *Historic resources* could include stone or adobe foundations or walls, and refuse deposits which are often found in old wells and privies.

[1]Jack Tracy, Sausalito Historical Society, personal communication, March 1989.

3. MITIGATION

If cultural resources are encountered during project construction, alteration of the materials and their surrounding area should be halted until they can be evaluated by a cultural resource professional. Mitigating measures as prescribed by the cultural resource professional and required by the city, should be undertaken prior to resumption of construction activities.

V. ALTERNATIVES TO THE PROPOSED PROJECT

The proposed tentative map and preliminary site plan have been considered in this assessment as the principal proposal for the development of the project site and have thus been subjected to detailed environmental impact analysis. To provide a further understanding of the related impacts of the proposed action and possible approaches to reducing identified impacts, and to meet CEQA requirements, six alternatives to the proposed action are briefly described and evaluated in this chapter. The six alternatives evaluated are:

No Project. The CEQA-required no project alternative, assuming continuation of the present use of the land.

Mitigated (13-Unit) Development Concept. A PUD layout with the same number of units, but incorporating mitigations from the impact analysis, including clustering of all 13 lots on the ridgetop areas east of the access road, and acquisition of lots 3, 9, 11, and 12 by the GGNRA as permanent open space.

Reduced Density (8-Unit) Development Concept. An 8-unit single-family estate layout, incorporating mitigation measures from the impact analysis, including acquisition of lots 3, 9, 11, and 12 by the GGNRA as permanent open space.

Increased Density (16-Unit) Development Concept (Maximum Allowable). A 16-unit single-family-detached PUD (the maximum density allowed by current general plan and zoning designations), with all 16 units clustered on the ridgetop east of the access road and served by the Sausalito-Marin City Sanitary District, and with acquisition of lots 3, 9, 11, and 12 by the GGNRA.

Increased Density (20-Unit) Development Concept). A 20-unit single-family-detached PUD development similar to the 16-unit scheme, and served by the Sausalito-Marin City Sanitary District, but with the additional residential development of lots 3, 9, 11, and 12, in order to increase the feasibility of the sewer extension and water system improvements. This alternative would include a residential density similar to other sewered areas below the freeway (e.g., the Hill area).

Alternative Sites. A project similar to the current proposal for the Wolfback Ridge site, but at some alternative site location.

The following analysis compares each alternative with the proposed project with respect to land use and visual impacts, traffic impacts, effects on water service, effects on septic disposal methods, and noise impacts.

A. NO PROJECT

1. Principal Characteristics

The no-project alternative would involve maintaining the existing characteristics of the site without any new construction. The existing duplex would remain, and the rest of the site would continue to be used as related yard area and open space. This scenario could also include the acquisition of existing parcel 200-130-10, or acquisition of its development rights, by the GGNRA.

2. Mitigating Factors

a. Land Use/Visual. This alternative would eliminate or postpone the introduction of 12 new residential structures and related road widenings and septic system installations, and as a result would avoid or postpone the related open space losses and visual impacts identified in this EIR.

b. Traffic. This alternative would eliminate the vehicular access impacts and traffic volume increases associated with the project.

c. Water. This alternative would eliminate the need for increased water supply, and thus would reduce the need for improvements to the existing Wolfback Ridge water supply, storage, and distribution system. It would also eliminate or postpone the project-related increase in the number of Wolfback Ridge homes subject to inadequate fire flow (water storage and pressure).

d. Sewage Disposal. This alternative would eliminate the need for new septic systems and related variances from county health regulators.

e. Noise. This alternative would prevent the introduction of additional homes subject to excessive highway-generated noise levels.

3. Adverse Factors

a. Land Use/Visual. This alternative could simply result in the deferment of development of the site to some future date. Under the current general plan land use density designations, 15 to 16 homes would be allowable on the site.

b. Traffic. This alternative would eliminate the incentive to make needed road widenings on Wolfback Ridge Road.

c. Water. This alternative would reduce to current levels the incentive to improve the existing substandard, interruptible water service on Wolfback Ridge, and would reduce the feasibility of assessment district establishment to upgrade the existing water system to minimal fire protection standards.

d. Sewage Disposal. This alternative would reduce to current levels the incentive to extend the municipal sewer system to the Wolfback Ridge area, and would significantly reduce the feasibility of an assessment-district funded extension of municipal sewer service to Wolfback Ridge.

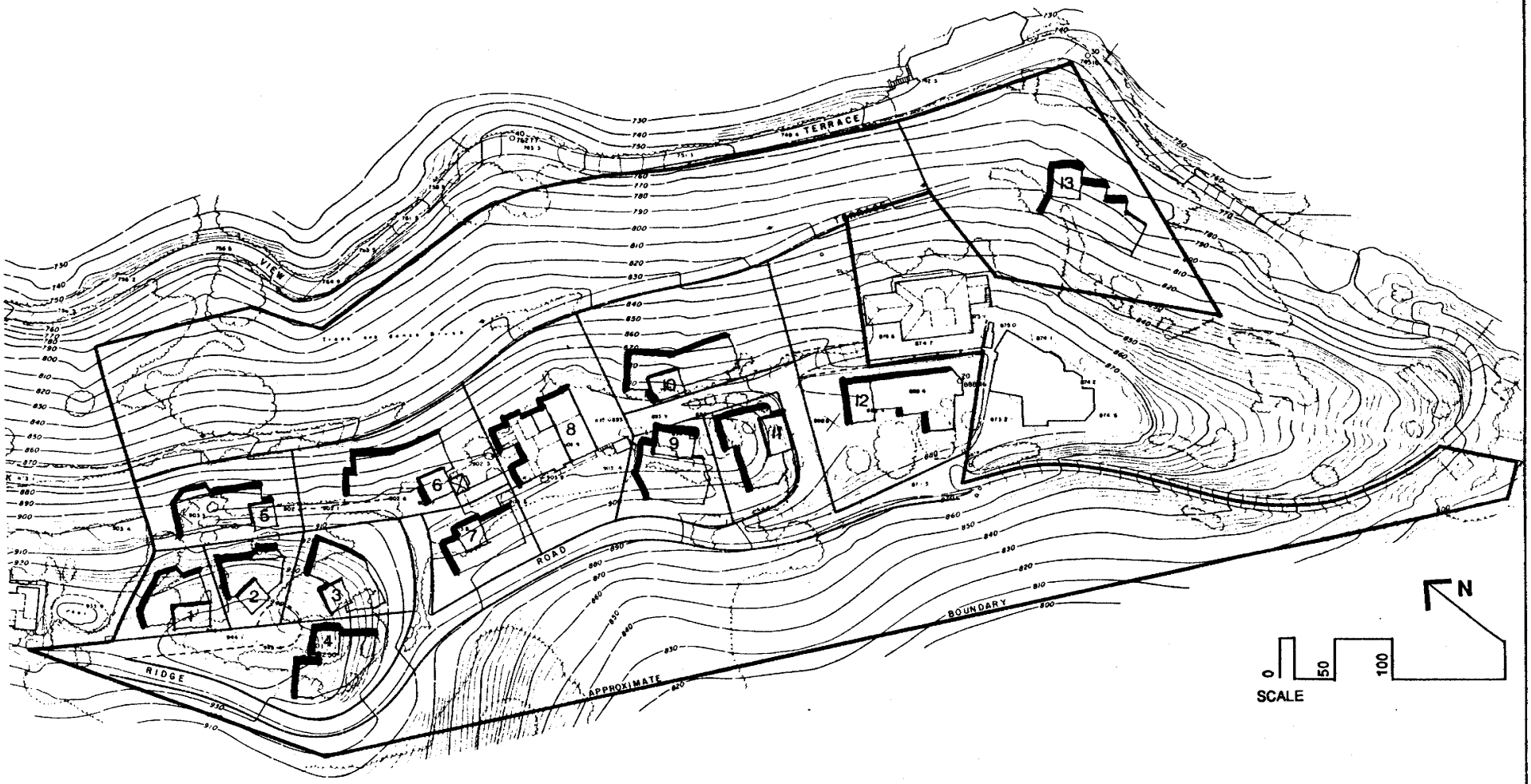
e. Noise. There are no adverse noise factors associated with this alternative.

B. MITIGATED 13-UNIT DEVELOPMENT CONCEPT

1. Principal Characteristics

Figure 28 shows the proposed Alternative B development layout. The intent of this alternative is to incorporate the mitigation recommendations from this EIR to the extent possible without reducing the number of units proposed by the applicant. This alternative would thus include the relocation of the four units proposed for the west (GGNRA) facing slopes (lots 3, 9, 11, and 12) to the ridgetop. In addition to the modified development configuration shown on Figure 28, this alternative would also incorporate the following mitigation measures from this EIR:

- Offsite road widenings on Wolfback Ridge Road,
- Enlargement of the turning radius in Wolfback Terrace,
- Provision of at least five offstreet parking spaces per residence (including garages),
- Annexation to the water district,
- Relocation of proposed drainage fields where necessary to prevent oversaturation,
- Relocation of drainage fields where necessary to prevent over compaction by vehicular traffic,
- Inclusion of noise mitigation measures in the construction of homes on all lots with homesites in direct line of vision with the freeway, and
- Protection of outdoor living spaces from freeway-generated noise where such spaces are in direct lines of vision to the freeway.



13-UNIT CLUSTER P.U.D., ASSUMING ONSITE SEWAGE DISPOSAL (SEPTIC) AND TRANSFER OF AREA EAST OF WOLFBACK RIDGE RD. TO GGNRA AS PERMANENT OPEN SPACE

Figure 28

ALTERNATIVE B: MITIGATED 13-UNIT DEVELOPMENT CONCEPT

2. Mitigating Factors

a. Land Use/Visual. This alternative would maintain the most visually vulnerable portion of the site, the west facing slope, as permanent open space. Although portions of the proposed higher-intensity residential cluster on the ridgetop could be visible from the GGNRA through the trees, this alternative would nevertheless significantly reduce project visual impacts on GGNRA and Golden Gate Bridge vantage points.

b. Traffic. This alternative would have no mitigating effect on offsite project traffic impacts. The provision of adequate offstreet parking for the project homes would reduce the likelihood of onsite emergency vehicle access problems.

c. Water. This alternative would upgrade the water service in the Wolfback Ridge area to MMWD standards, including minimum fireflow standards for water pressure and storage capacity. It would also eliminate the interruptible nature of existing Wolfback Ridge water service.

d. Sewage. This alternative would reduce the potential malfunctioning of onsite septic systems by avoiding both overcompaction and oversaturation of leach fields.

e. Noise. This alternative would mitigate the effect of existing highway noise intrusion on proposed residences.

3. Adverse Impacts

a. Land Use/Visual. This alternative could require significant additional grading of the site to accommodate the proposed homes and driveways. This alternative would also result in a project density and character substantially different from the existing residential development pattern on Wolfback Ridge.

This alternative would require the removal of substantially more vegetation on the east-facing slope and on the ridgetop, possibly increasing the visual impact of the project from the freeway and several locations in southern Sausalito.

The density of development in this alternative could also increase interference with internal views from the various project homes. Views from lots clustered on the site's northern knoll (especially lots 1, 2, and 3) could be interrupted by walls and roofs of adjacent or nearby proposed homes.

b. Traffic. Due to the smaller size of many of the lots in this alternative, required offstreet parking could be difficult to accommodate on all lots.

c. Water. This alternative would have no adverse impacts relating to water service.

d. Sewer. This alternative would increase the number of units requiring remote leaching fields (some leach fields currently proposed for the ridgetop area would have to be relocated to make room for the four additional ridgetop units). Concentration of these additional leach fields on the west slope could cause oversaturation of soils and increased landslide potentials.

e. Noise. This alternative would increase the number of ridgetop units exposed to and requiring mitigation for excessive freeway noise levels.

C. REDUCED DENSITY 8-UNIT DEVELOPMENT CONCEPT

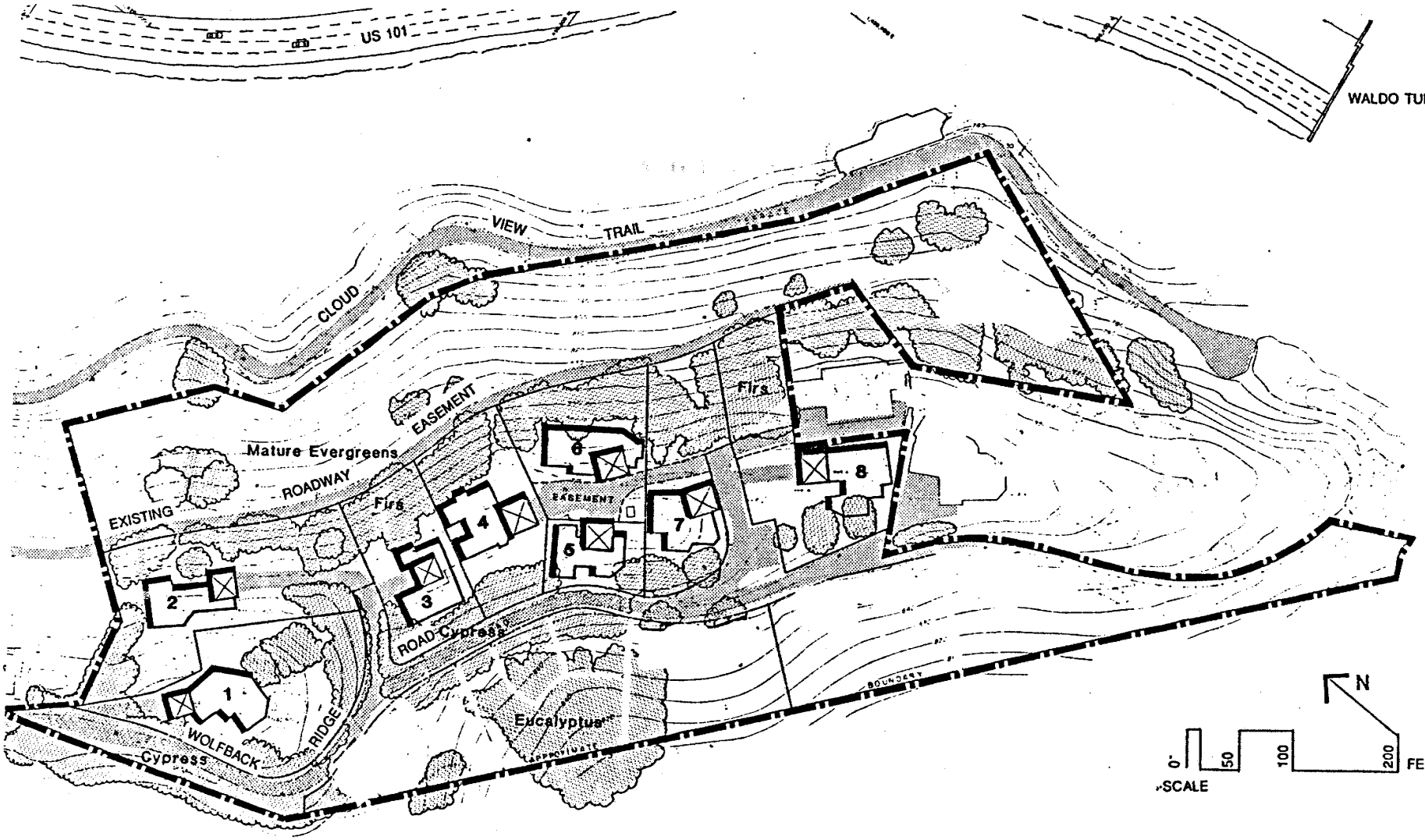
1. Principal Characteristics

The Alternative C development concept is illustrated on Figure 29. The intent of this alternative is to reduce the visual impacts of the project on the views from GGNRA, Sausalito, and Golden Gate Bridge vantage points by (a) eliminating proposed residential lots 3, 9, 11, and 12, and maintaining the associated west-facing slope as permanent open space; and (b) eliminating proposed lot 13 on the southern end of the east-facing slope. This could be done in the form of city-imposed conditions of project approval; by GGNRA fee acquisition of the property as proposed by the 1983 GGNRA Land Protection Plan; through some other less-than-fee acquisition method, such as purchase of a scenic easement; or by some combination of these methods. The lot layout for this alternative would be similar to the proposed project, but without lots 3, 9, 11, 12, and 13. This alternative would also include the following mitigation measures identified in the EIR:

- Offsite road widenings on Wolfback Ridge Road,
- Provision of at least five offstreet parking spaces per residence (including garages),
- Annexation to the water district,
- Relocation of drainage fields to prevent over compaction by vehicular traffic,
- Inclusion of noise mitigation measures in the construction on homesites in direct line of vision with the freeway.
- Protection of outdoor living space from freeway generated noise on all lots with such space in direct line of vision to the freeway.

2. Mitigating Factors

a. Land Use/Visual. This alternative would maintain the west-facing slope as permanent open space and would therefore eliminate most of the project visual impacts on GGNRA



8-UNIT ESTATE P.U.D., ASSUMING ONSITE SEWAGE DISPOSAL (SEPTIC) AND TRANSFER OF AREA WEST OF WOLFBACK RIDGE RD. TO GGNRA AS PERMANENT OPEN SPACE

Figure 29

ALTERNATIVE C: REDUCED DENSITY 8-UNIT DEVELOPMENT CONCEPT

vantage points. It would also eliminate the most prominent of the project units visible from Highway 101 and south Sausalito, reducing overall project visual impacts on these areas.

b. Traffic. This alternative would reduce the traffic generated by the project by approximately 40 percent. It would also eliminate the concern related to onstreet parking and access problems associated with the four units on the west-facing ridge and the access problems associated with the sharp turn in Wolfback Terrace.

c. Water. This alternative would reduce the amount of additional water supply necessary to serve the project. It would also eliminate the interruptible nature of water service currently available to the area and would improve area water pressure and water storage to MMWD standards.

d. Sewage. This alternative would reduce the number of septic systems required on the west-facing slope, which would reduce or eliminate the threat of oversaturation of the soil in the "bowl" area.

e. Noise. This alternative would eliminate lot 13, the proposed homesite most susceptible to noise impacts. This alternative would also reduce construction period noise affecting the Deaton and Butz residences.

3. Adverse Factors

a. Land Use/Visual. This alternative would not result in any additional land use or visual-related adverse impacts.

b. Traffic. Thls alternative would not result in any additional traffic-related adverse impacts.

c. Water. This alternative would not result in any additional water system related adverse impacts.

d. Sewage. This alternative would not result in any additional sewage disposal related adverse impacts.

e. Noise. This alternative would not result in any additional noise-related adverse impacts.

D. INCREASED DENSITY 16-UNIT (MAXIMUM CURRENTLY ALLOWABLE) DEVELOPMENT CONCEPT

1. Principal characteristics

The Alternative D development concept is illustrated on Figure 30. The intent of this alternative is to examine the comparative impacts of a project which provides the maximum residential density allowed on the site by current general plan and zoning designations (16 units), while also providing for open space preservation of the west-facing slope. This alternative could be accomplished by creating significantly smaller lots on the ridgetop, and by connecting the project to the municipal sewer system.

2. Mitigating Factors

a. Land Use/Visual. This alternative would maintain the west-facing slope as permanent open space and would thereby reduce project visual impacts on GGNRA vantage points.

b. Traffic. This alternative would eliminate the onstreet parking and access problems associated with the lots proposed for the west-facing slopes.

c. Water. This alternative would not have any mitigating effects related to water service.

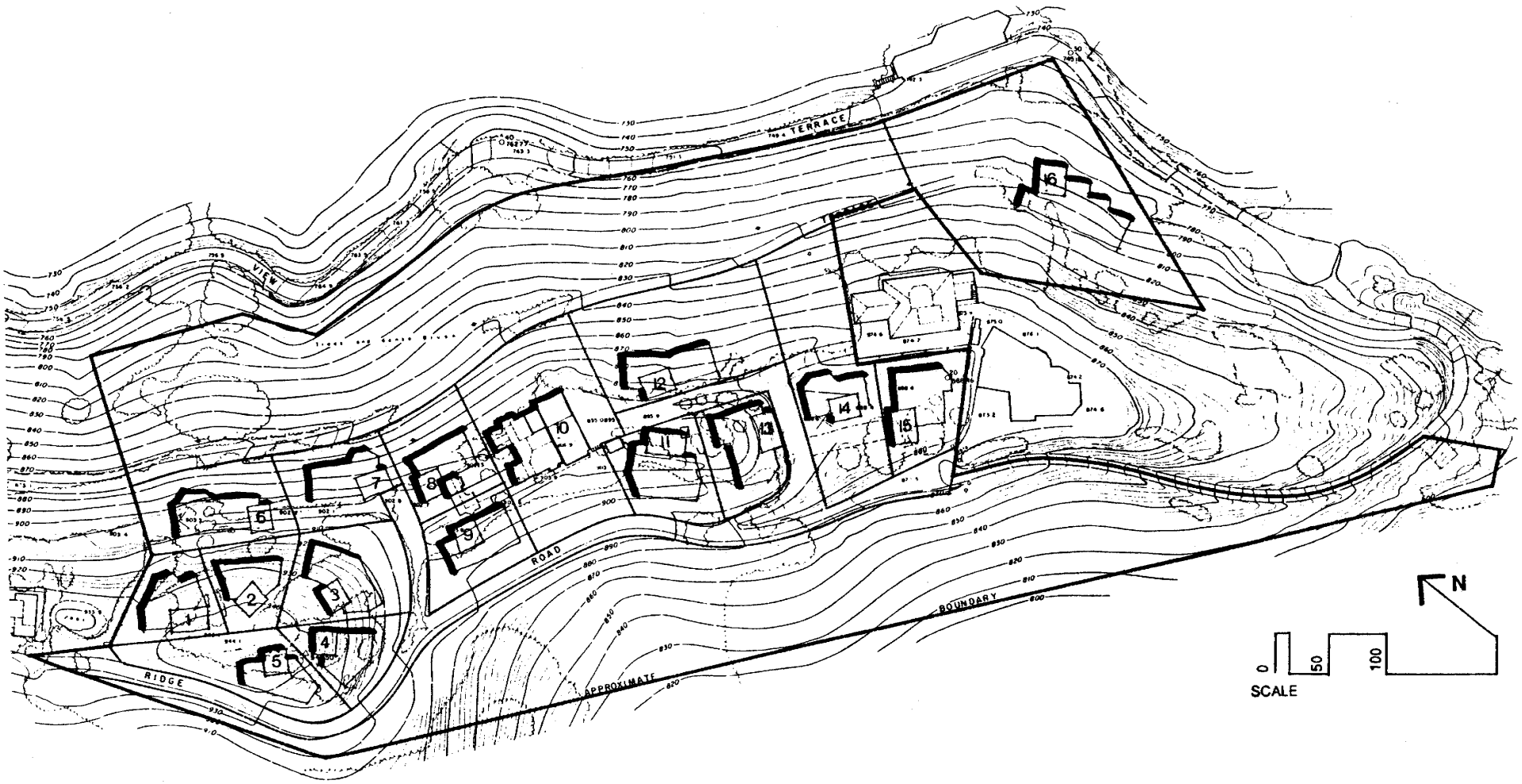
d. Sewage. This alternative would require the expansion of city sewer service to the Wolfback Ridge area. This aspect would eliminate the need for septic systems within the project, many of which would have required variances under county health regulations, and would provide opportunities to improve sewer service to other existing homes on the ridge.

e. Noise. This alternative would not result in the mitigation of identified freeway noise impacts.

3. Adverse Factors

a. Land Use/Visual. This alternative would require increased grading and tree removal, and would result in smaller lot sizes for the proposed homes on the ridgetop and the east-facing slope. The density and overall character of this ridgetop development layout would differ substantially from existing Wolfback Ridge residential areas. In addition, these characteristics could result in greater visual impacts on south Sausalito vantage points. Also, the smaller lot sizes would limit outdoor living space and could limit further views from proposed homes. Views from lots 1, 2, 3, 5, 11, and 13 could be blocked by proposed structures on other lots.

b. Traffic. The smaller lot sizes could limit the availability of offstreet parking.



16-UNIT CLUSTER P.U.D., (THE MAXIMUM DENSITY ALLOWED UNDER CURRENT CITY GENERAL PLAN AND ZONING PROVISIONS FOR THE SITE), ASSUMING MUNICIPAL SEWER SERVICE AND TRANSFER OF AREAS EAST OF WOLFBACK RIDGE RD. TO GGNRA AS PERMANENT OPEN SPACE

Figure 30

ALTERNATIVE D: INCREASED DENSITY 16 UNIT DEVELOPMENT CONCEPT (MAX. CURRENTLY ALLOWABLE)

c. Water. This alternative would increase the number of residences added to an existing interruptible water source.

d. Sewage. This alternative would not result in any significant adverse sewer system impacts.

e. Noise. This alternative would increase the number of ridgetop units exposed to excessive freeway noise levels.

E. INCREASED DENSITY 20-UNIT DEVELOPMENT CONCEPT

1. Principal Characteristics

If it is determined that approval of a project site PUD will require an upgrading of the Wolfback Ridge water system and extension of city sewer across to the freeway to serve the ridgetop site, then the applicant may request a substantial increase in development intensity in order to increase the feasibility of these sewer and water improvements. Specifically, this fifth alternative assumes a general plan amendment and rezoning request to allow a density similar to Sausalito hillside neighborhoods on the opposite side of the freeway; i.e., a density of 2.6 units per acre. The alternative also assumes development of the site's west-facing slopes. With these assumed changes, a 20-unit cluster-residential development has been illustrated for comparative impact evaluation.

The Alternative E development concept is illustrated on Figure 31. The layout of this alternative would be similar to the Alternative D layout, except that the four lots on the west-facing slopes would also be developed rather than transferred to the GGNRA.

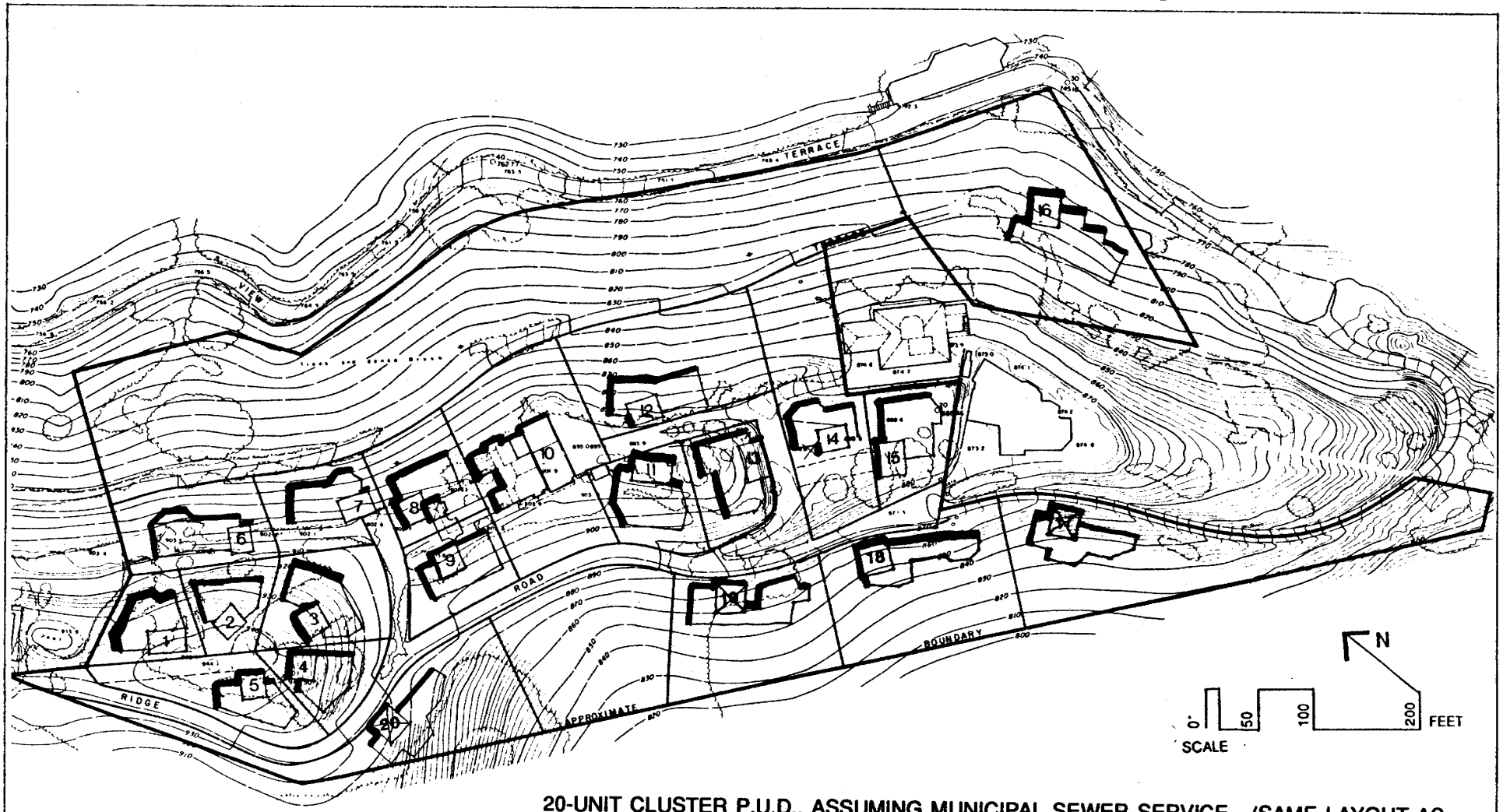
2. Mitigating Factors

a. Land Use/Visual. This alternative would have no land use or visual impact mitigating factors, except that the eucalyptus grove on the west-facing slope would not have to be removed to accommodate remote leachfields.

b. Traffic. This alternative would have no mitigating effects related to traffic.

c. Water. This alternative would not result in any significant adverse water system impacts.

d. Sewage. This alternative would require the extension of the city sewer system to serve the Wolfback Ridge area. This aspect would eliminate the need for septic systems within the project, many of which would have required variances under county health regulations.



20-UNIT CLUSTER P.U.D., ASSUMING MUNICIPAL SEWER SERVICE. (SAME LAYOUT AS ALTERNATIAVE D, BUT WITH DEVELOPMENT OF AREAS EAST OF WOLFBACK RIDGE RD., RATHER THAN TRANSFER TO GGNRA. THIS SCEME WOULD REQUIRE A GENERAL PLAN AMENDMENT AND REZONING).

Figure 31

ALTERNATIVE E: INCREASED DENSITY 20-UNIT DEVELOPMENT CONCEPT

e. Noise. This alternative would not have any mitigating effects related to noise.

3. Adverse Factors

a. Land Use/Visual. This alternative would require increased grading and tree removal and would result in smaller lot sizes for the proposed homes on the ridgetop and the east-facing slope. The density and overall character of this development layout would differ substantially from existing Wolfback Ridge residential area. In addition, these characteristics would result in greater visual impacts on south Sausalito and GGNRA vantage points.

The location of homes in this alternative could also limit views from several proposed lots. Specifically, views from proposed lots 1, 2, 3, 4, 5, 11, 13, 14, and 15 could be interrupted by walls and roofs of adjacent or nearby proposed homes.

b. Traffic. The smaller lots sizes could limit the availability of offstreet parking.

c. Water. This alternative would not result in any significant adverse water system impacts.

d. Sewage. This alternative would not result in any significant adverse sewer system impacts.

e. Noise. This alternative would increase the number of units exposed to excessive freeway noise levels.

F. ALTERNATIVE SITES

The Appellate Court decision, Citizens of Goleta Valley vs. Board of Supervisors of the County of Santa Barbara, clarified and expanded CEQA requirements for EIRs, ruling that project-specific EIRs may be required to include evaluation of alternative site locations for the proposed project. While the ruling noted that this evaluation is not required in all cases, this report acknowledges the Goleta ruling by evaluating the comparative effects of project development on alternative view sites in the project vicinity (southern Marin) to the extent that they are available. Although no suitable view sites were identified within the city of Sausalito, several were identified in the unincorporated area of southern Marin County through contacts with the county planning department. Several sites with similar physical features were identified in this process. However, only two of these sites appeared to have general plan and/or zoning designations which would allow development of a similar project (i.e., comparable residential densities). These two sites are considered below.

1. Alternative Site 1

(a) Project Description. This potential alternative site involves a seven-acre parcel (APN 34-012-30) located between the town boundaries of Tiburon, Corte Madera, and Mill Valley, off of Bay Vista Drive and Sky Road, north of Tiburon Boulevard. This site has similar topography to the subject site, and provides similar panoramic views. Sewer and water are available to nearby development, but have not been extended to the property. The Tiburon General Plan (the property is within the Tiburon Sphere of Influence) would allow up to one unit per acre on the property; i.e., seven homes. However, the topography of the site would probably limit development to four or five homes.

(b) Mitigating Factors. This alternative would eliminate the visual impacts of the project on views from the GGNRA, Sausalito, and the Golden Gate Bridge. It would also prevent additional Sausalito homes from receiving substandard water service and from being located in a substandard noise environment, and would eliminate the need for septic systems and related variances under county health regulations.

(c) Adverse Factors. This alternative would have visual impacts on views of the hillside from Tiburon Boulevard and from residential neighborhoods in the area. Because this alternative is adjacent to large areas of undeveloped, privately-held lands surrounding Ring Mountain, development of this parcel could also have growth-inducing impacts.

2. Alternative Site 2

(a) Project Description. This potential alternative site is comprised of approximately ten acres on Tennessee Valley Road in the Tamalpais Valley (APN 52-100-11) and is surrounded by existing residential development. The Marin County General Plan would allow development of up to two units per acre on the property. Water and sewer services are readily available.

(b) Mitigating Factors. This alternative site would eliminate the impact of adding homes to an unsewered area with single access and substandard water service. It would also eliminate the visual impacts associated with the project on Sausalito, Golden Gate Bridge, and GGNRA vantage points.

(c) Adverse Factors. This alternative would have significant visual impacts on existing Tamalpais Valley neighborhoods surrounding the site.

G. ALTERNATIVES CONCLUSIONS

In response to CEQA guideline provisions calling for identification of the "environmentally superior" alternative, the comparative environmental impact ratings of the various project alternatives evaluated in this chapter are listed below:

Highest Environmental Ranking (most environmentally desirable)	No Project Alternative
	Alternative Site 1
	Reduced Density (8 Unit) Development Concept
	Alternative Site 2
	Mitigated (13 Unit) Development Concept
	Increased Density (16 Unit) Development Concept
	Proposed Project
Lowest Environmental Ranking (least environmentally desirable)	Increased Density (20 Unit) Development Concept

VI. CEQA-REQUIRED ASSESSMENT CONCLUSIONS

This section summarizes report findings in terms of the various assessment categories suggested by the California Environmental Quality Act (CEQA) Law and Guidelines for EIR content. These assessment conclusion categories include "growth inducement," "unavoidable and irreversible adverse impacts," and "short term versus long term productivity."

A. GROWTH-INDUCING EFFECTS

1. Population and Housing

Development of the proposed project would result in the addition of 11 residential units and approximately 33 people to the city of Sausalito, a relatively insignificant demographic impact.

2. General Effects

The project would not be expected to induce additional growth to other similar areas in the community since it is the last undeveloped hillside parcel of its size in Sausalito. Most of the land in the area has been developed or has been acquired by the GGNRA.

If the project were modified to include expansion of the water district and extension of the municipal sewer system, the other existing five vacant lots on Wolfback Ridge may have increased incentive to develop. These improvements could also encourage current or future owners of a small number of existing "underdeveloped" Wolfback Ridge lots to further subdivide.

B. UNAVOIDABLE AND IRREVERSIBLE ADVERSE IMPACTS

If the proposed project were implemented subject to effective incorporation of all impact mitigation measures recommended in this EIR, the following significant adverse impacts of the project would still remain unavoidable, and in some cases, irreversible:

- The project would result in the loss of approximately six acres of ridgetop open space.

- The project would increase the number of residences in the Wolfback Ridge area, accessible by only one route, Wolfback Ridge Road.

C. SHORT-TERM VERSUS LONG-TERM ENVIRONMENTAL PRODUCTIVITY

In keeping with the California Environmental Quality Act (CEQA) Guidelines for EIR content, those project impacts which narrow the range of long-term beneficial uses of the environment due to short-term interests must be identified. Short-term interests served by the project would be to meet existing market demands for homes with a Sausalito location, unusually spectacular views, and direct access to an extraordinary open space and recreation area (the GGNRA). Long-term impacts on environmental productivity would include the project-related loss of ridgetop open space land and related minor wildlife habitat values. This EIR indicates that the conversion of the site to residential use would make the site less attractive to wildlife, and wildlife use of the site would be reduced. However, this EIR also states that such wildlife impacts would not be biologically significant.

VII. ORGANIZATIONS AND PERSONS CONTACTED

City of Sausalito

Kenneth M. Curtis, Planning Director
Katherine Arnaudo, Associate Planner
Stephen Bogel, Fire Chief
William D. Fraass, Police Chief
Norman Wohlschlaeger, City Engineer

Marin Municipal Water District

Ronald Johnson, Manager of Engineering
David Johnson, Engineering Supervisor
Bill Young, Administrative Assistant of Engineering
Barry Costa, Engineering Aide II
Stan Saldavini, Engineering Surveys

CALTRANS

Earl Sherman, Assistant Public Information Officer

Marin County

David Mesagno, Senior Sanitarian

Regional Water Quality Control Board

Greg Zentner, Water Resources Control Engineer

Sausalito Historical Society

Jack Tracy, President

VIII. APPENDICES

APPENDIX A: INITIAL STUDY

INITIAL STUDY

WOLFBACK RIDGE
PLANNED UNIT DEVELOPMENT
& MAJOR SUBDIVISION

ENVIRONMENTAL IMPACTS (CHECKLIST) AND
RECOMMENDED MITIGATION MEASURES

1. Earth
2. Air
3. Water
4. Plant Life
5. Animal Life
6. Noise
7. Light and Glare
8. Land Use
9. Natural Resources
10. Risk of Upset
11. Population
12. Housing
13. Transportation and Circulation
14. Public Services
15. Energy
16. Utilities
17. Human Health
18. Aesthetics
19. Recreation
20. Cultural Resources
21. Mandatory Findings of Significance

SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

The following summary identifies the potentially significant, adverse effects of the proposed subdivision and of future residential development at the site under a Planned Unit Development (PUD). A brief discussion of potential impacts and issues related to the subdivision and PUD action is followed by a discussion of potential impacts and recommended mitigation measures associated with the subdivision approval or the residential development phase. A more detailed discussion of these impacts and mitigation measures follows in the checklist section.

Geotechnical Constraints

Impacts: Much of this site is steep, with some of the proposed building sites on a 35% slope and the hillsides to the east and west ranging from 40% to 65% with some evidence of soils creep, according to geological reconnaissance. Construction on the steepest slopes or in the swales where soil deposits are deepest is to be avoided.

Mitigation Measures: Construction on the site should be clustered to avoid these areas, which is permissible under the PUD procedure. Existing cut banks and fill along Ridge Road should be stabilized as necessary. Adequate surface drainage should be provided.

Surface and Ground Waters

The geological reconnaissance was conducted in Spring 1987. No evidence of significant seasonal runoff or erosion was observed in the wooded swale on the western portion of the site. No indication of ponding or other evidence of surface waters were seen, and no ground water was found in test pits at that time.

Mitigation Measures: Adequate drainage measures should be employed at the time site improvements are made, such as drainage channels along the central portion of the site, roof gutters and downspouts for all residential structures, and provisions for draining roof and driveway runoff safely away from buildings, with waters to be deposited in a manner that will not cause erosion.

Noise

Impacts: The site has a fairly high exposure to noise from Highway 101. The City's Noise Element estimates that 1995 noise levels will exceed 65 dBA over the east side of the site.

Mitigation Measures: As much vegetation as possible should be retained along the easterly slopes, with removal of mature trees discouraged. At the Design Review Board level, study should be made by a qualified professional of the

acoustical exposure of the sites known as Lots 1, 5, 7 and 13 to insure appropriate measures to reduce interior noise levels.

Land Use

Impacts: The proposed subdivision and PUD would allow a density which is compatible with surrounding uses and which can be physically accommodated despite the steepness of slopes. These slopes constrain the applicant to a PUD proposal in order to cluster units on the buildable portions of the site and leave the major part of the easterly slopes as open space.

Mitigation Measures: Review and approval of individual residences or dwelling groups on site should require that adequate usable open space, circulation space and separation between buildings is incorporated in the site design.

Circulation

Impacts: The majority of traffic generated by residential development on the site would use Ridge Road and the Wolfback Ridge Road/Spencer Overpass intersection with U.S. Highway 101. Because the latter intersection is not signalized or well marked, there may be increasing difficulties faced by traffic turning up or down from the Spencer Overpass and by northbound traffic exiting U.S. 101 at that point.

Development on the project site with 12 new residences could require a minimum of 24 parking spaces and some provision for guest parking.

Mitigation Measures: The City Engineer should be asked to observe the overpass intersection and recommend any safety improvements that might be made in anticipation of the increased traffic from Wolfback Ridge.

Adequate convenience parking should be designed for each residential site and a common facility provided at a central location, as proposed by appliant.

Public Services & Utilities

Impacts: The effect of this development will require extension of electricity, gas, water, telephone and television cable services. The roadway easements would appear to need surfacing to avoid erosion, mud and dust, and degradation of surrounding vegetation. An increase in the water storage capability may be indicated. For adequate sewage disposal, a number of septic leachfields will need to be established where soils conditions are optimum. Demand for fire protection may be increased by this development.

Mitigation Measures: The applicant proposes to stage extensions of the utility lines and underground them as lots are individually sold. Roadway improvements would include grading for proper drainage and asphalt coating, again as a phased projects. The water supply would be increased to 40,000

gallons by addition of a 10,000 storage tank as the responsibility of the applicant. The septic disposal systems will require analysis and decision by the County of Marin health department. In addition to increasing the water storage supply, the applicant has agreed to increase fire protection by requiring installation of sprinkler system in each new residence.

These impacts on utilities and public services could be better mitigated if completely forestalled in advance, by requirement of improvement and installation of the new systems prior to recordation of final map. Applicant has recently voiced an intent of offering to extend the utilities and improve the street in advance.

Aesthetics

Impacts: The new construction on the easterly slope will alter the appearance of the U.S. Highway 101 open space corridor to some extent. Three residences will be prominently visible on the western grasslands above the main road leading from the Ft. Baker tunnel to Rodeo Beach at Ft. Cronkhite, within the Marin Headlands unit of the Golden Gate National Recreation Area (GGNRA). Whereas these residences will not necessarily be aesthetically offensive, they will insert an urban presence into lands where little construction is currently visible.

Mitigation Measures: One mitigation measure would be to decrease the number of parcels to be created on the westerly slopes, which are in any event very steep relative to the other proposed building sites. A second would be for the National Park Service to acquire the westerly parcel, or to secure view and conservation easements across that portion of the property.

At the development level, the color and texture of exterior materials on the new residences could be modulated to be compatible with the natural surroundings. Setbacks from the nearest viewing points could be evaluated to deemphasize building mass. Buildings should generally be limited in height, as are many currently found on Wolfback Ridge, to preserve views from adjacent uphill properties and views of the ridge from the adjacent parklands.

	Yes	Maybe	No
1. Earth. Will the proposal result in:			
a. Unstable earth conditions or in changes in geologic substructures?		X	
b. Disruptions, displacements, compaction or overcovering of the soil?	X		
c. Change in topography or ground surface relief features?		X	
d. The destruction, covering or modification of any unique geologic or physical features?			X
e. Any increase in wind or water erosion of soils, either on or off the site?		X	
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?			X
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?	X		

The site conditions are described in the recent geotechnical reconnaisance prepared by Herzog & Associates, Inc. The central portion of the property, where the majority of parcels are proposed, is gently sloping. Both the eastern and western slopes are described as moderately to steeply sloping, with gradients between 2:1 and 1½:1.

Although there are existing unpaved roads, and some degree of previous grading and various cuts and fills, future construction on this property would have some adverse impact on soils. There would be additional cuts and grading both along the common access easements and on the building sites, plus excavation for the sewage disposal systems. Soils would be overcovered by the asphalting of the roadway easements, as well as by future residences and parking structures. There would be an increase of exposure of people and property to geologic hazards, predominantly to the regional seismic hazards.

Mitigations of these impacts in addition to those discussed in the Herzog report would include:

- confining the majority of new building sites to the 100'-200' wide central portion of the ridge, which is relatively level and has already been graded extensively;
- reducing the number of new parcels on the steepest eastern and western slopes;
- setting back all residential development from existing cut banks;
- collecting all rainwater from residences, parking areas and roadways and transporting it to safe discharge points;
- conducting detailed geotechnical investigation prior to preparing final development plans for steep sites, to test soils stability and provide criteria for foundation design, grading and subsurface drainage.

		Yes	Maybe	No
2.	**Air.** Will the proposal result in:			
	a. Substantial air emissions or deterioration of ambient air quality?	___	___	X
	b. The creation of objectionable odors?	___	___	X
	c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	___	___	X

Future residential development within this subdivision could result in approximately 80-100 additional daily vehicle trips in the immediate vicinity, which would incrementally increase local and regional air pollution (principally ozone and hydrocarbons). This impact would be significant only as it contributes to the cumulative effect of area-wide growth.

3. Water. Will the proposal result in:	Yes	Maybe	No
a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?			X
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	X		
c. Alterations to the course or flow of flood waters?			X
d. Change in the amount of surface water in any water body?			X
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?			X
f. Alteration of the direction or rate of flow of ground waters?		X	
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?		X	
h. Substantial reduction in the amount of water otherwise available for public water supplies?			X
i. Exposure of people or property to water related hazards such as flooding or tidal waves?			X

Construction of residences on this property would result in increased surface runoff due to construction of impermeable surfaces (building and parking areas, paved roadways). These surface waters, which would contain traces of metals and oils from automobile residues, would drain eventually to San Francisco Bay or to Rodeo Lagoon and the Pacific Ocean. The impact on both bodies of water should be considered insignificant.

A greater potential impact is that increased surface runoff could lead to erosion of the cut banks and steeper slopes. If surface water is not properly drained, seepage into the soil (ground water) can cause sloughing of the slopes. This would be especially true in those areas where surface soils are shallow. Also, severe erosion could occur during construction (site excavation and grading) on some of the building sites unless mitigation measures are implemented.

Mitigation measures at all levels of subdivision density could include:

- Retain existing stands of trees and chapparal to the maximum feasible extent;
- Install storm water drains or ditches to catch runoff from the complex of buildings at the center of the site;
- Require residential structures to have roof gutters and downspouts and make provision to drain this runoff safely off site;
- Confine site grading and excavation (or filling) to the dry season only, and plant exposed areas as soon as possible;
- Maintain planting on constructed slopes for the life of the project to prevent erosion.

	Yes	Maybe	No
4. Plant Life. Will the proposal result in:			
a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants)?	X		
b. Reduction of the numbers of any unique, rare or endangered species of plants?			X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	X		
d. Reduction in acreage of any agricultural crop?			X

Development of a major part of the property for residential use would be likely to introduce new species of plants including ornamental shrubs and trees, and possibly lawns. The site is presently covered with wild grasses and scrub typical of the Marin Headlands, plus stands of introduced species such as Monterey cypress and pines, Douglas fir and eucalyptus. Other nativized exotics such as French broom cover the disturbed soils that surmount the ridge.

Although no inventory has been taken of the site, there are no known endangered species in the immediate environs. The changes to the biota on site are not therefore considered to be significant; further, this property abuts an urbanized area of Wolfback Ridge.

Among the mitigations of the impact of residential development:

- Retention of the mature stands of trees should optimize the possibility of maintaining the widest variety of species possible on this ridge, which is subject to strong prevailing winds in summer and storm gales in winter. The applicant proposes to clean them out and maintain them as part of this project.

- Minimization of construction on the expanse of grasslands to the southwest would enhance preservation of the native wildflower and grass mix that is typical of the coastal headlands.

16

	Yes	Maybe	No
5. **Animal Life.** Will the proposal result in:			
a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?	___	___	X
b. Reduction of the numbers of any unique, rare or endangered species of animals?	___	___	X
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	___	X	___
d. Deterioration to existing fish or wildlife habitat?	___	X	___

Development of the property with twelve additional residences would be likely to introduce domesticated animals to the site. No mitigations would be required, since the adjacent area to the north is already in residential use. The presence of dogs and cats would, however, tend to discourage the deer and rodents that abound in the nearby parkland and residential areas alike. Occasional large mammal visitants such as bobcats, foxes and mountain lion would also increasingly avoid Wolfback Ridge.

No known wildlife trails such as those that lead to the nearby springs along Alta Avenue or over the top of the Waldo Grade to the South Ridgelands would be significantly disturbed or interdicted by the residential development. The impact of this proposal should therefore not be considered substantially adverse on animal life.

	Yes	Maybe	No
6. Noise. Will the proposal result in:			
a. Increases in existing noise levels?	X		
b. Exposure of people to severe noise levels?		X	

The proposal will result in new noise associated with vehicular traffic. Standard trip generation rates for single-family residences ranges between 7-10 trips per 24 hour period. In the case of Wolfback Ridge development, however, the actual number of trips per residence may prove fewer given the remoteness of the location from resident-serving commercial centers.

The estimated 80-100 vehicle trips per day from future residences on the site would increase existing noise levels along Ridge Road and Wolfback Ridge Road. However, these increases would not be likely to exceed the existing ambient noise levels by more than a few decibels. The increases would be barely perceptible to area residents and are not considered to be significant.

The site has a fairly high exposure to noise from Highway 101 traffic. The Sausalito Noise Element of the General Plan shows that most of the site falls within an area that by 1995 will exceed City standards for new residential development, except for infill construction. In this case special mitigations, such as construction of noise barriers, additional insulation or clustering units on one portion of the site, could be required.

Among possible mitigations:

- Cluster the majority of new dwellings along and in the vicinity of the existing residence at the top of Wolfback Ridge, to take advantage of the noise shielding effect of distance from the highway, of the topography and existing tree barriers.
- Maintain the existing stands of trees along the southeasterly slopes of the property to serve as a permanent noise buffer.
- Recognize that the proposed open space parcel is a noise sensitive zone and require that it remain free from residential development.
- Require on-site noise studies for one or more of the parcels proposed for the southeasterly slopes, in order to determine actual noise exposure levels and develop appropriate mitigation measures.

	Yes	Maybe	No
7. Light and Glare. Will the proposal produce new light or glare?	X	___	___

The only light and glare associated with this project would be attributable to automobile headlights and residential lighting. No street lights are proposed. Several of the residential parcels would be wholly or partially visible from portions of Sausalito, U.S. Highway 101, and the Edwards Ridge sector of the Marin Headlands in the Golden Gate National Recreational Area (GGNRA). Three residences to be constructed on the open grasslands to the southwest of the site would be directly visible from the Ft. Baker Tunnel road that leads from Cronkhite Beach up Rodeo Valley within the GGNRA. The glare from headlights would be transient and would affect only the residents along Wolfback Ridge Road and Ridge Road leading to the site.

This impact is typical of incremental urbanization and would not be significant. It therefore requires no mitigation.

	Yes	Maybe	No
8. Land Use. Will the proposal result in a substantial alteration of the present or planned land use of an area?	X		

The site contains 7.84 acres gross in four parcels and is improved with only one duplex residence. It is therefore essentially vacant. These parcels are currently designated for low-intensity residential use under the Sausalito General Plan and Zoning Map. Although the requested subdivision into 13 building sites represents a substantial prospective change in the use of the land, it is consistent with the adopted plans and regulations that apply to the Wolfback Ridge residential planning area.

Development on the lots in the manner proposed on the Tentative Map would be consistent with the surrounding housing. A study of the development pattern of Wolfback Ridge shows a wide variety of lot size and configuration among the 35 developed and 5 undeveloped parcels outside the subject property. The new development would, however, be less compatible with the surrounding open space on three sides, represented by parklands and the highway right-of-way. Presumably the new residential development would eventually become familiar as the permanent "built-out edge" of Wolfback Ridge.

Development to the maximum density of fifteen (15) single-family residences allowable under this district is restricted by site features. Topographic, geologic and noise conditions militate against the traditional option of designing regular lots of approximately 20,000 sq. ft. each, evenly distributed about the site. Instead, since the development is to be designed as a planned unit development (PUD), the required open space can be grouped on the unbuildable slope areas.

Given the site constraints and the need to devote significant suitable acreage to leach fields and to roadways, the applicant has proposed thirteen (13) parcels, nine of which contain fewer than the standard 20,000 sq. ft. of parcel area. The suitability of this plan must be tested by evaluating whether there is adequate area for separation between residences, or for usable open space on the buildable portion of the site. Internal circulation and parking layout is somewhat restricted under these conditions, and should be analyzed for feasibility.

Approval of the proposed subdivision of the parcel into individual lots should ensure that no unbuildable lots are approved for development. The geotechnical reconnaissance report and sewage disposal feasibility study performed on this subdivision plan indicate that, based on information developed to date, residential construction on all thirteen parcels poses no special hazards or technical difficulties.

	Yes	Maybe	No
9. Natural Resources. Will the proposal result in:			
a. Increase in the rate of use of any natural resources?	___	___	X
b. Substantial depletion of any nonrenewable natural resource?	___	___	X

	Yes	Maybe	No
10. Risk of Upset. Will the proposal involve:			
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X
11. Population. Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?	X	___	___

The proposed development of these lots would allow a small increase (about 20-30 persons) in the population of Sausalito by providing up to 12 new residences. Although the project could increase by 1/3 the population within the Wolfback Ridge residential planning area, the density on the site would be comparable to that of surrounding residential properties.

The project would not have a substantial growth-inducing impact. Only the proposed parcels plus an estimated five others within the Wolfback Ridge planning area may be utilized for new residential units.

	Yes	Maybe	No
12. Housing. Will the proposal affect existing housing, or create a demand for additional housing?			X

The proposed subdivision would allow for the construction of additional housing in Sausalito (up to 12 single-family units under the R-1-20 zoning regulations, assuming retention of 1 existing residence).

This development would be consistent with the General Plan goal of providing a variety of different housing opportunities for residents and prospective residents of Sausalito. The size of the lots and permissible density, as well as the cost of land on a choice ridgetop location with spectactular view opportunities, are not conducive to the provision of housing affordable by either low or moderate income families.

No mitigation of this impact is necessary since this project does not displace affordable housing or preempt any fair-share affordable housing development opportunities.

	Yes	Maybe	No
13. Transportation/Circulation. Will the proposal result in:			
a. Generation of substantial additional vehicular movement?			X
b. Effects on existing parking facilities, or demand for new parking?	X		
c. Substantial impact upon existing transportation systems?			X
d. Alterations to present patterns of circulation or movement of people and/or goods?			X
e. Alterations to waterborne, rail or air traffic?			X
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?		X	

Based on a maximum site capacity of 12 new single-family dwellings, the project could generate 84-120 daily vehicle trips or about 10-14 p.m. peak hour trips (5-6 p.m. weekdays). Weekend peak hour (3-4 p.m.) trip generation would be less than weekday peaks.

Present volumes on Wolfback Ridge and Ridge Road are low and the project-generated trips would not adversely affect the capacity of these common roadway easements. The Highway 101 offramp that leads to the Spencer Avenue overpass, however, may be a location that experiences an increase of frequency of near-incidents to the degree that northbound traffic tends not to observe Wolfback Ridge vehicles entering from the overpass.

The impact of these new trips should not contribute significantly to the cumulative traffic of all new developments on Wolfback Ridge, the upper portion of the Hill, and the upper portion of the New Town residential planning districts. Only in-fill development is anticipated in these three areas.

Under Citywide standards, a minimum of 2 parking spaces per unit would be required to be provided on each building site.

Mitigation measures:

- Analyze the Spencer Overpass/U.S. 101 offramp intersection at the time of development review.
- Require provision of additional parking on each site to complement the two space minimum standard per dwelling unit.
- Cluster additional common parking in an appropriate central location, to preclude overflow demand on the common access road.

	Yes	Maybe	No
14. **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		
b. Police protection?			X
c. Schools?			X
d. Parks or other recreational facilities?		X	

Adequate fire protection for the development will require extension of the water main, placement of one or more hydrants on the Ridge Road frontage, and sprinklering of the individual residences as required by the Fire Chief. In addition, the applicant proposes to increase the present water storage system by adding a fourth 10,000 gallon tank at the community facility he owns on Ridge Road.

The Police Department reports that the Wolfback Ridge area typically has a low demand for police services. This demand profile is expected to be unaffected by this project.

There may be additional demand on the federal park system services since new residents will avail themselves of the hiking, biking and horse trails immediately adjacent to the project site. The impact of the demand on governmental services by this new recreational population should, however, be insignificant.

	Yes	Maybe	No
15. Energy. Will the proposal result in:			
a. Use of substantial amounts of fuel or energy?		X	
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?			X

A substantial amount of energy may be required to heat future dwellings on the site and for transportation to and from the site. Care should be taken in the review of the future site plan(s) to assure that adequate solar access and orientation for the units is provided, to allow passive energy savings. This site may lend itself also to use of wind energy conversion systems.

	Yes	Maybe	No
16. **Utilities.** Will the proposal result in a need for new systems, or substantial alterations to the following utilities:			
a. Power or natural gas?	X		
b. Communications systems?		X	
c. Water?	X		
d. Sewer or septic tanks?	X		
e. Storm water drainage?		X	
f. Solid waste and disposal?			X

Electricity and gas lines are available nearby and will be extended underground to serve the new building sites in the proposed subdivision. Telephone lines and television cable will be handled in the same manner.

There is a private water system serving all of Wolfback Ridge. It will be expanded to 40,000 gallons in storage with the addition of a 10,000 gallon water tank. The Marin Municipal Water District water is delivered by pipe under the Spencer Avenue overpass then pumped uphill to the various storage tanks and distribution lines that comprise the private water system.

There is no sewage line serving Wolfback Ridge and none is proposed. The project therefore proposes a septic system, with recommendations developed by the Questa Engineering Corporation in a recent study. One suitable disposal area was found on the bayside portion of the site; five along the ridgetop area; and six on the oceanside slopes. These twelve systems plus the one serving the existing residence are recommended as sufficient for the waste disposal needs of the 13-lot Planned Unit Development. The County of Marin would make the final determination on the adequacy of each field.

No surface drainage ditches or similar facilities are proposed at this time. The Director of Public Works has commented there may be some need to handle storm water runoff from the future residences. This may be considered at the design stage.

Solid waste pickup and recycling services are presently provided on Wolfback Ridge. The new development will place minor additional demand on this service.

	Yes	Maybe	No
17. **Human Health.** Will the proposal result in:			
a. Creation of any health hazard or potential health hazard (excluding mental health)?			X
b. Exposure of people to potential health hazards?			X

	Yes	Maybe	No
18. Aesthetics. Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?	X		

The proposal will not result in the obstruction of any scenic vista or view open to the public, however, it will have the effect of imposing the sight of new buildings on viewers of the U.S. Highway 101 open space corridor and of the Golden Gate National Recreation Area headlands along Wolfback Ridge.

One additional residence would join the highly visible single-family dwelling on the face of the U.S. 101 embankment above the Waldo Grade. Several others to be located on the southeasterly facing slopes could potentially be visible from various parts of The Hill and the Old Town residential planning areas, and from the Bay, depending on the amount of tree trimming and removal that may occur.

Three proposed new residences would be especially prominent visually as seen by park visitors headed east along Rodeo Valley toward the Ft. Baker tunnel. At present, the park visitor gains the impression of a succession of ridgelines largely unencumbered by buildings, although portions of several Wolfback Ridge residences are visible. Since the site is relatively near the main park road, the existing sense of seclusion and removal from the urbanized Bay Area would be notably changed.

The proposal would not necessarily result in the creation of an aesthetically offensive site open to public view; it would, however, alter the character of the park experience by increasing urban construction where little is presently in evidence.

	Yes	Maybe	No
19. Recreation. Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?		X	

As described above, recreational opportunities would be impacted visually by the new construction adjacent to the lands of the Golden Gate National Recreation Area, especially on the grassy slopes facing the ocean. In addition, there would be a marginal increase of use conflict between day users of the park trails and the residents of Wolfback Ridge. The National Park Service reportedly has received complaints in the past from Wolfback Ridge property owners about the unpermitted recreational use of Ridge Road and other private property. In order to provide proper separation and circulation, GGNRA has built a trail (SCA trail) immediately west of this site to allow hikers to bypass the residential area and reach the headlands beyond the Waldo Tunnel.

Park planning personnel have offered to comment on this project and to propose any mitigations of the possible adverse effect of this project on recreational opportunities in the immediate vicinity.

	Yes	Maybe	No
20. Cultural Resources.			
a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?	___	___	X
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	___	X
c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	___	___	X
d. Will the proposal restrict existing religious or sacred uses within the potential impact area?	___	___	X

Although there has been no field investigation or literature search, there is no evidence that future residential construction on this site will result in any alteration of or damage to either a prehistoric or historic archaeological site. There have been no reports of local finds of artifacts. There are no streams, springs, or noteworthy rock outcroppings on the property such as characterize many Native American sites. The use of Wolfback Ridge prior to the most recent times was confined to ranching, particularly of dairy cattle.

Should any archaeological resources be encountered during site work for development of any of these parcels, work should be halted and a qualified archaeologist should be contacted to evaluate their significance.

	Yes	Maybe	No
21. Mandatory Findings of Significance.			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	___	X	___
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	___	X	___
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	___	___	X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	___	___	X

Future residential development on the site without the recommended mitigation measures would have the potential to degrade the quality of the environment in terms of increasing erosion and fire hazards, exposing project residents to potentially excessive levels of noise, altering views of the ridgeline, and adding to possible hazards at the intersection of the Spencer Avenue overpass and U.S. Highway 101.

With the recommended mitigation measures incorporated into subdivision improvements and future development proposals, these potentially significant impacts could be reduced to insignificance.

Residential development of the remainder of this property would commit open slopes and heavily forested ridgelands to private use over both the near term and long term, prohibiting its use for recreation and open space. The dedication of open space, or of view or conservation easements could mitigate this project impact.

APPENDIX B: GGNRA LETTER TO THE CITY OF SAUSALITO

United States Department of the Interior

NATIONAL PARK SERVICE
GOLDEN GATE NATIONAL RECREATION AREA
FORT MASON, SAN FRANCISCO, CALIFORNIA 94123

IN REPLY REFER TO:

L14 (WR-GOGA)

DEC 15 1987

Katherine Arnaudo
Assistant Planner
City of Sausalito
420 Litho Street
Sausalito, California 94966

Dear Ms. Arnaudo:

Thank you for sending us the information regarding the proposal to create a 13 parcel residential Planned Unit Development on a 7.84 acre property on Wolfback Ridge. As you know, 3.48 acres of this property is located within the boundaries of the Golden Gate National Recreation Area. The reason for its inclusion is so that the National Park Service can acquire it to preserve its natural and open space values and to protect the Rodeo Valley area of the park from visual intrusions of the sort that seem to be threatened by this proposal.

Although the property is currently quite low on our acquisition priority list, as explained in the Park's Land Protection Plan (enclosed), a confirmed threat of development can serve to substantially elevate its priority. We understand that the project before your commission does not currently include construction proposals. However your earliest assessment in writing to us indicating the probability of the success of future proposals to develop the property would be most helpful. Once we have received such a confirmation we will take steps to acquire the property as soon as possible.

Sincerely,

Brian O'Neill
General Superintendent

cc: Ed Haberlin, WRO
Amy Meyer

APPENDIX C:

VISUAL IMPLICATIONS OF EACH PROPOSED PROJECT HOMESITE

Appendix C
VISUAL IMPLICATIONS OF EACH PROPOSED PROJECT HOMESITE

Lot	Visual Considerations

1 Proposed homesite concealed from Sausalito viewpoints below by setback from ridge edge, and to a lesser degree, by existing vegetation on edge of the ridge.

Upper stories could be visible above treeline from viewpoints below.

Developer or future homeowners may be inclined to remove or thin existing edge vegetation to open up views to Sausalito, Richardson Bay, Belvedere, Tiburon, the East Bay, and beyond. Such vegetation removal could expose portions of the new home to view from the Prospect-Sausalito Boulevard neighborhood below.

Suggested homesite location would be directly visible from Johnson homesite to the northwest, unless screened by introduced vegetation and/or fencing.

Rooftops on homesite 1 would be visible from proposed homesite 2 above.

Lot 1 would be concealed from all other external offsite views from the south and west (GGNRA).

2 One existing mature cyprus may require removal to accommodate proposed driveway.

Home construction on proposed homesite would be visible from parts of Prospect/Cloudview area of Sausalito, as well as from more distant Belvedere viewpoints. Selective removal of existing trees could occur on portions of lot 2 for significant view improvement without offsite visual impacts.

Three homes north of the site would have partial views of lot 2 home, unless or until screened by introduced vegetation and fencing.

Lot 2 effectively screened from GGNRA view by existing tree-rows along Wolfback Ridge Road. Removal or thinning of these trees to improve solar access and/or views to the west from lot 2 could expose the lot 2 home to views from the GGNRA.

3 Exposed, fairly steep, rocky grassland. Although partially sheltered from GGNRA vantage points to the west by topography (the "bowl"), the homesite would be partially to fully exposed to views from Rodeo Valley.

Lot	Visual Considerations
	Site provides panoramic views west-to-south of Richardson East Peak, Rodeo Valley, Fort Barry, the Marin Headlands, the Pacific Ocean, the Farallon Islands, the Golden Gate Bridge towers, the Golden Gate, Lincoln Park, and the Richmond District. Transmission tower prominent in foreground.
4	Contains north portion of existing house, including tower; this portion of structure concealed from Sausalito views by hillside vegetation. Although the ridgetop location of this unit can provide panoramic views to the east and west (see Figure 5, section BB), existing dense tree-rows along the east and west edges of the ridgetop block these views. Thinning of hillside vegetation for view improvement and solar access purposes would expose portions of the proposed homesite to view from Sausalito vantage points. Similarly, thinning of tree-rows along either side of Wolfback Ridge access road to improve views to the west could result in exposure of the structures to GGNRA vantage points.
5	Contains southern portion of existing house, including elevated section visible from Sausalito vantage points below between vegetative screening. Like lot 4, panoramic view opportunities to the east, west, and south from this lot may result in tendencies by future homeowners to thin or remove screening vegetation to improve views and solar access, exposing portions of the new home to views from Sausalito viewpoints below.
6	The proposed homesite on this lot would be located on the slope between the ridgetop plateau and the Wolfback Ridge Road extension at approximately 900 feet (elevation). The homesite would be concealed from Sausalito vantage points by its location on the west edge of the ridgetop, and would be concealed from GGNRA/Rodeo Valley viewpoints by existing eucalyptus tree-rows. Any future thinning or removal of this tree-row screening to open up views to the GGNRA and the Pacific could expose the homesite to views from Rodeo Valley.
7	The proposed homesite would be located at the top of the east-facing slope off the ridgetop plateau. The structure would be heavily concealed from Sausalito vantage points below by existing vegetative screening, although building rooftops may be partially visible through the existing vegetation. Any thinning or removal of this existing vegetation to open up views and solar access could expose more of the hillside structure to views from Sausalito below.

Lot	Visual Considerations

8 The proposed lot 8 homesite location would have long-range, panoramic views to the south of the bay, Alcatraz, San Francisco, and the Golden Gate. However, construction of a home on the proposed lot 10 homesite, although approximately 5 feet lower, could distract from or block portions of the bay and all of the downtown San Francisco portion of this view.

The proposed homesite location would provide views over the treetops to the bay to the east and views to the south of the Golden Gate. Views to the west of Rodeo Valley and the Pacific would be blocked by existing tree-rows along Wolfback Ridge Road. Thinning or removal of any of this existing vegetation for view improvement purposes could expose portions of the ridgetop home to Sausalito and Rodeo Valley vantage points. Portions of the structure and any introduced landscaping would also be visible behind and above the Butz home from Golden Gate Bridge vantage points (distant views from the southern half of the span).

9 Home construction as proposed on lot 9 would be highly prominent and fully exposed to views from Rodeo Valley and could probably require removal of portions of the cypress tree-row along the Wolfback Ridge Road extension, increasing the possibility of partial exposure of the homesite on ridgetop lot 8 to view from Rodeo Valley. The home itself would benefit from panoramic views of Rodeo Valley, the Pacific, and the Marin Headlands, plus partial views of the Golden Gate and the Richmond District.

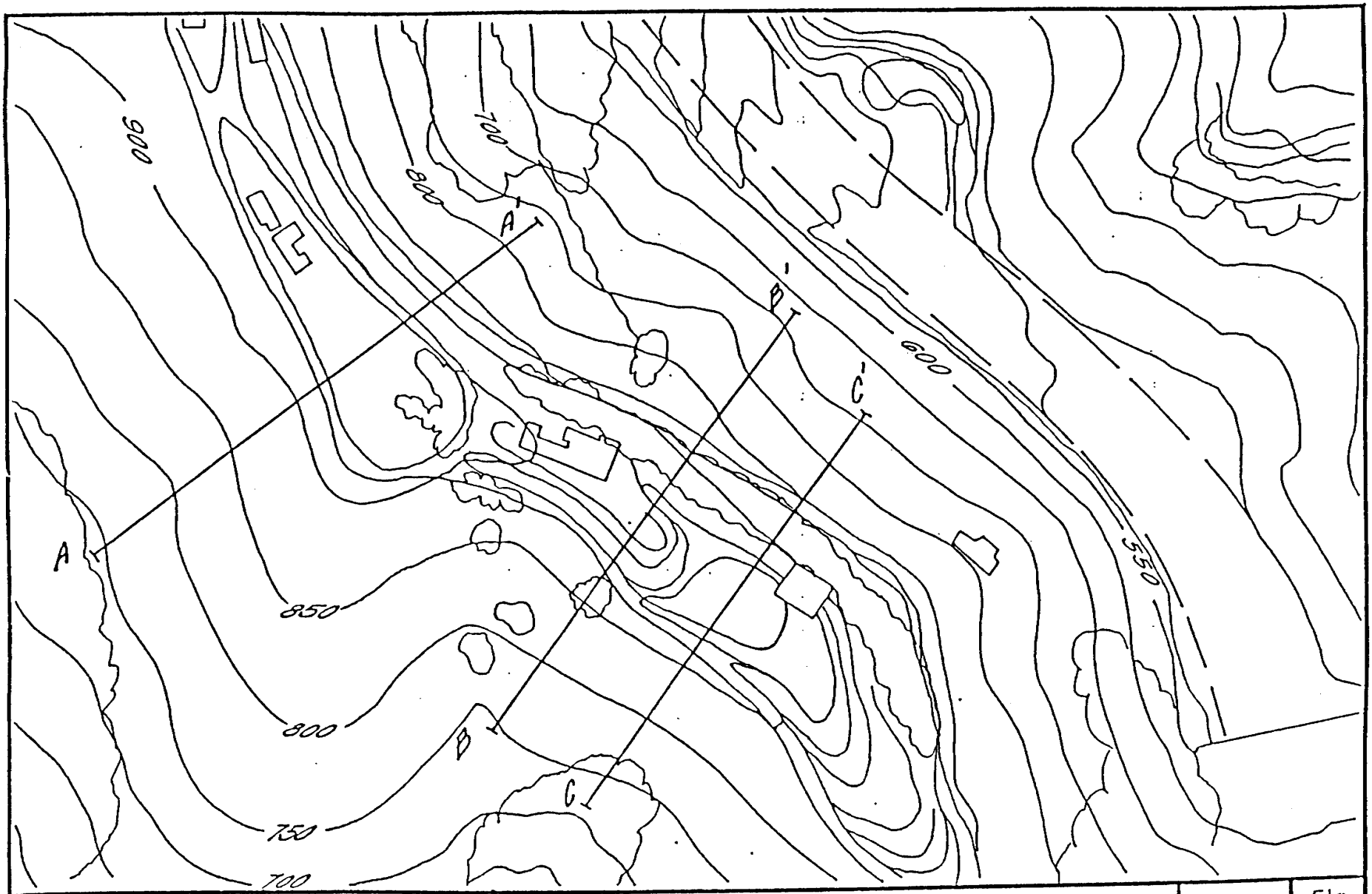
10 The proposed homesite location on lot 10 would provide panoramic views from east to south. Views to the east of Belvedere would be partially disrupted by the rooftop of the existing Deaton home, encouraging perhaps a two- or three-level structure. Views to the west towards the GGNRA would be largely blocked by the cypress tree clusters existing on the lot. The rooftop of this unit, and/or any upper stories, would be visible along the ridgeline from Rodeo Valley below, and from the distant vantage points along the southern half of the Golden Gate Bridge. The structure would be concealed from Sausalito views by topography and the existing Deaton home.

11 The proposed hillside homesite would be fully exposed to, and highly prominent from, Rodeo Valley vantage points. The homesite would also benefit from panoramic views south-to-west of San Francisco (partial), the Golden Gate Bridge (partial), the Marin Headlands, Rodeo Valley, and the Pacific. The homesite would also be clearly visible from the southern half of the Golden Gate Bridge span.

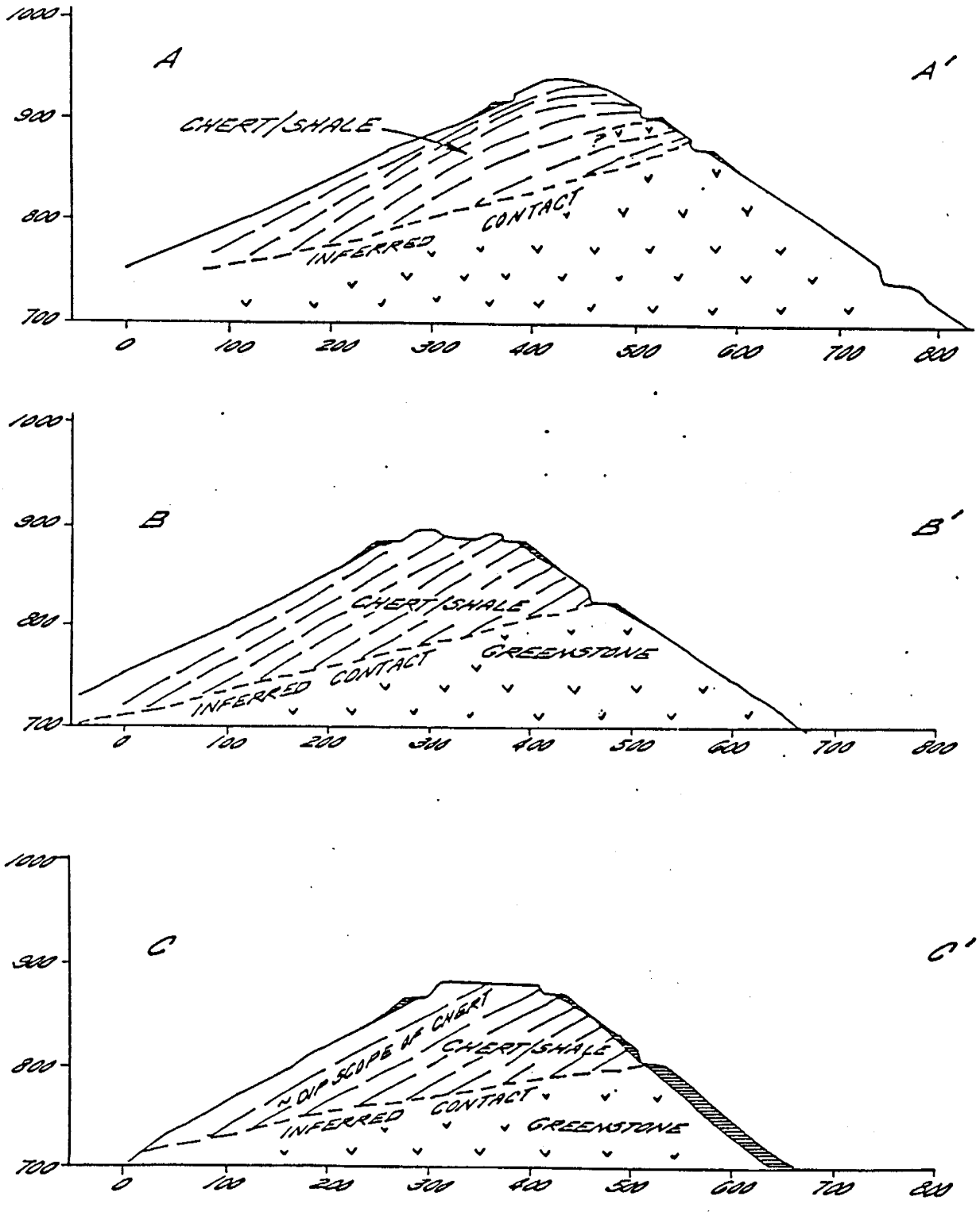
Lot	Visual Considerations
12	Same as lot 11.
13	From Sausalito vantage points, home construction on the homesite proposed for lot 13 would be partially visible through the existing hillside vegetation above the Warren home. Any thinning or removal of this existing hillside vegetative screening to improve views from this homesite would increase project impacts (building exposure) on views below.

SOURCE: Wagstaff and Associates

APPENDIX D: SUPPLEMENTAL GEOTECHNICAL DATA



Questa Engineering Corporation Point Richmond, Calif.	GEOLOGIC CROSS-SECTION LOCATIONS	SCALE 1"=200'	Fig. 4



Questa Engineering Corp. Point Richmond, Calif.	RIDGE TOP AREA GEOLOGIC CROSS-SECTIONS	Fig. 5

APPENDIX E: SUPPLEMENTAL VEGETATION AND WILDLIFE DATA

Appendix Partial plant species list, Wolfback Ridge

PLANT SPECIES	COMMON NAME	HABITAT
Achillea millefolium var. borealis	yarrow	grass, woods
Adenostoma fasciculatum	chamise	chaparral, dry rocky slopes
Agapanthus sp.	agapanthus	ornamental escape
Agoseris heterophylla	annual agoseris	grassland
Aira caryophyllea	annual hairgrass	grassland, woods, disturbed
Alchemilla arvensis (= A. occ.)	alchemilla	dry slopes and rock flats
Arbutus menziesii	madrone	forest
Artemisia californica	Calif. or coast sagebrush	coastal hills; coastal scrub
Artemisia douglasiana	mugwort	riparian, moist places
Athysanus pusillus	dwarf athysanus	grassland
Avena fatua	wild oat	grassland, disturbed
Baccharis pilularis ssp. consanguinea	coyote bush	dry hills, floodplains, pastures
Brassica geniculata	mustard	disturbed fields, grassland
Brassica rapa ssp. olifera (B. campes.)	field mustard	disturbed
Briza maxima	large quaking grass	grasslands, ornamental
Briza minor	little quaking grass	grassland, woods, meadows
Bromus carinatus	California brome	dry slopes, woods
Bromus diandrus	ripgut	grassland, woods, disturbed
Bromus hordeaceus ssp. hord. (B. mollis)	soft chess	grassland, woods
Bromus inermis	smooth brome	waste places, meadows
Calandrinia ciliata (C. c. var. menz.)	red maids	grassland, woods, disturbed
Calocedrus decurrens	incense cedar	forest, riparian
Capsella bursa-pastoris	shepherd's purse	grassland, fields, disturbed
Cardamine oligosperma	bitter cress	moist woods, canyons
Carduus pycnocephalus	Italian thistle	disturbed, grassland
Castilleja affinis	Indian paintbrush	dry wooded slopes, chaparral
Centaurea solstitialis	yellow star thistle	grassland, disturbed
Cerastium arvense	chickweed	moist rocky places
Chlorogalum pomeridianum	soap plant	dry grass, woods, chaparral
Cirsium arvense	bull thistle	waste places, disturbed fields
Cirsium sp.	thistle	moist places, seeps
Cirsium vulgare	common thistle	disturbed areas
Claytonia perfoliata (Montia p.)	miner's lettuce	shaded vernally moist banks
Convolvulus arvensis	morning-glory, bindweed	disturbed grassland
Cortaderia sellanoana	pampas grass	distrubed, often rocky places
Crassula erecta (Tillaea e.)	sand pygmy-weed	open dry places, burns
Cupressus sp.	cypress	planted
Cynodon dactylon	Bermuda grass	moist disturbed places
Cynosurus echinatus	dogtail grass	grass, disturbed
Cyperus eragrostis	umbrella sedge	riparian, wet places
Cytisus monspessulanus	French broom	disturbed
Cytisus scoparius	Scotch broom	roadsides, disturbed places

Source: C. Patterson, unpubl. field data, Feb. 1989

Appendix Partial plant species list, Wolfback Ridge

PLANT SPECIES	COMMON NAME	HABITAT
Lotus purshianus	bird's foot trefoil	open disturbed places
Lupinus albifrons	bush lupine	rocky woods, forests
Lupinus bicolor	bicolor lupine	sandy grassland, woods
Mahonia pinnata	barberry	forest
Malva neglecta	mallow	disturbed
Marah fabaceus var. agrestis	wild cucumber	chaparral, woods, forests
Marrubium vulgare	horehound	disturbed grassland, woods
Monardella villosa ssp. sheltonii	coyote mint	woods, forests, serpentine
Phacelia sp.	phacelia	dry sandy places
Picris echioides	ox-tongue	disturbed places, moist banks
Pinus radiata	Monterey pine	coastal hills
Pityrogramma triangularis	goldenback fern	rocky shaded places
Plantago lanceolata	rattlesnake plantain	disturbed
Poa annua	annual bluegrass	seasonal wetlands, disturbed
Polygonum aviculare	knotweed	moist disturbed places
Polypodium californicum	California polypody fern	rocky ledges, moist banks
Polystichum munitum	sword fern	mesic woods
Prunus sp.	escaped ornamental	cultivated
Pseudotsuga menziesii	Douglas-fir	forest
Pteridium aquilinum var. pubescens	bracken fern	mesic hills, forest, woods
Quercus agrifolia	coast live oak	woods, forest, ravines
Quercus wislizenii	live oak	woods, foothill woodland
Quercus X morehus	Morehus oak	woods, forest
Ranunculus californicus	buttercup	mesic slopes, meadows
Raphanus sativus	wild radish	disturbed
Rhamnus californica ssp. californica	coffeeberry	chaparral, forest
Ribes malvaceum	chaparral currant	forest, woods
Rubus discolor (R. procerus)	blackberry	riparian, disturbed
Rubus leucodermis	blackberry	woods, forest
Rumex acetosella ssp. acetosella	sheep sorrel	grass, disturbed
Rumex crispus	curly dock	wet places, disturbed
Satureja douglasii	yerba buena	shaded woods
Scrophularia californica ssp. floribunda	bee plant	chaparral, scrub
Senecio vulgaris	groundsel	disturbed
Sequoia sempevirens	redwood	coastal forests
Silybum marianum	milk thistle	disturbed
Sisyrinchium bellum	blue-eyed grass	mesic grasslands, meadows
Sitanion jubatum	squirreltail grass	rocky, disturbed
Solanum nodiflorum	nightshade	moist, disturbed places
Sonchus asper	sow thistle	disturbed
Stachys sp.	hedge nettle	scrub, woods, forests
Stellaria nitens	chickweed	grasslands, disturbed

Source: C. Patterson, unpubl. field data, Feb. 1989

Appendix Partial plant species list, Wolfback Ridge

PLANT SPECIES	COMMON NAME	HABITAT
Dichelostemma pulchellum var. pulch.	brodiaea, blue dicks	grassland, dry slopes
Diplacus aurantiacus	bush monkeyflower	rocky slopes, chaparral
Dodacatheon hendersonii	shooting star	shaded woods, grass
Dryopteris arguta	wood fern	shaded slopes, open woods
Dudleya cymosa	stonecrop, live-forever	rocky cliffs, woods, chap.
Elymus glaucus	wild rye grass	shaded woods, mesic slopes
Elymus triticoides	creeping wildrye	moist and alkaline places
Epilobium minutum	willow herb	dry open places, woods, forests
Eremocarpus setigerus	turkey mullein	dry open sandy soil, disturbed
Eriogonum latifolium	wild buckwheat	cliffs, sandy places, seacoast
Eriogonum nudum	wild buckwheat	dry rocky places
Eriophyllum staechadifolium	wooly daisy	coastal strand, scrub, bluffs
Erodium brachycarpum (E. obtusiplic.)	filaree	grasslands, woods, disturbed
Erodium cicutarium	red-stemmed filaree	grassland, disturbed
Eschscholzia californica	California poppy	grassy, open places
Eucalyptus sp.	blue gum, eucalyptus	coastal hills and valleys
Filago vulgaris (F. germanica)	filago	grass, disturbed
Foeniculum vulgare	fennel, wild anis	disturbed
Fragaria californiaca	wild strawberry	shaded chaparral & cst. scrub
Galium aparine	bedstraw	shaded banks
Galium sp.	bedstraw	shaded places, edges of meadows
Geranium dissectum	wild geranium	disturbed
Geranium molle	wild geranium	grasslands, disturbed
Gnaphalium californicum	everlasting	dry woods, disturbed
Hemizonia (fitchii ?)	tarweed	grasslands
Heracleum lanatum	cow parsnip	mesic woods, forest
Heteromeles arbutifolia	toyon	chaparral, dry slopes
Holcus lanatus	velvet grass	moist grassland, meadows, riparian
Hordeum hystrix	wild barley	grassland, disturbed
Hordeum pusilum	wild barley	moist grassland, pasture
Hypochoeris glabra	cat's-ear	grass, disturbed
Iris (cultivar)	cultivated iris	cultivated, landscaping
Iris (douglasiana ?)	iris	shaded woods, open forest
Juncus bufonius	toad rush	vernal pools, wet places
Juncus patens	spreading rush	meadows, streambanks
Kniphofia sp.	red hot poker	ornamental escape
Lactuca serriola	prickly lettuce	disturbed
Lathyrus odoratus	sweet pea	shaded disturbed places
Lepidium nitidum	peppergrass	grasslands
Lolium multiflorum	Italian ryegrass	disturbed
Lonicera hispidula	honeysuckle	mesic woods, forests
Lotus micranthus	bird's foot trefoil	open plains, slopes

Source: C. Patterson, unpubl. field data, Feb. 1989

Appendix Partial plant species list, Wolfback Ridge

PLANT SPECIES	COMMON NAME	HABITAT
Stipa pulchra	needlegrass	chaparral, scrub, woods
Taraxacum officinale	dandelion	damp, low places
Tellima grandiflora	fringe-cups	moist shaded rocks
Toxicodendron diversilobum	poison oak	woods, forest, ephemeral riparian
Umbellularia californica	California bay	forest, mesic slopes, ravines
Vicia sp.	vetch	many plant communities
Vinca major	myrtle	shaded woods, landscaping
Vulpia myuros var. hirsuta (F. megalura)	annual fescue	grassland, disturbed
Zigadenus fremontii	Fremont's star lily	rocky grasslands, chaparral

Source: C. Patterson, unpubl. field data, Feb. 1989

Table 1. Primary Sensitive Plant Species of Southern Marin County

PLANT TAXON	COM. NAME	LIST	R-E-D	FWS	CDFG	HABITAT
Trifolium amoenum	showy Indian clover	1a	PE 1969	C2*	-	low rich fields, swales; serpentine
Agrostis blasdalei var. blasdalei	Blasdale's bent grass	1b	3-2-3	C2	-	coastal strand, dunes, scrub, prairie
Agrostis clivicola var. punta-reyesensis	Pt. Reyes bent grass	1b	3-2-3	C2	-	coastal bluffs prairie, scrub
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	1b	3-3-3	C2	-	low wet places, marsh, riparian scrub
Arctostaphylos montana	Mt. Tamalpais manzanita	1b	3-1-3	C2	-	serpentine rocks, chaparral
Arctostaphylos virgata	Bolinas manzanita	1b	2-1-3	C2	-	closed-cone pine, redwood, chaparral
Calochortus tiburonensis	Tiburon mariposa lily	1b	3-3-3	C1	T	serpentine rock and grassland, Ring Mt.
Campanula californica	swamp harebell	1b	1-2-3	C2	-	fr. marshes, bogs, seeps, closed cone pine, meadow
Castilleja neglecta	Tiburon paintbrush	1b	3-2-3	C1	-	open serpentine, coastal prairie
Ceanothus masonii	Mason's ceanothus	1b	3-2-3	C2	R	dry rocky slopes, chaparral
Chorizanthe valida	Sonoma spineflower	1b	3-3-3	C2	-	sandy places, coastal scrub
Cirsium hydrophilum var. vaseyi	Mt. Tamalpais thistle	1b	3-1-3	C2	-	moist serpentine, coast. decid. forest chaparral
Delphinium luteum	yellow larkspur	1b	3-3-3	C2	R	sea bluffs, coastal scrub
Delphinium bakeri	Baker's larkspur	1b	3-3-3	C2	R	low brush; coastal prairie
Erigeron supplex	supple daisy	1b	3-2-3	C2	-	coastal bluffs, prairie
Fritillaria liliacea	fragrant fritillary	1b	1-2-3	C2	-	heavy adobe soils, coastal grassland, scrub
Hemizonia multicaulis ssp. vernalis	Tiburon tarplant	1b	1-2-3	C2	-	coastal scrub prairie; serpentine
Hesperolinon congestum	Marin dwarf flax	1b	3-3-3	C1	-	dry slopes; serpentine; coastal prairie & scrub
Holocarpha macradenia	Santa Cruz tarplant	1b	2-3-3	C1	E	heavy soils, coastal grassland
Horkelia marinensis	Pt. Reyes horkelia	1b	3-1-3	-	-	coastal dunes, prairie, scrub

Table 1. Primary Sensitive Plant Species of Southern Marin County

PLANT TAXON	COM. NAME	LIST	R-E-D	FWS	CDFG	HABITAT
Limnanthes douglasii var. sulphurea	Pt. Reyes meadowfoam	1b	3-2-3	C2	E	moist coastal scrub, marsh
Lupinus tidestromii var. layneae	Pt. Reyes lupine	1b	3-2-3	C2	-	coastal strand
Microseris decipiens	Santa Cruz microseris	1b	2-2-3	C2	-	coastal prairie, grassland
Orthocarpus floribundus	San Francisco owl's clover	1b	2-2-3	C2	-	coastal scrub and prairie, grassland
Pentachaeta bellidiflora	white-rayed pentachaeta	1b	3-2-3	C2	-	dry rocky slopes; north coastal scrub, and prairie
Perideridia gairdneri ssp. gairdneri	Gairdner's yampah	1b	1-2-3	C2	-	moist places, woodland, chaparral
Pleuropogon hooverianus	Hoover's semaphore	1b	3-2-3	C2	R	meadows, coastal deciduous forest
Rhynchospora californica	California beaked rush	1b	3-3-3	C2	-	bogs, swamps, marsh
Sidalcea hickmanii ssp. viridis	Marin checkerbloom	1b	3-1-3	C2	-	chaparral
Silene verecunda ssp. verecunda	Dolores or San Francisco	1b	3-2-3	C2	-	coastal strand, scrub, dunes, & prairie
Streptanthus batrachopus	Tamalpais jewelflower	1b	3-1-3	C2	-	serpentine, chaparral, closed cone pine
Streptanthus glandulosus ssp. pulchellus	Mt. Tamalpais jewelflower	1b	3-1-3	C3c	-	high exposed ridges; serpentine, shale
Streptanthus niger	Tiburon jewelflower	1b	3-3-3	C1	-	serpentine; coastal prairie
Calamagrostis crassiglumis	Thurber's reed grass	2	3-3-1	C2	-	fresh marsh, wet meadow, coastal scrub
Hemizonia congesta	hayfield tarplant	3	?-?-3	-	-	coastal scrub
Horkelia tenuiloba	thin-lobed horkelia	3	?-?-3	-	-	mesic chaparral
Navarretia heterodoxa ssp. rosulata	Marin County navarretia	3	?-?-3	-	-	closed cone pine forest
Trifolium grayi	Gray's clover	3	?-?-3	-	-	meadows, mesic grassland

Table 2. Secondary Sensitive Plant Species of Southern Marin County

PLANT TAXON	COM. NAME	LIST	R-E-D	FWS	CDFG	HABITAT
Agrostis clivicola var. clivicola	coastal bluff bent grass	4	1-1-3	C2	-	coastal bluff scrub
Amsinckia lunaris	bent-flower'd fiddleneck	4	1-1-3	-	-	valley and foothill grassland
Arabis blepharophylla	coast rock cress	4	1-1-3	C3c	-	rocky places, cliffs, coastal scrub, prairie
Calamagrostis ophitidis	serpentine reed grass	4	1-1-3	-	-	serpentine soils and outcrops
Calochortus umbellatus	Oakland star tulip	4	1-1-3	-	-	dry wooded or barren hills; serpentine; meadows
Ceanothus gloriosus var. gloriosus	Pt. Reyes ceanothus	4	1-1-3	-	-	closed cone pine, dunes, coastal scrub
Cirsium andrewsii	Fransiscan thistle	4	1-1-3	-	-	broadleaved upland forest, coastal bluffs
Cirsium walkerianum	Alameda Co. thistle	4	1-1-3	-	-	dry slopes, mixed evergreen forest
Cypripedium fasciculatum	clustered lady's-slipper	4	1-1-2	C3c	-	open rocky woods, redwoods to yellow pine
Dirca occidentalis	western leatherwood	4	1-2-3	-	-	wet rocky hills, coastal decid. forest, chaparral
Elymus californica (Hystrix c.)	California bottlebrush grass	4	1-1-3	C2	-	coastal, shaded woods and forest
Eriogonum caninum	Tiburon buckwheat	4	1-2-3	C3c	-	dry rocky slopes; shale and serpentine
Erysimum franciscanum	San Francisco wallflower	4	1-2-3	C2	-	serpentine, chap., dunes, coast. bluffs, scrub
Monardella undulata var. undulata	curly-leaved monardella	4	1-1-3	-	-	coastal dunes, scrub, chaparral
Piperia elongata ssp. michaelii	purple- flowered piperia	4	1-2-3	C3c	-	coastal bluff scrub
Pityopus californicus	California pinefoot	4	1-2-1	C3c	-	deep shade, mixed evergreen forest
Pleuropogon refractus	nodding semaphore grass	4	1-2-1	-	-	wet meadows, riparian, no. coast coniferous forest
Quercus lobata	valley oak	4	1-2-3	-	-	foothill and valley woodland, riparian
Ranunculus lobbii	Lobb's aquatic buttercup	4	1-2-3	-	-	shallow vernal ponds and pools
Ribes divaricatum var. publiflorum	straggly gooseberry	4	1-1-2	-	-	broadleaved upland forest, north coast forest
Ribes victoris	Victor's gooseberry	4	1-1-3	-	-	broadleaved upland forest, chaparral

LEGEND FOR TABLES 1 and 2

Plant Taxon: as listed by Smith and Berg (1988).

List: refers to the list number on which the plant is included in Smith and Berg (1988; California Native Plant Society's sensitive plant inventory). 1a: Plants presumed extinct (PE) in California with date last seen, 1b: Plants rare or endangered in California and elsewhere, 2: Plants rare or endangered in California, but more common elsewhere, 3: Plants about which we need more information, and 4: Plants of limited distribution [a watch list]. Appendix 1: Plants considered, but not included.

R-E-D: rarity (R), endangerment (E), and distribution (D) code from Smith and Berg (1988) :

Rarity :

1 = Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time

2 = Occurrence confined to several populations or to one extended population

3 = Occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom seen

Endangerment :

1 = Not endangered

2 = Endangered in a portion of its range

3 = Endangered throughout its range

Distribution :

1 = More or less widespread outside California

2 = Rare outside California

3 = Endemic to California

FWS: C1 = A candidate taxon, Category 1: information sufficient for federal listing by FWS (1985). C2 = Also a candidate, Category 2: information insufficient for formal proposal for listing. C3c = Previously considered, but currently known to be too common for listing.

CDFG: E = Endangered, R = Rare as designated by CDFG (1986).

Habitat, Elevation, Flowering Period: As reported in Munz and Keck (1959), Munz (1968), Smith and Berg (1988), and/or Abrams and Ferris (1923 - 1951).

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