COLLABORATIVE LAND-USE PLANNING FOR THE COASTAL ZONE: VOLUME II

HALF MOON BAY CASE STUDY

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HALF MOON BAY CASE STUDY

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PREFACE

This report illustrates the application of the collaborative planning process and related analytical methods to the Half Moon Bay subregion of San Mateo County, California. The specific steps in the collaborative planning process are described in a companion volume, Collaborative Land Use Planning for the Coastal Zone (Volume I): A Process for Local Program Development. The primary focus of this volume is the development of a workable methodology for each analytical step in the preparation of local coastal programs.

The Half Moon Bay case study covers 58 square miles and includes the City of Half Moon Bay, the unincorporated communities of Montara, El Granada, and Moss Beach, and rural lands in San Mateo County. Devil's Slide and the Santa Cruz Mountains presently separate the subregion from San Francisco and the urbanized portions of San Mateo County. The boundaries of the subregion were defined to include the entire watershed draining into Half Moon Bay, the coastal viewshed, and the highway service system. Land use within the subregion is presently in transition from row crops and grazing to floriculture and suburban residential development. It should be noted that the study area defined for analysis in the case study is subregional, including the city of Half Moon Bay and portions of San Mateo County.

The Half Moon Bay case study has been conducted over the past two-year period and has served a number of functions. Initially, the case study served as a means to test and evaluate specific policies proposed by the California Coastal Zone Conservation Commission (CCZCC) in Preliminary elements of the Coastal Plan.

The case study also served to evaluate the operability of the collaborative planning process (as mandated in the California Coastal Act of 1976) and to test specific analytic methods for subregional and local coastal planning. The analytical steps will serve as one basis for the Commission's guidelines and development of a common methodology (Coastal Act §30501 [a]) for the preparation of local coastal programs. This document will also provide technical assistance to units of government initiating local coastal programs.

It should be kept in mind that the major purpose of the case study was the development of a workable process and analytic methods. Thus the study does not make specific planning recommendations for Half Moon Bay. The implementation steps of the process (outlined in Volume I), including certification and monitoring, will be addressed in forthcoming Sea Grant research reports.

The six chapters of this report correspond to the major plan preparation steps outlined in Volume I ("Process for Local Program Development"). Each chapter presents a sequential description of the analysis to be conducted for sub-steps in each respective major step. Data and information requirements for each analytical step have been included as appendices to the report.

Chapter One presents a procedure for determining a local government's existing commitment to growth and comparing that commitment to the level of development indicated by Coastal Policies. The chapter also discusses methods for applying the geographically specific coastal policies. Chapters Two and Three present methods for analyzing the existing and potential capacities of water supply and waste water systems and a process for allocation of system capacity consistent with Coastal Policies. Chapter Four outlines a process for analyzing the existing

capacity of transportation facilities and describes a means to allocate or budget remaining capacity between coastal recreationists and coastal community residents. The development of alternative land use plans consistent with Coastal Policies is the subject of Chapter Five. The concluding chapter presents a process for evaluating the environmental, economic, social, public service, and access impacts of local coastal plans.

It should be noted that parallel efforts conducted this summer by the Commission in the Irvine and Big Sur areas have verified the general applicability of the analytical methods presented for the Half Moon Bay case study.

The analysis for the Half Moon Bay case study was initially based on Coastal Plan policies. The current draft reflects the policies contained in the Coastal Act of 1976 (SB 1277) with cross references to Coastal Plan policies. A table of correspondence between Coastal Plan and Coastal Act policies is included in this report (Appendix H).

ACKNOWLEDGMENTS

The Half Moon Bay case study was carried out under the overall direction of Thomas Dickert, Assistant Professor and Sea Grant Project Leader and Jens Sorensen, Coastal Resource Management Specialist. Members of the project team included: Richard Hyman, who contributed to the impact assessment chapter and on all other chapters did background research as well as providing organizational and editorial assistance; James Burke, who researched and developed the transportation analysis presented in Chapter V; Gus Fruh, Professor of Civil Engineering, University of Texas, who assisted in the developing of the methodology for water supply and wastewater capacities; Steven Matthews and Janet Falk, who contributed to the chapter on land use alternatives; David Neivelt, who did the initial estimates for the existing development commitment in Chapter I.

We also acknowledge the following production assistants: Nancy Wilson for editorial work; Eric Metz and Glenn Nunez-Hoke for preparation of maps and figures; and Evie Roberts, Marga NewComb, Rachael Meserve, and Vickie Hawk for typing and layout of the various drafts.

Finally, we wish to acknowledge the continuing interest and support of the State Coastal Commission staff, especially Jack Schoop, Bill Boyd, William Travis, Rod Mead, and Tom Mikkelsen.

CHAPTER I

APPLYING COASTAL POLICIES TO LOCAL LAND USE PLANS

This chapter presents a procedure for determining a local government's commitment to growth and development, and then compares that commitment to the level of development permitted by Coastal Policies.* Figure I-1 indicates the sequence of sub-steps in the process.

Through this procedure local governments can determine the specific conflicts between their existing plans and Coastal Policies.† The conflicts identified will be the basic issues dealt with in the local coastal or subregional plans. Because this procedure involves a substantial amount of detailed analysis, it is suggested that local governments first undertake a cursory analysis following the format of the procedure. Then if, on the basis of this brief review, it is determined that the possibility of substantial conflict exists, localities can proceed with the detailed analysis that is described in this chapter.

ASSESSMENT OF CURRENT COMMITMENTS TO GROWTH

The existing commitment is defined as the land use pattern and the associated population level which would result if present local plan policies and zoning were fully implemented. The assessment of current

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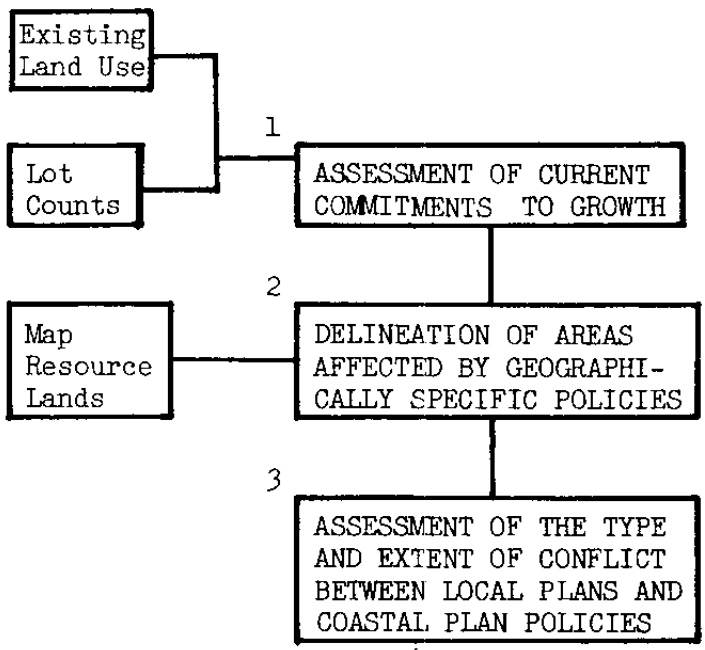
*"Coastal Policies" refers to the policies contained in Chapter III, Articles 1-7 of the California Coastal Act of 1976 and the California Coastal Plan.

†The three steps presented in this chapter correspond to Steps 1, 3 and 4 as described in Volume I.

Figure I-1

Process for Applying Coastal Policies to Local Land Use Plans



commitments to growth includes a delineation of geographic districts, a calculation of improved and unimproved residential and nonresidential parcels, a calculation of full buildout, and a calculation of population at full buildout. Estimation of the existing commitment can also be used to update available census data in order to reflect recent population changes. As part of this step, an existing land use map should be prepared using categories related to Coastal Policies (see Appendix A).

The data necessary to perform this assessment as indicated in Appendix B-1 is included in general plans, zoning ordinances, and other public agency development plans. (See Appendix C for specific data sources used in Half Moon Bay).

Delineation of Districts Within the Planning Area

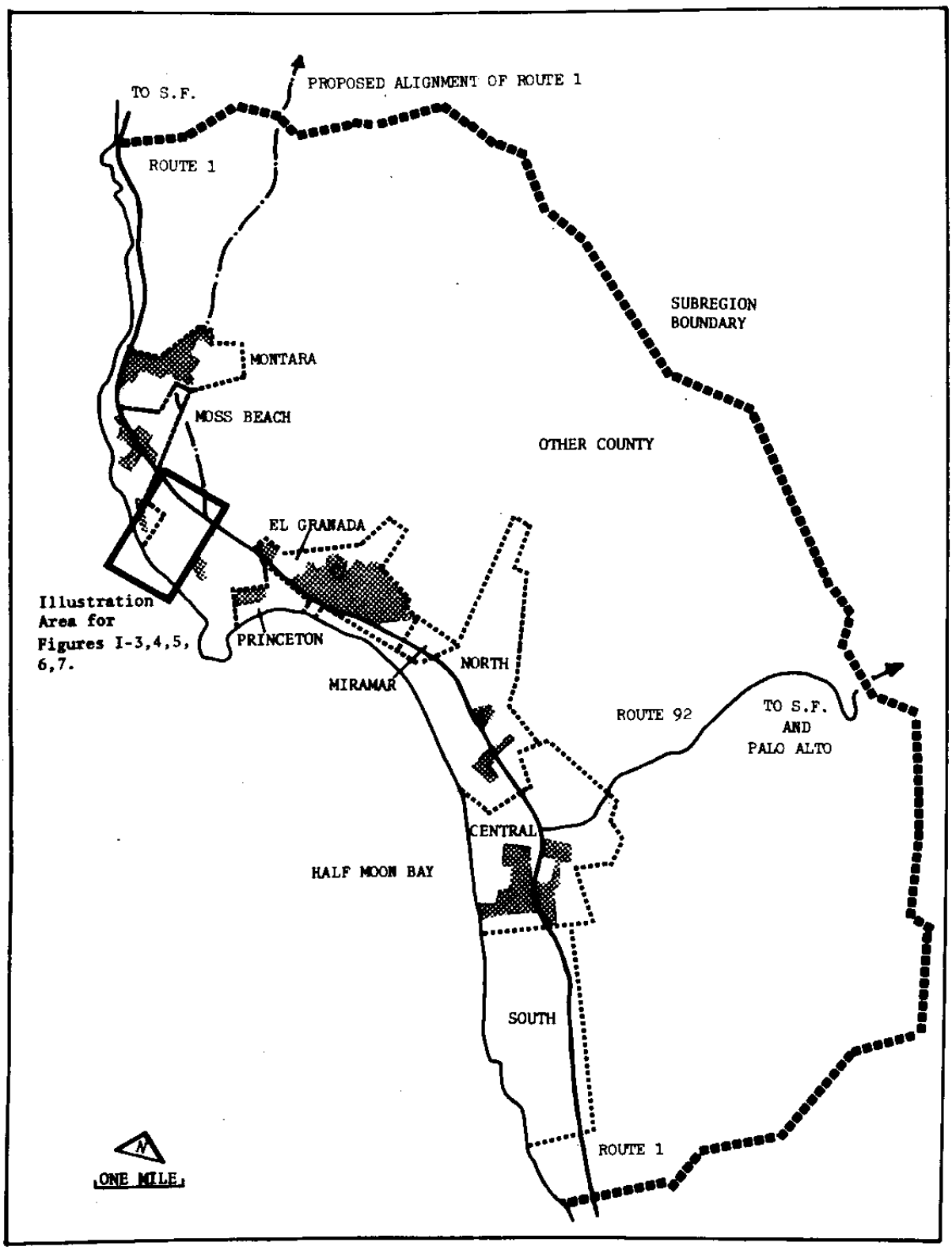
For purposes of grouping the data into homogeneous areas for comparison and for convenience in the later refinement of alternatives, the Half Moon Bay subregion is divided into nine districts: Montara, Moss Beach, Princeton, El Granada, Miramar, Half Moon Bay North, Half Moon Bay Central, Half Moon Bay South, and Other County. These boundaries are based on existing development (roads, census tracts, neighborhoods) since the county and city have neither existing boundaries for planning purposes nor established traffic zones. The district boundaries are shown in Figure I-2.

Calculation of Improved and Unimproved Residential and Nonresidential Parcels

For each district, the total acreage of all improved and unimproved parcels was determined. Potentially developable unimproved parcels were designated based upon existing zoning and subdivision regulations. The county assessor's records were used as a basis for

FIGURE I-2

HALF MOON BAY SUBREGION WITH DISTRICT BOUNDARIES



this computation. An orthophoto map and field surveys may be used to verify determinations made using the assessor's records. In Half Moon Bay, 1":400' orthophotos taken in 1970, with lot lines superimposed, were updated by assessor's information (which was current) together with a field inspection to reflect land use changes (see Figure I-3). Both manual tabulation and automated methods were used in the calculation(s).

For manual tabulation, the assessor's information was plotted on a 1":400' base map with property lines (see Figures I-4 and I-5). A lot was defined as being one acre or less in area; a parcel was defined as being greater than one acre. All lots were counted,* and all parcel acreage was measured with a planimeter.

After the manual count had been completed, an automated data base was developed for the project at the University of California, Berkeley.† The assessor's records for the subregion were obtained and prepared for use on this system. A wide range of data was available in the assessor's records including ownership, assessed values, use codes, and zoning (see Appendix D for a complete listing of data). (Table I-1 illustrates a typical assessor's record and corresponds to the area shown in Figure I-5.) With this information coded and aggregated by district, it was possible to perform the analysis of existing parcels in an automated format more quickly and to do the analysis according to land use type (i.e., number of parcels in a single family, duplex, multiple family,commercial, or industrial use). Furthermore, by creating an overlay indexing the assessor's book and page maps (see

*In Half Moon Bay, the majority of lots less than one acre in size were zoned for single family use, thus it was not necessary to develop a classification based upon lot size. In other areas where zoning may permit subdivision of existing lots,it may be necessary to classify lots based upon further subdivision to the maximum permitted density.

†INGRES Project, Department of Electrical Engineering, U.C. Berkeley.

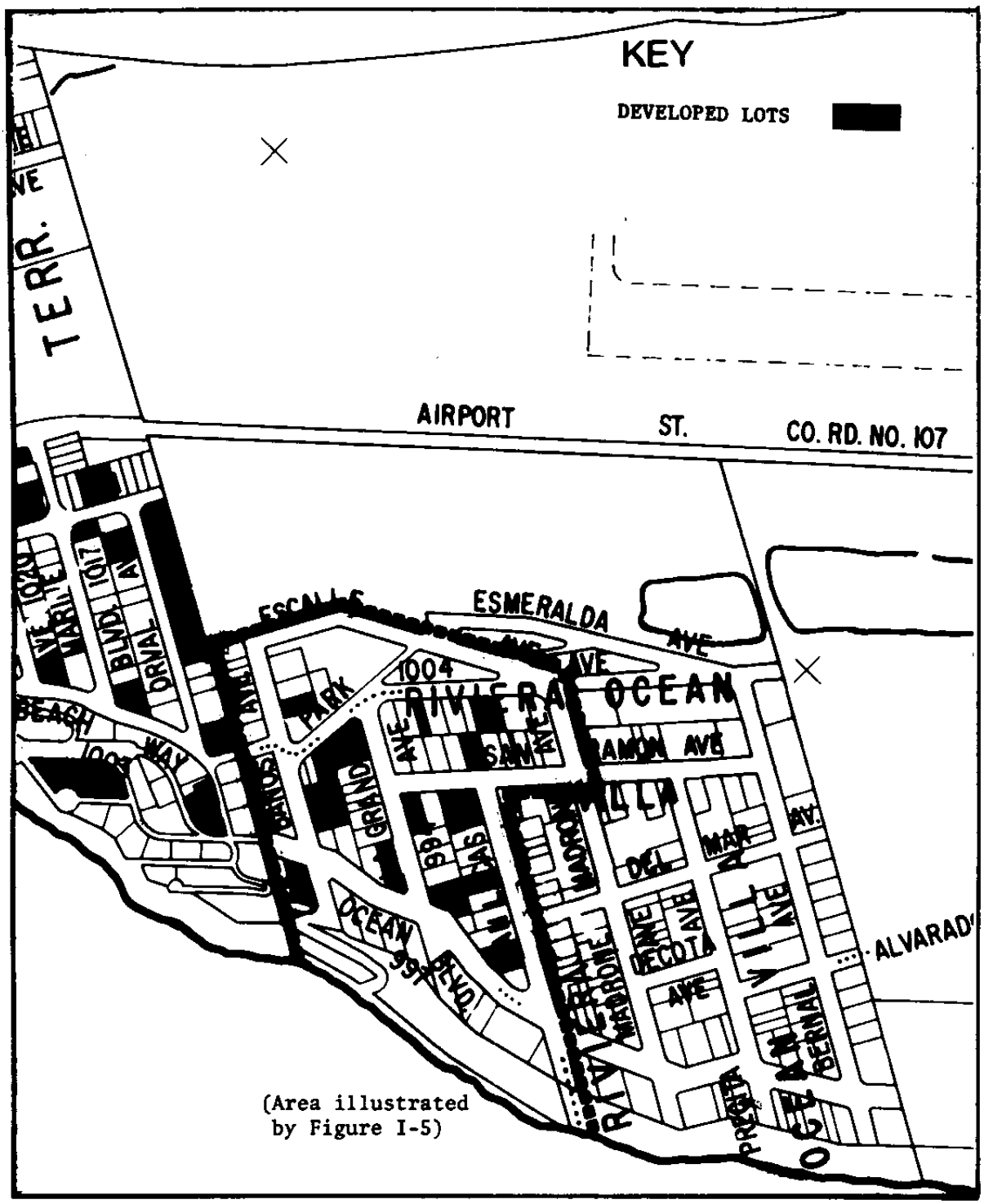
Figure I-3

Orthophoto Map

Scale: 1" = 800'

Figure I-4

Assessor's Parcel Map



Scale 1" = 800'

FIGURE I-5

Assessor's Plat of Record

(Book 37 - Page 25)

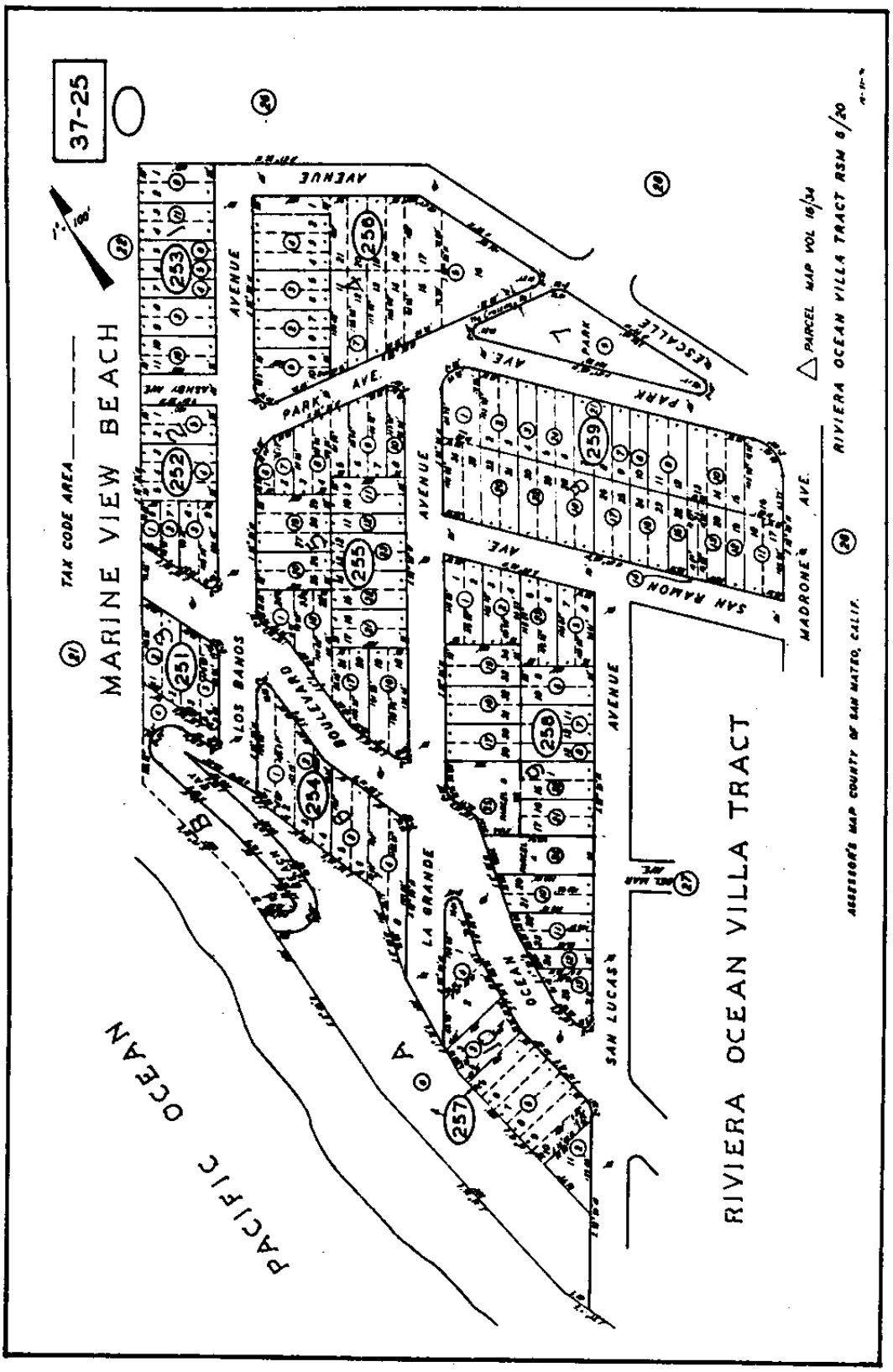


Table I-1

Assessor's Ownership Record Summary

thirsevtufiv relation

firstname	bkpg	block	parcelno	street	land	imps	zoninguse	
ADAIR DELBERT O & CATHERINE P	3725	8	10	146 LA GRANDE AVE	1125	9375	R10006	1
BARTLETT JOHN S	3725	5	120	0	356	0	R10006	0
BOUNDS MYLDA J	3725	6	20	0	1125	8375	R10006	1
CALLAN THOMAS J & BRIDGIE E	3725	7	28	0	215	0	R10006	0
CASTLETON THOMAS E & EVA B	3725	2	30	0	1069	0	R10006	0
CASTLETON THOMAS E & EVA B	3725	5	200	106 LOS BANOS AVE	1250	8925	R10006	1
CONLEY BETTY R	3725	9	10	0	2129	8475	R10006	1
CONWAY RAYMOND J C	3725	9	150	0	238	0	R10006	0
COSTA MANUEL & MARY	3725	9	160	0	475	0	R10006	0
COUNTY OF SAN MATEO	3725	3	30	0	0	0		88
COUNTY OF SAN MATEO	3725	7	60	0	0	0		88
CRABTREE RONALD E & JAN R	3725	8	70	171 SAN LUCAS AVE	1125	10975	R10006	1
CRESCI PETER J JR	3725	7	30	0	2500	10075	R10006	1
DAVIS DAVID C & BETTY M	3725	9	210	864 PARK AVE	1125	6950	R10006	1
DOLPHIN REAL ESTATE	3725	3	110	0	831	0	R10006	0
ESCOBAR RODOLFO E & MARIA E	3725	8	60	0	950	0	R10006	0
GATTO ALFONSE & MARIA	3725	2	40	125 LOS BANOS AVE	1500	11325	R10006	1
GONSALVES MANUEL & DORIS	3725	1	20	0	1663	0	R10006	0
GUION CAROL E	3725	8	110	0	1750	5725	R10006	1
GURNETTE RUTH M	3725	9	80	0	309	0	R10006	0
GURNETTE RUTH M	3725	9	100	0	713	0	R10006	0
HACKETT LUCILE	3725	5	160	0	1625	4300	R10006	1
HELLER RICHARD H	3725	5	90	0	1125	5400	R10006	1
HELLER RICHARD H	3725	5	100	0	375	0	R10006	0
HERRINGTON AGNES V	3725	3	40	0	238	0	R10006	0
HERRINGTON AGNES V	3725	3	50	0	238	0	R10006	0
KHERR PAUL R & CHERYLE L	3725	8	50	854 SAN RAMON AVE	1125	9075	R10006	1
LEA FANNIE P	3725	9	110	0	950	0	R10006	0
MANNON MARION L	3725	8	220	131 SAN LUCAS AVE	1125	9075	R10006	1
MC CANDLESS CHARLES S & JEAN A	3725	7	40	0	1425	0	R10006	0
MC CANDLESS CHARLES S & JEAN A	3725	7	50	0	2850	0	R10006	0
MC NIE ALLAN B & CANDACE C	3725	9	220	0	950	0	R10006	0
MOORE BERNICE D	3725	8	20	0	950	0	R10006	0
MORENO MANUEL & CARLA M	3725	9	180	955 SAN RAMON AVE	1125	7950	R10006	1
O NEILL MICHAEL R & MARY E	3725	8	180	0	950	0	R10006	0
O NEILL MICHAEL R & MARY E	3725	8	240	103 SAN LUCAS AVE	1250	9400	R10006	1
PAULSON LOIS C	3725	4	40	0	375	0	R10006	0
QUADROS SERAPHIM F & ELIZABETH	3725	9	20	846 PARK AVE	1125	10150	R10006	1
PACHUAL ANSELM M & AURORA M	3725	8	210	0	950	0	R10006	0
ROSE LUCY M	3725	8	130	0	950	0	R10006	0
ROY RAYMOND W & JANET	3725	5	230	155 LA GRANDE AVE	1125	8925	R10006	1
RUTH HAROLD S JR & GRACE M	3725	6	80	0	1000	0	R10006	0
SANDRETTO LOUIS D & EVELYN E	3725	6	70	0	1000	0	R10000	0
SCHEMBER WILLIAM H & LAVONNE L	3725	8	150	136 LA GRANDE AVE	1125	8950	R10006	1
SCHOEFER THEODORE	3725	5	110	0	950	0	R10006	0
SERNAS VYTAUTAS M & JULIE J	3725	9	170	0	950	0	R10006	0
STAINFORD ROBB	3725	6	100	837 OCEAN BLVD	2000	11525	R10006	1
TEMPLE ROBERT & JANET	3725	8	170	106 LA GRANDE AVE	1250	10450	R10006	1

Figure I-6), it was possible to locate this information within one or two blocks on the orthophoto map of the subregion.* The summary of these counts appears in Table I-2.

The automated counting of lots by use type is much faster and more detailed than the hand tabulation method. But it cannot replace the use of updated orthophotos. The photos provide information about not only the level of development but also its pattern. The pattern of development is very important when considering alternative scenarios for future land use.

Calculation of Full Buildout

The number of residential units possible, assuming full buildout of unimproved parcels at existing zoning, was calculated by overlaying existing zoning on the 1":400' scale updated orthophoto of the Half Moon Bay subregion (see Figure I-7). In subdivided areas, the assumption was made that substandard (in terms of minimum lot size) unimproved parcels could be aggregated to satisfy zoning requirements. The total number of residential units at full buildout was then determined by a direct count of all existing and aggregated unimproved parcels satisfying minimum zoning requirements. For unsubdivided parcels, the number of residential units at full buildout was determined by dividing the parcel acreage by the number of units per acre allowable under existing zoning.

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*Figure I-6 thus serves to locate the assessor's page illustrated in Figure I-5, namely page 25 of book 37.

Figure I-6

Assessor's Book and Page Map Overlay

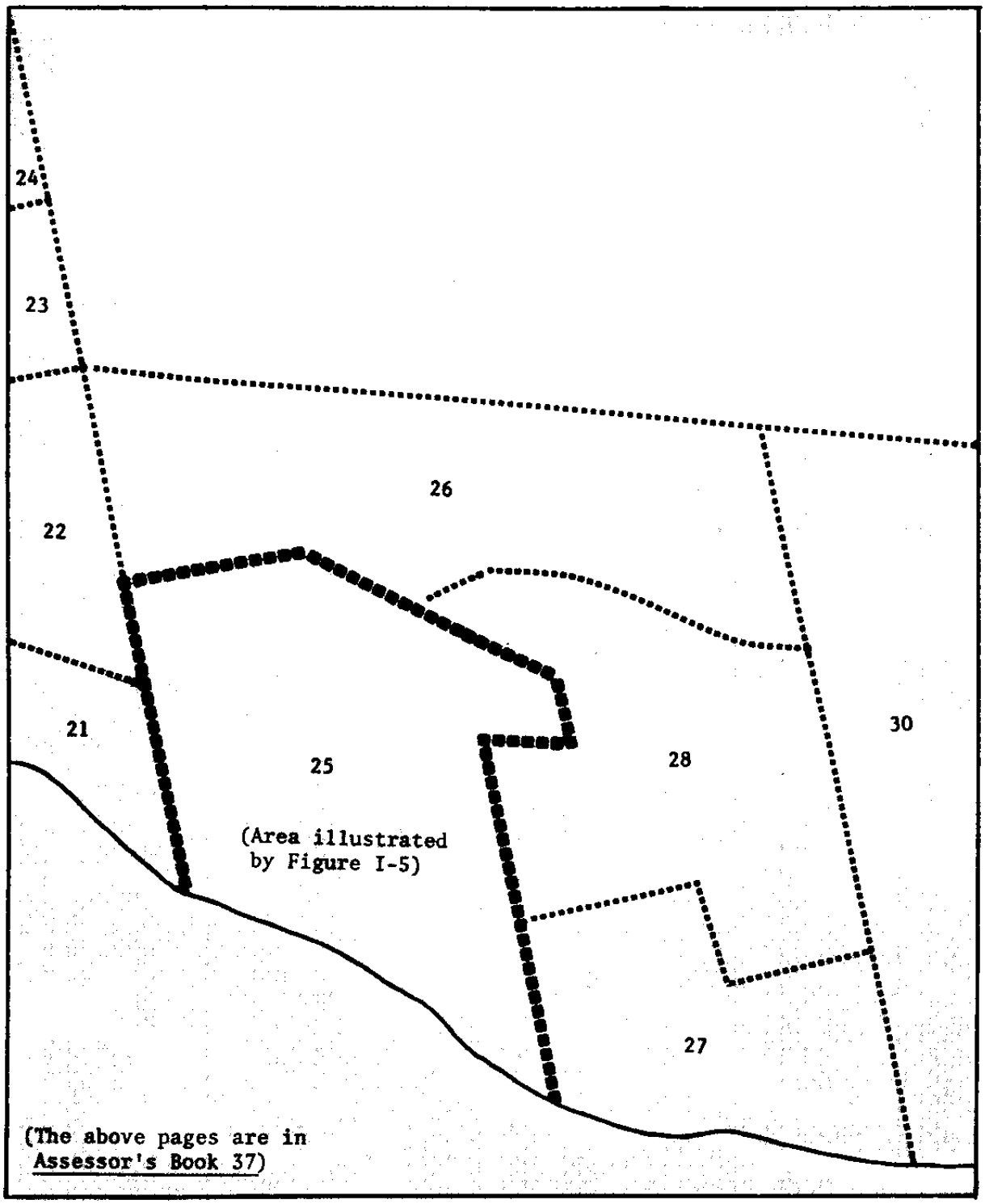


Table I-2

Existing Parcel Characteristics - March 1975

District	USE										
	Single Family*	Duplex*	Multiple*	Trailer*	Rooming House	Vacant†	Commercial†	Industrial†	Agricultural†	Institutional & Miscellaneous	Government†
Montara	614	10	9	0	0	719	9	0	21	18	17
Moss Beach	410	22	0	0	0	722	10	1	33	11	26
Princeton	19	0	0	0	0	296	7	3	5	1	15
El Granada	862	92	40	0	0	1,257	14	1	9	6	26
Miramar	56	2	0	0	0	331	1	0	4	1	3
Half Moon Bay North	566	10	5	0	0	551	7	0	37	2	63
Half Moon Bay Central	839	76	53	59	0	1,140	61	8	48	32	178
Half Moon Bay South	11	0	0	186	0	1,268	10	1	42	1	136
Other County+	336	0	0	227	0	5	0	4	322	12	23
TOTALS	3,713	212	107	472	0	6,289	119	18	521	84	487
Population‡	11,956	522	205	906	0						

*Data entered is in number of units. Population multipliers are 3.22 for single family; 2.46 for duplex; 1.92 for multiple family and trailer.

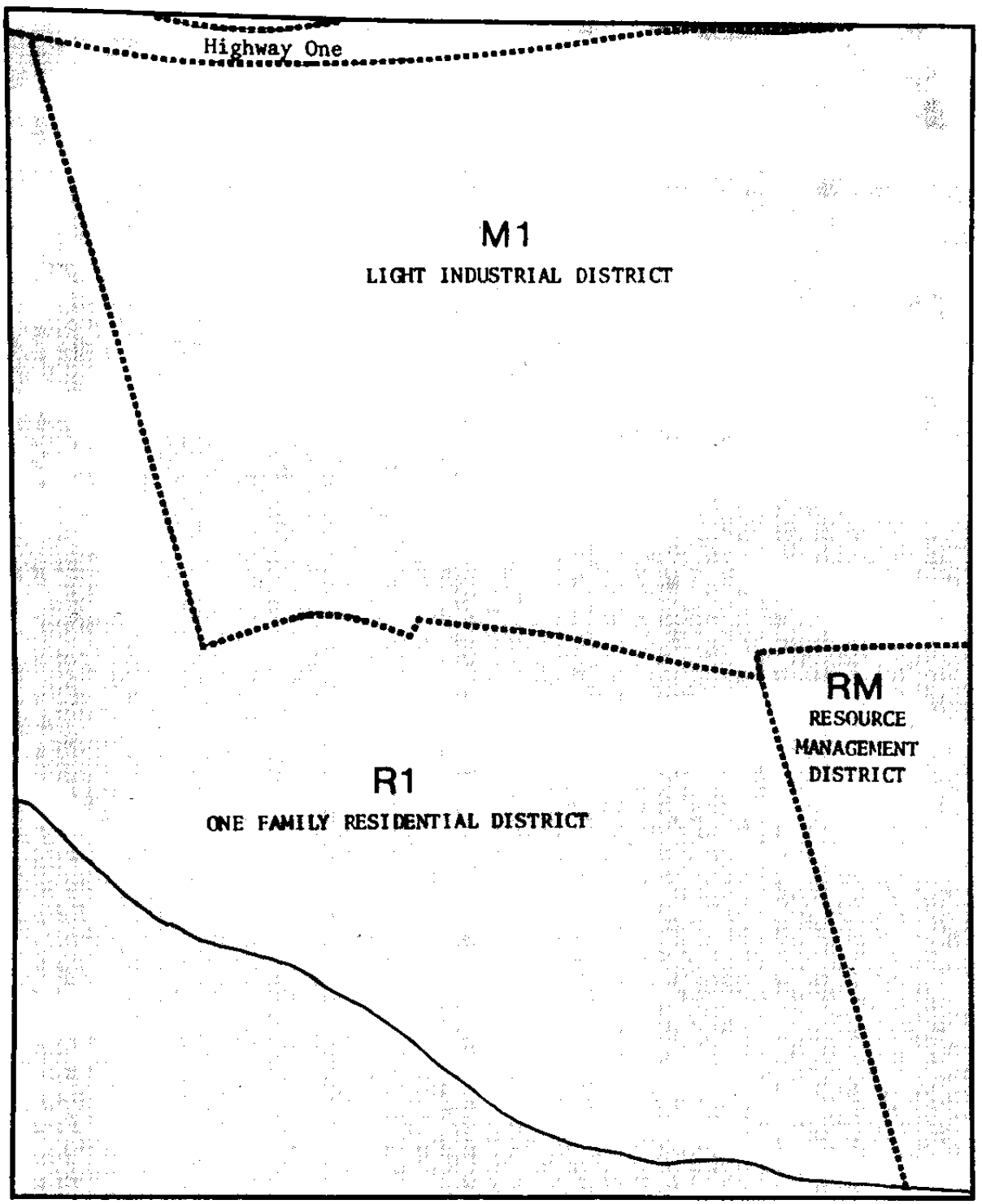
†Data entered is in number of parcels.

+Single family is land use code 1, 51, 52, and 53 (see Appendix D).

‡Total population is 13,589.

Figure I-7

Zoning Districts Overlay



RULES FOR CALCULATING FULL BUILDOUT

A. For lots:
   1. Determine the maximum number of units allowed for each lot per zoning district classification.
   2. Multiply the number of lots by the number of units allowed per lot

B. For parcels in non-subdivided areas:
   1. Same as A-1.
   2. Reduce the total parcel acreage by 25% to approximate the net acreage (except when zoned at 1 unit/acre--reduce by 20%). This reduction provides for roads and other public service easements.
   3. Divide the net acreage by the minimum lot size allowed by the zoning to determine the number of lots.
   4. Multiply the number of lots by the number of units allowed per lot.

C. For parcels in subdivided areas omit B-2 above.

Various rules and adjustments must be employed in the calculation of full buildout where zoning is ambiguous or is only one of several determining factors. In Half Moon Bay certain adjustments have been made to recognize the possibility of development in areas now zoned for agriculture or greenbelt under "grandfather" clause provisions. Adjustments were also made to allow for recently issued permits for development that are not yet recorded on the assessor's roles.

Zoning, general plans and existing development may not all show the same use, and a decision rule must be established to determine which to follow.* In the Half Moon Bay case, shoreline lots already

*Current California planning law (Covernment Code 65860) requires consistency between zoning and elements of the general plan. However, review of local plans in coastal cities and counties indicates that most jurisdictions have not undertaken such revisions.

purchased by public agencies were considered public open space in accordance with the County General Plan, although they were still zoned for urban uses. Also, a new general plan for the City of Half Moon Bay is being prepared during the course of this study. Thus, two buildout scenarios were calculated:

(1) "Buildout of Districts According to Existing Zoning" (referred to as Alternative 4a in subsequent sections); and

(2) "Buildout of County Districts According to Existing Zoning and the City of Half Moon Bay According to its Proposed New General Plan" (referred to as Alternative 4b).

The first scenario, mapped in Figure I-8, is based on the City and County zoning as of December 1974. The latter alternative modifies the first one by incorporating the City of Half Moon Bay's recently proposed general plan prepared by Jones-Tillson Associates in June 1975. This plan has since been adopted (see Figure I-9).*

Similar adjustments and alternative scenarios may be necessary in other subregions. Urban buildout calculations must account for special conditions such as density bonuses and redevelopment. Rural buildout must consider variations allowed under PUD zoning, histories of zoning changes, and areas that are unclassified. Alternative scenarios may depict potential new developments such as new towns that are proposed for large tracts of vacant land. But consideration of these factors will depend upon the extent to which information on them is publicly available.

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*Figures I-8 and I-9 are maps folded in the pocket attached to the inside of the rear cover.

Calculation of Population at Full Buildout

On the basis of a special census by the Cabrillo Unified School District of 1972, it is possible to determine a reasonable multiplier for the average number of people per dwelling unit for single-family residences (3.22), two-family residences (2.46), and multi-family residences (1.92). In other areas, the U.S. Census (1970) and the mid-decade census undertaken in 1975 may be used to establish population/unit multipliers. In all cases these should be related to the census tracts within the study area.

The population multiplier has been used to convert the adjusted total residential units at full buildout into a maximum population estimate for each district, and for the maximum total population estimate for the entire study area (see Table I-3). Alternative 4a (Figure I-8) results in an allowance for an additional 47,650 persons within the sub-region or an ultimate population of 61,250 persons under existing plans. Alternative 4b (Figure I-9), with a slight decrease in the densities of development within the City of Half Moon Bay, results in an additional population of 39,500, or an ultimate total of 53,100 persons.

The current population of 13,600 was estimated by applying the multipliers to the existing number of units (from Table I-1). This calculation is necessary because the special census is already three years old.

DELINEATION OF AREAS AFFECTED BY GEOGRAPHICALLY SPECIFIC POLICIES

This step identifies specific areas within the subregion where Coastal Plan policies may limit development.

Table I-3

Additional Units and Population by District
for Existing Commitment Alternatives

District	Type of Unit	ALTERNATIVE 4a Existing Commitment to Growth, December 1974		ALTERNATIVE 4b New Half Moon Bay General Plan	
		New Units	Added Population	New Units	Added Population
Montara	SF*	635	2,045	635	2,045
Moss Beach	SF	1,169	3,764	1,169	3,764
Princeton	SF	93	299	93	299
El Granada	SF	1,216	3,916	1,216	3,916
	2F†	170	418	170	418
	M ‡	120	230	120	230
Miramar	SF	513	1,652	513	1,652
Half Moon Bay North	SF	1,302	4,192	2,048	6,581
Half Moon Bay Central	SF	1,296	4,173	1,833	5,893
	2F	598	1,471	789	1,940
	M	3,727	7,156	0	0
Half Moon Bay South	SF	3,634	11,701	1,902	6,122
Other County	SF	2,062	6,640	2,062	6,640
TOTALS		16,535	47,657	12,550	39,500
Existing Population			+13,600		+13,600
Total Population			61,257		53,100

*Single family dwelling; population multiplier is 3.22

†Duplex; population multiplier is 2.46

‡Multiple family dwelling (5+ units); population multiplier is 1.92

Categorization of Geographically-Specific Coastal Policies

Coastal Plan policies provide direct and indirect guidance in terms of land use patterns and configurations that will result from the application of land-based policies. These policies can be divided into three broad categories:

1. Geographically defined and mapped policies concerning protection of resource lands and conflicts of urban use in hazard land areas;
2. Concentration of development policies emphasizing concentrated urban growth; and
3. Development-constraining policies dealing with limits to growth and opportunities for access to the coastal zone by a wide range of socio-economic groups.

Policies included in group 1 deal with agriculture, habitat, viewshed, coastal hazards, and recreation (see Table I-4). Geographic areas include prime agricultural lands, wetlands and estuaries, recreation sites, and scenic resource areas. In most cases, not all geographically specific policies will be applicable in any one local coastal area. Part Four of the Coastal Plan (pp. 199-420), which outlines a number of issues in each coastal subregion, provides an indication to local governments of the pertinent policies for this step.

Policies in group 2 include 44 (§30251), 58 (§30253{5}), 59 (§30250), and 60 (§30241.e).* These policies will be followed in preparing alternative land use plans (as outlined in Chapter V of this volume).

Group 3 policies will be cited in the subsequent water, wastewater, and transportation chapters (Chapters II-IV).

*Numbers in parentheses refer to sections of the California Coastal Act of 1976 that are comparable or equivalent to the policies of Coastal Plan identified.

Table I-4

Geographically Specific Policies

5b.* Facilities serving the commercial fishing and recreation boating industries shall be protected (§30234)†

15a. Restrict new development in wetlands (§30233)

15b. Restore degraded wetlands (§30233)

26. Preserve significant natural and rare species (§30240)(§30230)

27. Protect fragile habitat areas (§30240)(§30230)

28b. Restrict disturbance of shoreline habitats (§30240)(§30230)

35. The maximum amount of prime agricultural land shall be maintained in agricultural production (§30241)

38a. Restrict conversion of productive timberlands (§30243)

45. New development in highly scenic areas shall be subordinate to the character of its setting (§30251)

50. Development not allowed to significantly block view of shoreline from key public viewing areas (§30251)

58a. Protect special communities and neighborhoods (§30253{5})

67a. Regulate new development in areas of high geologic hazard (§30253)

70. Regulate bluff and cliff developments for geologic safety (§30253{2})

132. Oceanfront land suitable for recreational use (§30221)

134. Coastal areas suited for water-oriented activities (§30220)

136. Upland areas necessary to support coastal recreational uses shall be reserved (§30223)

151. Protect historical and prehistorical resources (§30244)

---

*Coastal Plan policy numbers

†Numbers in parentheses refer to sections of the California Coastal Act of 1976 that are equivalent or comparable to various policies of the Coastal Plan.

Identification of Existing Data Sources

For Half Moon Bay, data has been compiled on soils, hazards, and viewsheds for the entire coastal portion of the subregion and for generally 1 to 2 miles inland, thus covering all of the heavily developed areas of the subregion. Appendix B-1 provides a data requirements checklist, and Appendix C identifies specific information sources for Half Moon Bay. For some subregions, data may be inadequate or unavailable, while other localities like Morro Bay and the San Diego Coastal Plain will have mapped and even computerized basic resource information. For such areas it will only be necessary to update and verify this data.

The U.S. Soil Conservation Service Soil Survey is available for most areas. It identifies Class I, II, and III soils, other lands now being used for or appropriate for producing coastal-related crops and grazing lands.*

The USGS San Francisco Bay Region Environment and Resources Planning Study delineated one-hundred-year floodplains, tsunami run-up areas, shorelines subject to erosion, and landslide prone areas. All localities are now required to map floodplains so this data should soon be available. Viewshed information was obtained through a field survey.†

Compilation of Resource Maps

The simplest means of displaying the data collected is to transfer each factor to maps of identical scale. However, for ease of interpreta-

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*Grazing lands were defined as at least one animal per unit per acre per month.

†David Bobb, Daniel Wormhoudt, and Jens Sorensen. "Identification and Mapping of California's Coastal Viewshed Corridor." (Draft) University of California, Berkeley: Institute of Urban and Regional Development, 1975.

tion and use the data should be aggregated into either one composite map or capability map.

Composite maps can be prepared by overlaying single factor maps (e.g., prime agricultural lands, hazard areas) and delineating areas affected by one or more of the geographically specific policies. The Half Moon Bay orthophotos, with an overlay of lot and parcel lines, are used to map the resource data at a scale of 1":400' (see Figure I-10). Something similar to this scale base map (1":300' to 1":500') is necessary for developing land use alternatives. Where orthophotos are not available at this scale, the data maps will have to be enlarged before being overlayed on the base maps, or the information will have to be transferred manually.

A second method for developing resource maps is to establish resource capability units based upon coastal system characteristics. A resources capability unit is a geographic unit (e.g.; land, water, biota, area of active process) defined on the basis of the nature, degree of activity, or use the unit can sustain with an acceptable level of environmental quality.* The specific criteria used to determine capability will vary among geographic areas. Capability mapping will be particularly appropriate in areas where impacts related to Coastal resource systems (e.g., sedimentation, biological productivity) are of primary importance. In other areas, single factor maps will be satisfactory for analysis of geographically specific policies.

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*Capability analysis has been used extensively in coastal zone management programs in some states -- see for example: L.F. Brown, W.L. Fisher, A.W. Erxleben and J.H. McGovern, Resource Capability Units: Their Utility in Land and Water-Use Management with Examples from the Texas Coastal Zone, Bureau of Economic Geology, University of Texas, Austin, 1971.

ASSESSMENT OF THE TYPE AND EXTENT OF CONFLICT BETWEEN LOCAL PLANS AND COASTAL PLAN POLICIES

This step quantitatively identifies the specific conflicts between local plans and Coastal Policies. Three basic categories of potential conflict should be examined:

1. Conflict between the priority of use specified by Coastal Policies and the designation of uses for specific geographic areas in the local coastal plan;

2. Conflict between the priority of use designation in a local coastal plan and the effects in adjacent jurisdictions; and

3. Conflict between the priority of use for public service capacities defined by Coastal Policies and the capacity required by the existing commitment from local plans.

Methodology for the analysis of conflicts is presented in the discussion of impact assessment (Chapter VI).

Identifying the conflicts in the first category fundamentally involves comparing the spatial distribution of uses from the existing commitment and the areas affected by geographically specific resource policies (i.e., comparing the results of the two previous sections of this chapter). Table I-5 illustrates the potential conflicts between the Coastal Policies and the existing commitment in the Half Moon Bay subregion by district. Agricultural and scenic resource areas and flood and geologic hazard areas, locations for which the Coastal Act has provisions restricting or controlling development, are designated for development by the San Mateo County and City of Half Moon Bay General Plans.

Conflicts concerning effects on other geographic areas should be identified for further analytical work in subregional planning or joint preparation of local coastal programs. Effects on other geographic areas may include both geographic impacts

Table I-5

Effect of Coastal Plan Policies on the Existing Commitment in the Half Moon Bay Subregion
(derived from local plans and ordinances)*

Coastal Plan Policies	Measures	Montara	Moss Beach	El Granada	Princeton	North Half Moon Bay	Central Half Moon Bay	South Half Moon Bay	Pilarcitos Valley and Skyline Slope	Miramar	TOTAL REDUCTION
35. The maximum amount of prime agricultural land shall be maintained in agricultural production	Acres affected		65(M) 486(R)			134(R) 34(M)	4(C) 422(R)	596(R)	1311(R)	61(R)	3160(R)
	Residential units		51			713	3056	2416	194	529	7077
	Population		164			2296	6800	7780	625	1703	19748
50. Development not allowed to significantly block views of shoreline from key public viewing points	Acres affected	30			37(C)	27(C) 19(M) 18(R)		218(R)			349
	Residential units	6				230		847			1083
	Population	19				740		2727			3486
67a. Regulate new development in areas of high geologic hazard	Acres affected										
	Residential units		40					55		7	102
	Population		129					177		23	329

*The following geographically-specific policies are not applicable with respect to the existing commitment: 5b, 15a, 15b, 26, 27, 28b, 38a, 45, 58a, 70, 132, 134, 136, 151. In other areas this comparison would include all relevant policies.

(such as the effect of development on a wetland) or access-related impacts (such as the congestion of coastal highways). The definition of the geographic area within and between jurisdictions for each cumulative impact category should assist in initial definition of areas requiring further subregional analysis. System boundaries for Half Moon Bay are shown in Figure I-11.

Identifying the conflicts in the third category requires a complete analysis of public service capacities. Service capacity conflicts exist when the capacity required by the level of development implied in the existing commitment exceeds existing service capacities. Analysis procedures covering water, wastewater, and transportation systems are described in Chapters II-IV (step 3 of Volume I). In Half Moon Bay the analysis indicates a higher level of development commitment than can be serviced by existing facilities (see Figure I-12). Such results, coupled with the results shown in Table I-5, serve to determine and pinpoint the conflicts to be resolved by alternative plan formulations in subregional plans or local coastal programs (see Chapter V).

FIGURE I-11

CUMULATIVE IMPACT BOUNDARIES

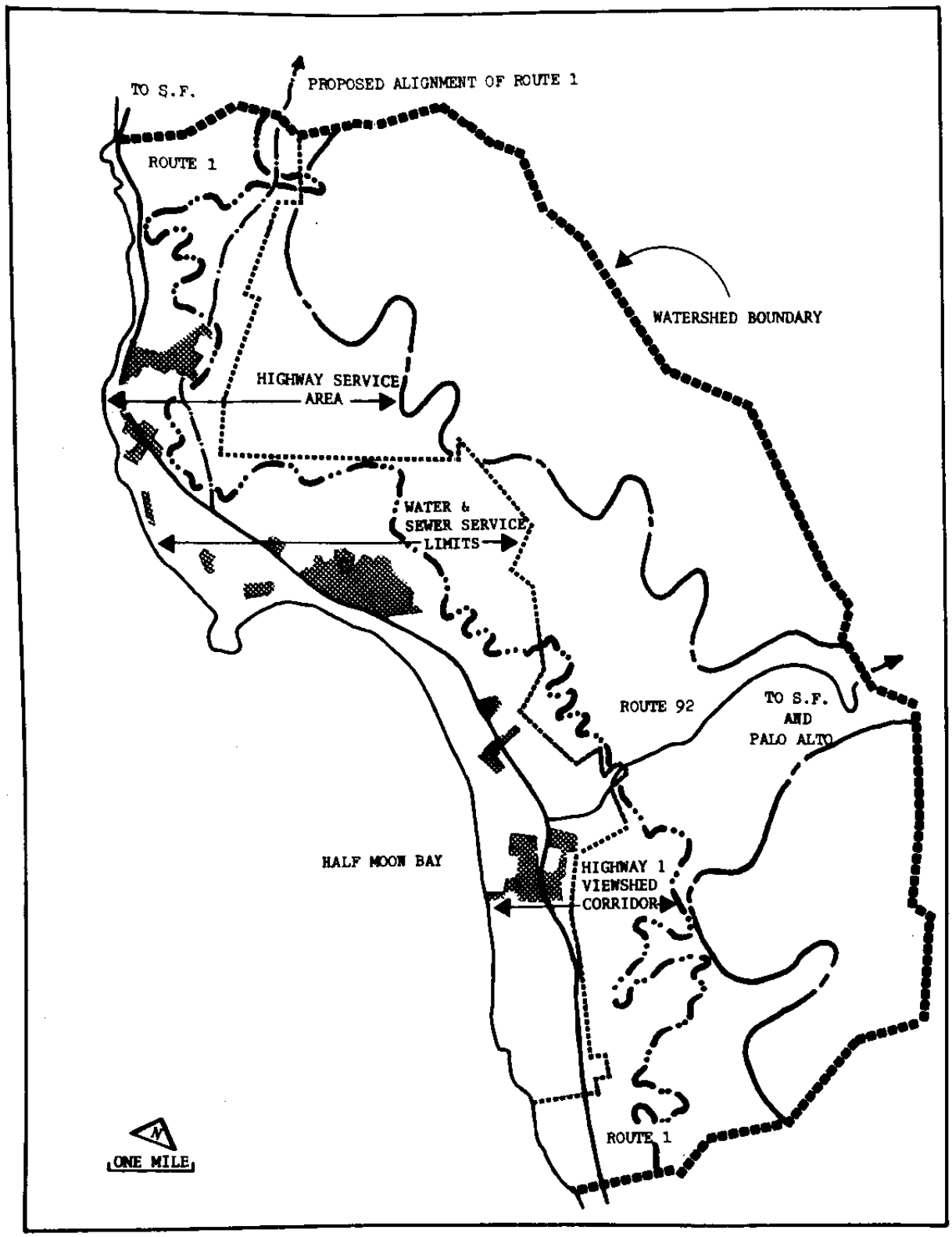
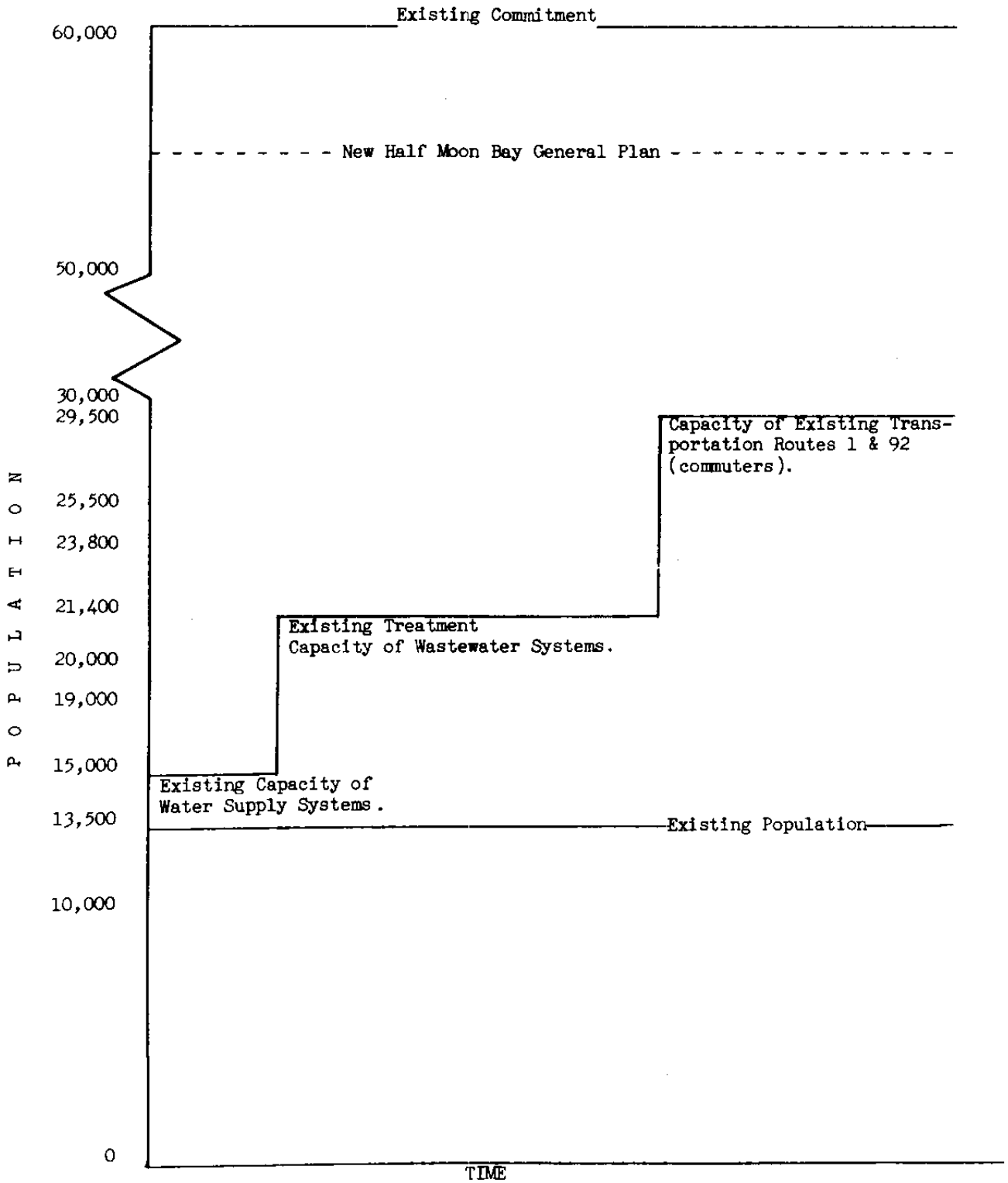


Figure I-12

Existing Levels of Public Service
Compared with Existing Commitment to Growth



CHAPTER II

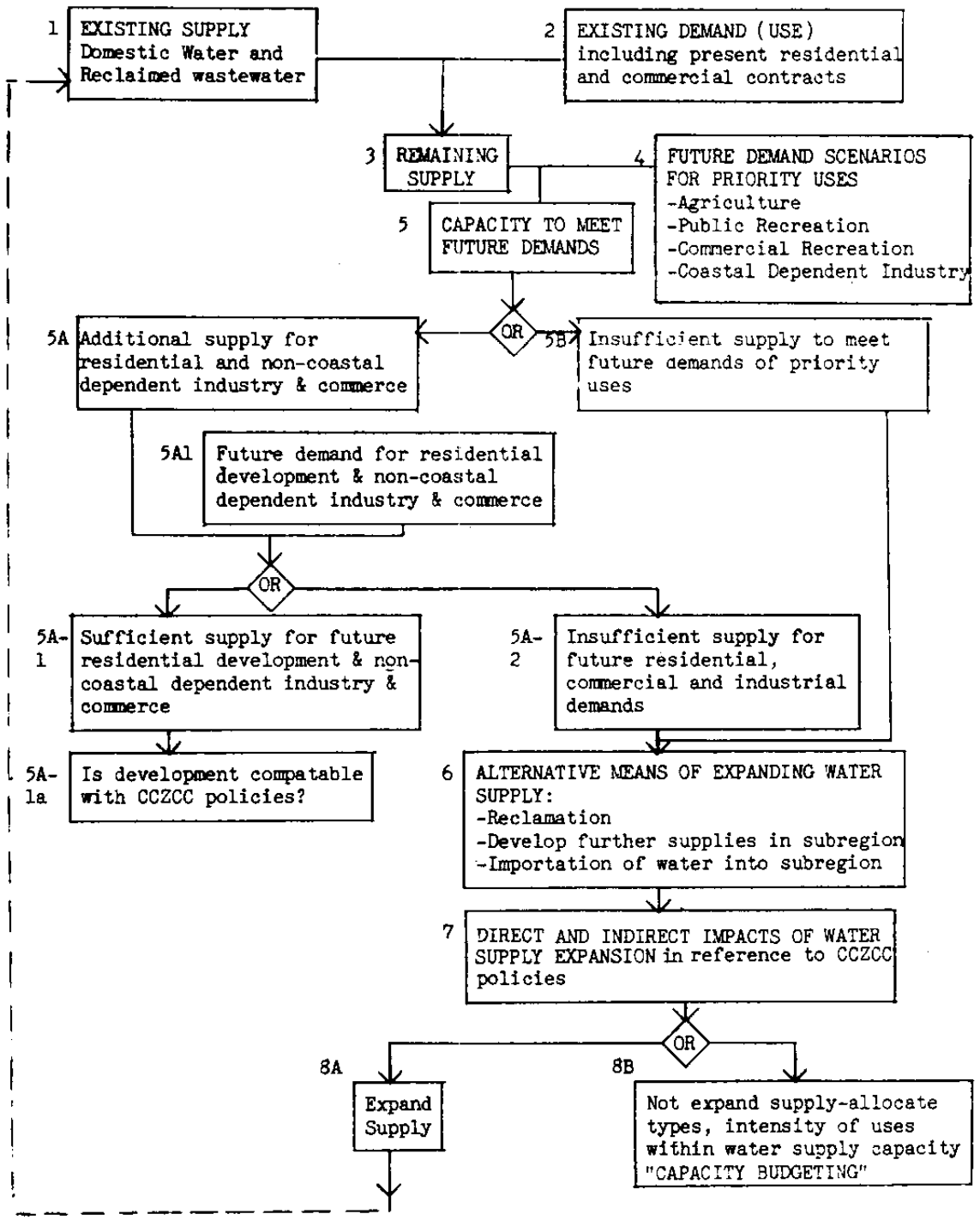
WATER SUPPLY ALLOCATION AND DEVELOPMENT

Using the policies in the Coastal Plan and the Coastal Act of 1976 it is possible to devise a process for the development and allocation of water supplies. The process outlined in this chapter is illustrated by Figure II-1. Steps 1 through 8B are based on the following policies:

> 30254. New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division.... Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.
>
> 30255. Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland.
>
> 30241. The maximum amount of prime agricultural land shall be maintained in agricultural production to assure the protection of the areas' agricultural economy, and conflicts shall be minimized between agricultural and urban land uses through all of the following: ...
>
> (d) By assuring that public service and facility expansions and nonagricultural development do not impair agricultural viability, either through increased assessment costs or degraded air and water quality.

Figure II-1

A Generalized Process for Applying the Coastal Commission Policies to Water Supply Allocation and Water Development Projects



> 30220. Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.
>
> 30221. Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and forseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.
>
> Consider recreational potential before allowing other uses of oceanfront land* (Coastal Plan policy 132).†

The various steps of Figure II-1 are discussed in context with the Half Moon Bay case study. The necessary data to perform this study are outlined in Appendix B-2.

EXISTING SUPPLY

There are two water supply agencies within the Half Moon Bay case study area, the Coastal Utilities Corporation and the Coastside County Water District. The boundaries of the service areas are indicated in Figure II-2. The Coastal Utilities Corporation (CUC) serves the unincorporated communities of Montara and Moss Beach. It is a private company and cannot buy water from a governmental agency. Coastside County Water District (CCWD) is a public agency, servicing the unincorporated communities of Princeton, El Granada, and Miramar and the City of Half Moon Bay.

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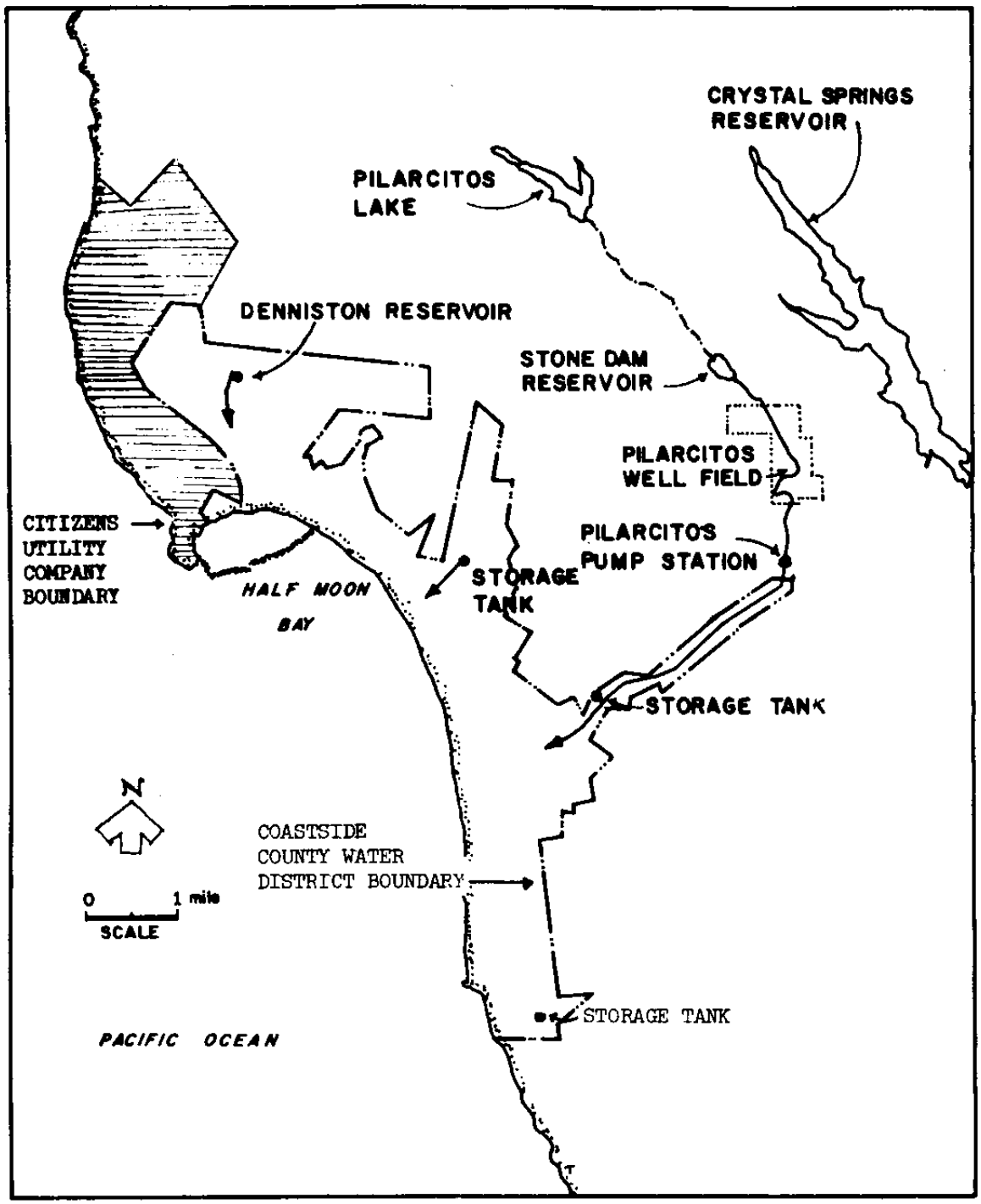
*Oceanfront lands "usually do not extend more than 1,000 feet landward" (glossary of the Coastal Plan).

†This policy is considered as an extension of Coastal Act §30220 and §30221.

Figure II-2

Half Moon Bay Water Districts and Facilities



Source: Draft Environmental Impact Report: Denniston Creek Project -- Phase II.

Coastal Utilities Corporation

The Coastal Utilities Corporation's present supply of .3 million gallons per day (MGD) is drawn from five wells (75 percent of the supply), and one spring (25 percent of the supply). The wells are located on the terrace adjacent to the north end of the airport. The county will not allow CUC to drill additional wells on the airport property and is disputing the ownership of the existing wells. They are presently being pumped at capacity. Due to the yield of the subsurface materials, large pumps will not draw out additional water. CUC recently hired an engineering firm to locate new sources of water within its service area because the present supply is being used at or near full capacity in order to service the existing 936 connections (essentially all residential).*

Coastside County Water District

The present service capacity of the Coastside County Water District is 2.52 MGD. Pilarcitos Lake provides 1.95 MGD on purchase contract from San Francisco Water Department.† This contract expires in 1990. The Denniston Creek Project (Phase 1) safely yields approximately .57 MGD. (Pilarcitos Creek wells are available during the winter but cannot be used in summer and hence are not considered in the calculation of peak demands.)

Phase II of the Denniston Creek Project is in the final stage of construction. It will divert San Vicente Creek using the existing agricultural diversion structure and drill additional wells in the

*General Manager, CUC, in an interview.

†CCWD figures from the "District Engineer's Summary Report for 1974," except where otherwise noted.

Denniston drainage. CCWD estimates that Phase II Denniston will safely yield .6 MGD.*

Previously, the Phase II project design included wells within the vicinity of Princeton fresh water marsh. According to the environmental impact statement, withdrawals from these wells might induce salt water intrusion and adversely affect the present biological composition of the marsh.†

With completion of Phase II Denniston, the total water supply of CCWD should be 3.12 MGD (1.95 + .57 + .6). Combining the water supply of CUC and CCWD yields a total existing water supply of 3.42 MGD for the Half Moon Bay subregion. In addition to supplying water to the utilities, private wells and stream withdrawals are used to obtain water supplies for floriculture, nursery production, and crop irrigation. Brussel sprout, artichoke, and other field crop producers cannot afford to purchase water from either water district and must rely on their riparian rights or wells to obtain supplies for irrigation. Field crops would be forced out of production if the water district or private developers purchase riparian rights. This practice would conflict with Coastal Plan policy 21b and Coastal Act §30241. It may be possible for crop producers to substitute well and stream water with reclaimed wastewater. The likelihood that wastewater could be used for irrigation depends on a number of factors, including purchase price, health standards, soil effects, and crop production effects.

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*James Teter. "Preliminary Investigation: Future Water Supply Sources," October 1975.

†Lampman and Associates. Environmental Impact Report: Denniston Creek Project. Phase II. August 1974. An adverse impact on Princeton fresh water marsh would conflict with Coastal Plan policies 15 and 22 and Coastal Act §30231.

EXISTING DEMAND

Citizens Utility Corporation

It is estimated that CUC serves a population of 2,892 (using 3.09 per capita per household multiplier from the 1972 special census) at a rate of 100 gpcd.* The lot count based on zoning and ownership pattern estimated that CUC service area is capable of accommodating an additional 1,715 residential units. A problem arises however, if water in excess of present capacity cannot be found within the service area to supply these additional 1,715 residential units. Should this occur, CUC may be forced to combine with the Coastside County Water District which surrounds it or to participate with other water districts in developing an additional water source.

Coastside County Water District

Data on annual water use for 1972 through 1975 obtained from the "District Engineer's Summary Report for 1975" are presented in Table II-1.

The largest use, residential and miscellaneous consumption, has remained relatively constant at approximately 44,000,000 cf throughout the four years. The second largest use is for irrigation, which ranged from 14 to 24 percent based on annual totals. The water use by governmental agencies is fairly constant as is the commercial demand other than the two trailer parks and restaurants. In 1975, 158,100 cf of water was supplied to the public beaches by the district.

Table II-2 lists the estimated peak water demands in 1976 and percentage of total demand for the major types of water use.

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*Ernest Steel. Water Supply and Sewerage. McGraw-Hill, 1960. gpcd = gallons per capita per day.

Table II-1

Water Use Records (in 100 cf)

USE	1972	1973	1974	1975
Floriculture and non-recreational irrigation	69,898	83,689	93,285	110,632
Recreation	9,340	63,979	4,873	7,589
Governmental agencies	18,895	17,090	19,705	19,199
Commercial (major)				
Trailer parks	8,612	12,915	15,874	19,308
Restaurants	960	1,372	1,401	5,147
Hotels and motels				1,674
Other	11,113	11,098	9,753	14,068
Residential and miscellaneous*	446,968	418,493	448,641	466,615
Total	565,768	608,636	593,532	644,432

*Miscellaneous includes leakage, fire flows, main flushing, etc.

Table II-2

Estimated 1976 Peak Water Demands

	MGD	% Total Demand
Residential and miscellaneous	1.84	66
Floriculture and irrigation	.60	21
Major commercial	.20	7
Government agencies	.12	4
Recreation	.04	2
	2.80 MGD	100%

The 1974 average monthly residential connection use was 321 gpd (indicating agreement with a 1972 school census of approximately 3.02 persons per residence (Lampman, 1974). The district's present criterion reserves 400 gallons per residential connection per day (129 gpcd) on an annual average basis and a peak daily criterion of 550 gpd per residence (177 gpcd). (The District Engineer notes that the latter criterion is low when compared to other areas.*)

According to the District Engineer's 1974 and 1975 Reports, CCWD is committed to serve 3,264 residential service connections.† Using a 3.02 multiplier per residence, CCWD serves approximately 9,857 residents.‡ Table II-3 illustrates the supply and demand situation in the district.

---

*Engineering standards recommend that the peak daily use is likely to be 180 percent of the annual average (Steel, 1960). If 400 gpd is the annual average, 720 gpd would be the estimated peak per residential connection.

†Approximately 164 residential connections were added during 1975.

‡Cabrillo Unified School District. 1972 Special Census.

Table II-3

Present Water Supply and Demand

EXISTING SUPPLY (MGD)		DEMAND (Peak) (MGD)	
3.12	PILARCITOS 1.95	2.80	RESIDENTIAL 1.84 (9,857 residents)
			FLORICULTURE and IRRIGATION .60
			GOVERNMENTAL AGENCIES .12
	DENNISTON I .57		MAJOR COMMERCIAL .20
	DENNISTON II .6		RECREATION .04
		.32	REMAINING SUPPLY

REMAINING SUPPLY

Approximately .32 MGD may exist as surplus at the completion of Denniston Phase II. If 66 percent of the surplus is committed to residential service,* an additional residential population of 1,159 could be accommodated.†

*The percentage of the total water demand expected to be consumed by residential use in 1976 (see Table II-2).

†Using a 550 gpd rate per residential connection and a multiplier of 3.02 persons per residential unit.

FUTURE DEMAND SCENARIOS

According to Figure II-1, after existing and committed demands are met, the remaining supply of water should first be allocated to agricultural, public recreation, commercial recreation, and coastal-dependent industry.

Coastal Agriculture

As previously mentioned, floriculture is the only form of agriculture that can afford to buy domestic water. During the last three years floriculture use has steadily increased (see Table II-1). Floriculture water use increased by 17 percent between 1972 and 1973, 10 percent between 1973 and 1974, and 18.6 percent between 1974 and 1975.*

If floriculture water use continues to increase at 10 percent per year, demand will double in eight years. Neither CCWD or the county agricultural extension service has estimated the future expansion of floriculture in the subregion. In 1974 floriculture and irrigation of the golf course had a peak daily consumption of .5 MGD. If the assumption is made that floriculture demand for domestic water will at least double, a .5 MGD increase should be projected for agricultural use.†

Recreation

Improvements of Routes 1 and/or 92 will accelerate the transformation of the subregion to a regional recreation destination.

---

*The average "2" meter connection for new floriculture expansion is equal to 100 residential connections (personal communication with James Teter, Consulting Engineer to CCWD).

†This assumption is based on the premise that reclaimed wastewater will not be substituted for domestic water in floriculture production (see the following discussion on future supplies).

Chapter V, "Land Use and Recreation Alternatives," (Table I-13) estimates that peak beach day use could be 42,800 when all recreational facilities are fully developed.* The impact statement for Pillar Point Harbor estimated peak day use of 5,700 marina visitors.† There are also plans to develop a 593-unit overnight campter area.‡ Using Park and Recreation criteria of 5 gpcd for day visitors and 25 gpcd for campers, at least .3 MGD should be planned for recreation use.§

There are no specific projections for private recreational development in the subregion. Presently there are a number of restaurants and bars that cater to tourists. Plans for a 52-unit motel|| have recently been approved. Plans for development of Pillar Point Harbor propose leasing sites for restaurants, hotels, and tourist retail shops.

Coastal-Dependent Industries#

The development of Pillar Point Harbor may also attract coastal-dependent industries such as fish processing operations and boat repair yards. No estimates exist on water supply requirements for these coastal industries.

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*Based on turnover rate of 3 (last column of Table V-13) minus So. Pillar Point Beach which is assumed to develop as a harbor.

†San Mateo Harbor District. Environmental Impact Statement: Pillar Point Harbor East Basin Project El Granada, California. November 1972.

‡California Department of Parks and Recreation. "Half Moon Bay State Beach 1975-1976: Conversion of Day Use Area to Recreation Vehicle Campground."

§Clark Muldavin, Engineering Section, Department of Parks and Recreation, in an interview, Sacramento, January 1976.

||100 g/min. requested service.

#"District Engineer's Summary Report for 1974" does not break out industrial use from major commercial use. Fifty minor commercial uses that consume amounts equivalent to residential connections are included in residential and miscellaneous category. To determine an average peak use for commercial-industrial connections, the 50 minor commercial uses at 550 gpd were combined

CAPACITY TO MEET FUTURE DEMANDS

It is evident that the .32 MGD surplus expected at the completion of Phase II Denniston will be insufficient to meet the water demands of agriculture, recreation, and coastal-dependent industry. Neither will this surplus meet the continuing demands for connections by residential and non-coastal-dependent industry.

.5 MGD	floriculture increase
.3 MGD	public recreation projections
.8 MGD	+unknown future demands for private recreation and coastal-dependent industry

It could be expected that the .8+ MGD demand increase in recreation, floriculture, and coastal-dependent industry will not fully occur for at least five years. CCWD should be able to develop additional sources within this time period that would satisfy demands of the CCZCC priority uses as well as non-coastal-dependent industry or commerce and residential construction. CCWD's current policy is to provide service on a first-come first-served basis. To the extent that additional residential and non-coastal dependent industry or commerce connections are permitted to use the remaining .32 MGD supply, floriculture and recreation expansion in the subregion may be curtailed or deferred until additional water supplies are developed. Coastal Policies suggest that CCWD reserve a portion of the .32 MGD necessary to accommodate estimated increases in coastal priority uses that are projected to occur before additional water supplies are developed. If floriculture industries cannot obtain necessary domestic water supplies from CCWD, one

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with peak water consumption of the 10 major commercial uses (minus the two trailer parks) listed in the 1974 Summary Report. The figure 7,000 gpd was derived as a rough multiplier to use in forecasting peak consumption of future commercial and industrial use on a per unit basis.

consequence may be the acquisition of cropland properties in order to obtain riparian rights. This may force conversion of brussel sprout and other field crops to floriculture production. Greenhouse conversion of croplands was addressed by Coastal Plan policy 35a:

> Greenhouses may be permitted on agricultural lands within developed areas or the urban-rural fringe in accordance with agricultural protection plans. Outside of these areas, greenhouses that degrade soil capabilities or prime land shall be treated as conversions.

An increase in the number and depth of wells may be another consequence of domestic water-restriction of floriculture. Increased groundwater extraction may, in turn, result in salt water intrusion of the aquifer, in conflict with Coastal Plan policy 22b.

ALTERNATIVE MEANS OF EXPANDING WATER SUPPLY

James Teter, CCWD's consulting engineer, has recommended funding feasibility studies to determine potential additional sources of water within the subregion (Teter, 1975). Three additional sources of water are currently under consideration. Two other sources of additional water will also be mentioned. One short-term project would be the drilling of wells in the Seal Cove fault area. The yield from these wells may be 300 to 500 gallons/minute (or .43+ MGD at 300 gpm) (Teter, 1975). The potential well yields are a rough estimate. A reliable yield prediction cannot be made until test drilling surveys are conducted. The Seal Cove fault wells are within the inland boundary line delineated by the Coastal Act of 1976.

A second dam on Denniston Creek and a water diversion from San Vicente Creek is the second option being considered for increasing the water supply. The San Vicente diversion and a larger Denniston Creek dam may produce an additional 1.6 MGD yield. This yield projection is

highly speculative and may be significantly revised based on future climatologic, geologic, and hydrologic studies. The construction of a second dam and a water diversion from San Vicente Creek is expected to reduce present yields from the well fields near the airport.*

Obtaining additional supplies from Pilarcitos Reservoir is the third option being considered. Presently, CCWD takes 1.95 MGD on a peak demand day. The peak supply from Pilarcitos is presently limited by the capacity of the pipeline from the dam and the 1.5 MGD average annual yield contract with the San Francisco Water Department. If an additional pipeline is constructed, Pilarcitos may provide an additional 1 MGD on a peak demand basis (Teter, 1975).

Reclamation of wastewater is a fourth possibility for expanding the water supply in the subregion. Treated sewage effluent from a non-industrial community such as Half Moon Bay would normally be suitable for irrigation of certain types of crops and, possibly, flowers. The use of reclaimed wastewater for crops, floriculture, and parkland irrigation has at least three advantages:

- large amounts of water would be available for other uses and new supplies of water may not have to be developed;
- fewer fertilizers would have to be applied due to nutrients in the wastewater;
- a reduction in the volume of wastewater discharged by ocean outfalls (at least during the summer and fall).

---

*James Teter, engineering consultant to CCWD, in an interview October 18, 1975.

Coastal Plan policies encourage the reclamation and reuse of wastewater:

> Reclamation and reuse of adequately treated wastewater (for agricultural, industrial, recreational, fish, and wildlife enhancement, or domestic use) shall be fully considered as a preferred alternative to discharges into coastal waters and as a desirable component of all water and wastewater management programs. (8)
>
> Water management shall stress conservation....Appropriate alternatives for recycling and conserving water shall be implemented, including the reclamation of wastewater, especially for non-domestic uses... (23d)

According to the impact report on the San Mateo County Mid-Coastside Wastewater Management Plan, farmers who grow field crops such as brussel sprouts and artichokes could not afford to buy reclaimed wastewater (at $.23/1,000 gallons compared to $.81/1,000 gallons for CCWD water).*

Floriculture which currently purchases CCWD water may be a future market for reclaimed wastewater. However, the floriculture industry would have to be assured by a pilot study that wastewater delivery would be reliable and of a quality that would not adversely affect production or foul their irrigation systems. Figure II-3 diagrams the relationships between wastewater reclamation and the supply of water for residential development (given CCZCC priority of use policies).

Importation of water from Crystal Springs Reservoir into the subregion represents a fifth alternative for increasing the water supply. Presently CCWD has a contract with San Francisco Water Department for 3,650 MG/year on an average annual basis of 10 MG/day.

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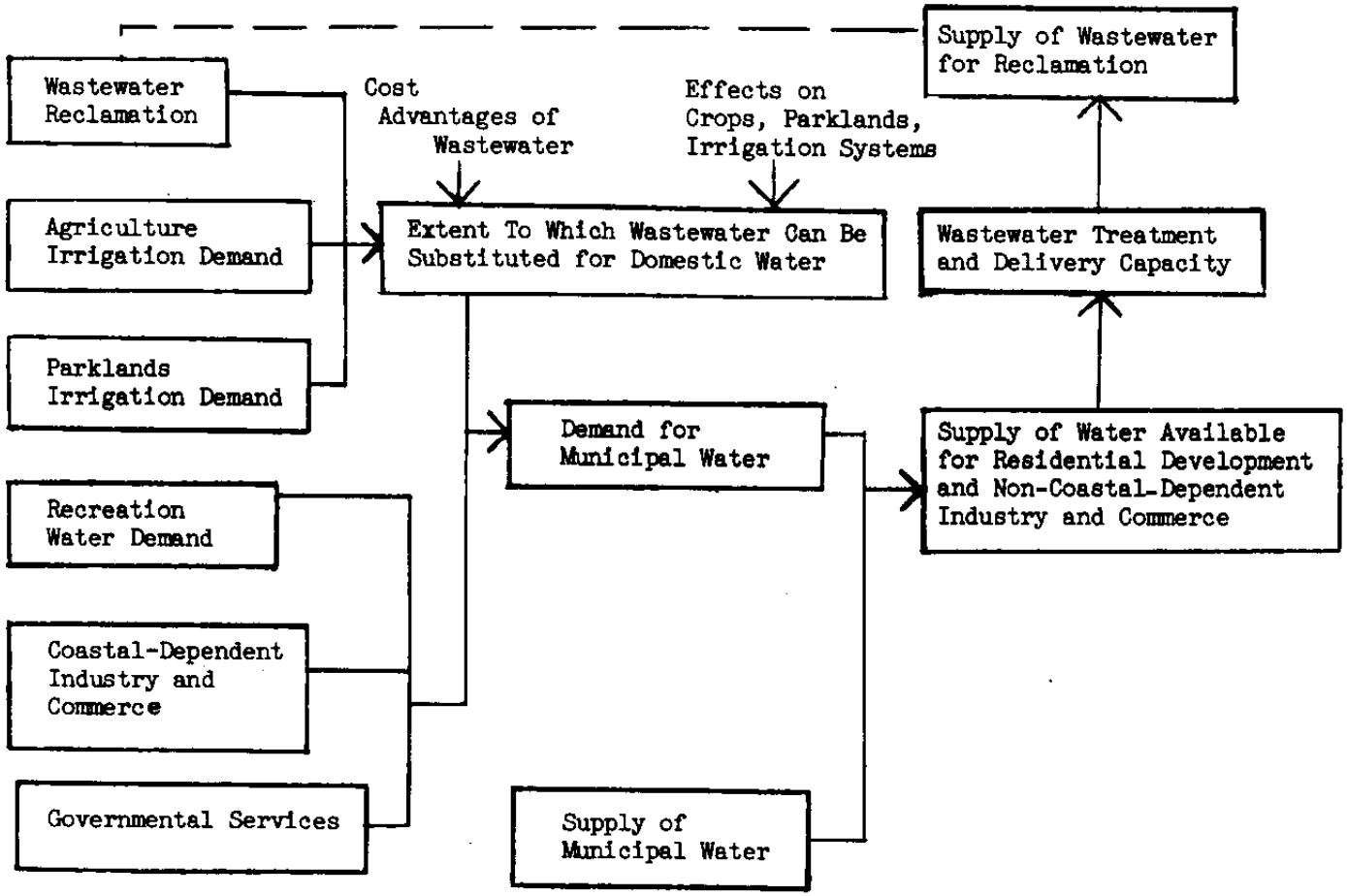
*Thomas Reed Associates. San Mateo County Mid-Coastside Wastewater Management Plan: Draft Environmental Impact Report. June 1975.

Figure II-3

Future Residential Population as a Function of Wastewater Reclamation and Recreational Demands



According to CCWD's consulting engineer, the water supply is not limited on a daily basis to 10 MGD but to a yearly total of 3,650 MG. The supply of water to the district on any peak demand day is only limited by the size of the facilities (pipe, treatment plant, pumping stations) and a yearly aggregate supply limit of 3,650 MG.

To obtain the 3,650 MG/year, CCWD must construct a pipeline across the Santa Cruz range, a pumping station, and a purification plant. The size of the pipe would be the limiting factor on the number of gallons per day that could be supplied on a peak demand basis.

DIRECT AND INDIRECT IMPACTS OF WATER SUPPLY EXPANSION

Each of the three projects proposed to expand the water supply may generate impacts that could conflict with the policies of the Coastal Act and Coastal Plan. Impacts of each project must be evaluated in terms of relevant policies.

The Seal Cove fault well-field may induce salt water intrusion into the Princeton Freshwater marsh. Salt water intrusion may degrade the environmental qualities of the marsh which would conflict with the Coastal Act's policies on wetlands protection (§30231).

A larger dam on Denniston Creek and San Vicente Creek diversion may conflict with a number of Coastal Plan policies on watershed planning; in particular policy 22b with regard to:

- loss of natural riparian vegetation that has no significant value for wildlife habitat or recreation amenities;
- adverse alteration of saltwater-freshwater balance in coastal wetlands;
- reduction of existing agricultural production and process (loss of riparian rights downstream);

. loss or reduction of coastal sand supply;

. degradation of groundwater resources.

The reservoir behind the dam may provide a recreational amenity for a park project in the surrounding watershed (Teter, 1975), thereby compensating for the loss of riparian vegetation. Dam operation may be able to assure flows to croplands downstream to meet irrigation requirements. Sand transport on Denniston Creek should not be a problem since the material that bypasses the existing dam collects in Pillar Point Harbor. One notable advantage of a second dam on Denniston Creek would be its proximity to Montara-Moss Beach. Since Citizens Utility Corporation, which serves these areas, is at or near capacity and has no other potential supplies within its district, water from a larger Denniston Creek reservoir will enable residential development to infill these communities.

In comparison to the policies of the Coastal Plan, the Coastal Act's policy on impoundments is relatively permissive, particularly if the Denniston dam is demonstrated to be necessary for water supply.

> 30236. Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.

The indirect effect of an additional Pilarcitos pipeline as well as a second dam on Denniston may be to divert attention away from the need to conduct studies on the feasibility of wastewater reclamation. Coastal Plan policies suggest that wastewater reclamation be given at least equal consideration to conventional means of developing new supplies.

It is estimated that it will cost at least $8 million to construct the facilities necessary to import the Crystal Springs water (Teter, interview). Considering the size of capital investment and the possibility that importing water would have growth-inducing effects, it appears that a bond issue to finance the water importation project would meet with voter resistance. A more politically feasible financing arrangement would be the formation of a special improvement district. However, formation of such a special improvement district may conflict with Coastal Commission policies, particularly if the district would tax marginally economic agriculture.

> ...specific measures to assure that projected levels of urban development in the subregion will not significantly increase public service costs or assessment costs of agricultural lands (e.g., for sewer or water services)... (32b)

Formation of a special improvement district will require a guarantee that a minimum number of residential and commercial units be developed in order to pay off the municipal bonds. It is not possible to estimate at this time the magnitude of development needed to pay off the bonds since the capital costs of the project and the specific financing arrangements are unknown. Importation of water from Crystal Springs may conflict with Coastal Plan policy 23c:

> Because water importation may entail high energy demands and may in some instances encourage inappropriate development in coastal resource areas, decisions concerning development shall be in accord with water management plans and programs that minimize the need for interbasin transfers and that consider total water basin impacts.

The dam on Denniston Creek and water treatment or storage facilities that may be constructed as components of any future water supply projects in the subregion would be evaluated by at least two policies of the Coastal Act:

> Dams or other substantial alterations of rivers... shall incorporate the best mitigation measures. (§30236)
>
> ...permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas and to minimize the alteration of natural land forms to be visually compatable with the character of surrounding areas. (§30251)

Appendix E-1 is a framework of major impacts in context with Coastal Plan policies associated with expanding capacity.

CAPACITY BUDGETING

The Seal Cove wells, second Denniston Dam and additional supplies from Pilarcitos Reservoir may collectively yield 3 MGD (this figure may vary considerably based on results of future studies). An additional 3.03 MGD supply may be sufficient to serve 10,980 more residents,* if the present proportion of peak daily demand consumption is projected into the future (residential consumption at 66 percent of total demand, see Table II-2). The projection which states that the existing and future water supplies in the Half Moon Bay subregion will accommodate a residential population of 24,780 (illustrated in Figure II-4) should be viewed with caution. Supply will probably not accommodate that level of population. As noted in the discussion of future demand scenarios, floriculture and recreational uses will be expected to increase in the subregion (particularly if Coastal Plan policies are implemented). Residential population capacity will be further reduced to the extent that recreation, coastal-dependent industries, and floriculture expand at a faster rate than residential development.

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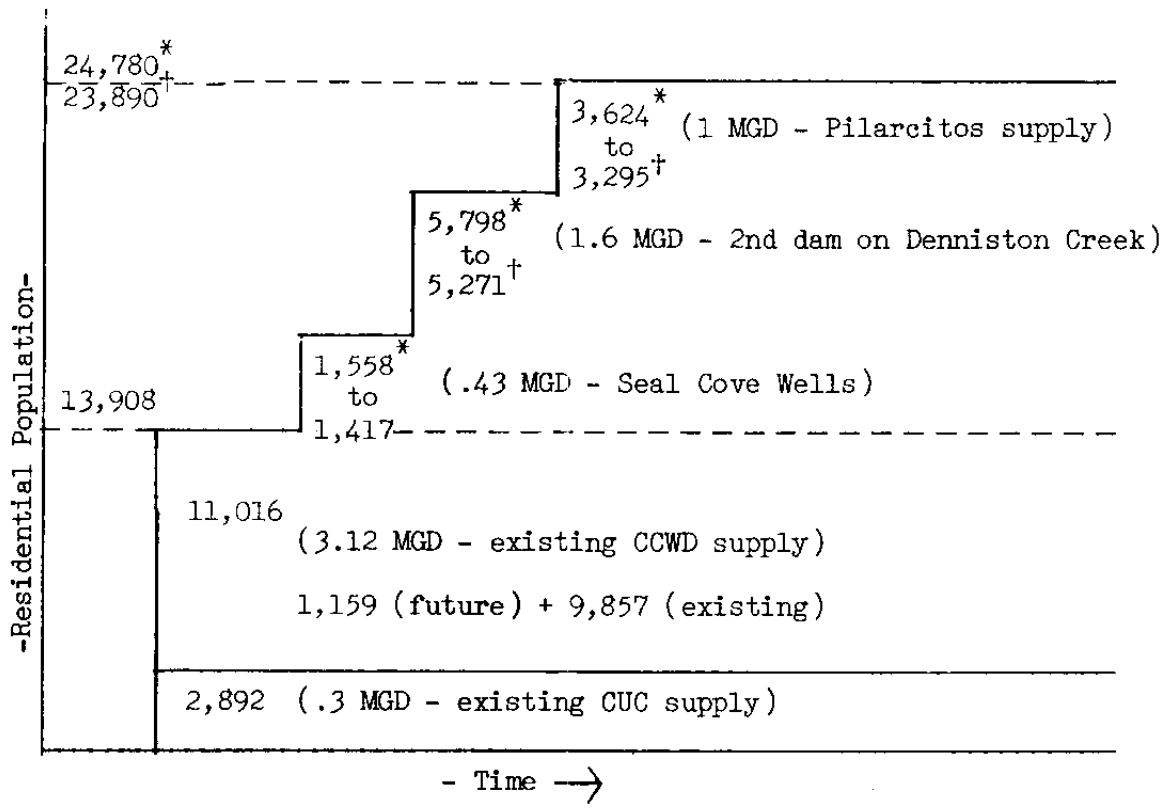
*Using a 550 GPD as the residential connection consumption standard and 3.02 as the residents per unit multiplier.

Figure II-4

Future Population in the Half Moon Bay Subregion
as a Function of Water Supply



*66% of supply allocated to residential consumption. 550 gpd per residential connection and 3.02 persons per residential unit.

†60% of supply allocated to residential consumption, 550 gpd per residential connection and 3.02 persons per residential unit.

Table II-4 illustrates the possibility of reducing the total additional supply of water available to residential development to 1.93 MGD by reserving supplies for future increases in public recreation, floriculture, commercial recreation, and coastal-dependent industry (in accordance with Coastal Act §30241, §30254, §30222). One-hundred-twenty-one-thousand gallons should also be reserved for governmental agencies since their activities have consistently accounted for 4 percent of the total peak use over the last four years.

Table II-4

Possible Allocation of Additional Water Supply

3.03 MGD	
- .50	- floriculture
- .30	- public recreation
- .30	- private recreation and coastal dependent industries*
- .12	- governmental agencies
1.81 MGD	

Allocating 1.81 MGD to future residential development means that residential peak demand for the additional water supply will account for only 60 percent of the total peak demand (compared to 66 percent of the total peak demand estimated for 1976--see Table II-2). An additional residential population of 9,939 can be served by a 1.81 MGD supply.† Figure II-4 indicates that a total residential population of 23,890 can be accommodated in the subregion if 60 percent of the additional water supply is allocated to residential development.

*The District Engineer's Summary Report for 1975 estimates that major commercial activities will account for 7 percent or .2 MGD of the peak demand in 1976. Private recreation activities (restaurants and motels) are the fastest growing component of commercial use.

†Using a 550 gpd rate per residential connection and a multiplier of 3.02 persons per residential unit.

CHAPTER III

WASTEWATER TREATMENT ALLOCATION AND DEVELOPMENT

From the policies in the Coastal Plan and the Coastal Act of 1976 it is possible to outline three analytical processes for relating coastal development to wastewater systems. A sequential procedure emerges from three different types of considerations and associated CCZCC policies regarding wastewater systems:

> 30254. New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division... Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.
>
> 30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff...
>
> Expansion of sewer service in areas with substandard treatment and disposal facilities shall not be permitted until adequate facilities are in operation. (7e) Upgrade existing municipal and industrial discharges. (7a) Phase out discharges to enclosed bays and estuaries. (7b)*

*Policy 7 of the Coastal Plan could be considered as a means of achieving Coastal Act §30231.

Population and development policies particularly relevant to the provision and expansion of sewer systems include:

> 30241. The maximum amount of prime agricultural land shall be maintained in agricultural production to assure the protection of the areas' agricultural economy, and conflicts shall be minimized between agricultural and urban land uses through all of the following: ...
>
> (d) By assuring that public service and facility expansions and nonagricultural development do not impair agricultural viability, either through increased assessment costs or degraded air and water quality.
>
> Consider recreation potential before allowing other uses of oceanfront land.* (Coastal Plan policy 132)
>
> 30222. The use of private lands suitable for visitor-serving commercial recreational facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development...
>
> 30255. Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland.
>
> Phase out discharges to enclosed bays and estuaries (7b)† ...and...require adequate treatment for new or enlarged discharges to other coastal waters. New or enlarged sewage systems and treatment plants discharging to other coastal waters shall meet present Federal requirements, and all wastes shall be treated sufficiently to maintain the natural quality of ocean waters and thereby to sustain optimum health populations of marine organisms (e.g., fisheries, kelp beds), and maintain human health and suitability, where appropriate for water contact sports. (76)†

A process for relating wastewater systems to coastal development is illustrated by Figure III-1. The various steps of the diagram are discussed in context with the Half Moon Bay case study. The data necessary to perform the analysis are outlined in Appendix B-3.

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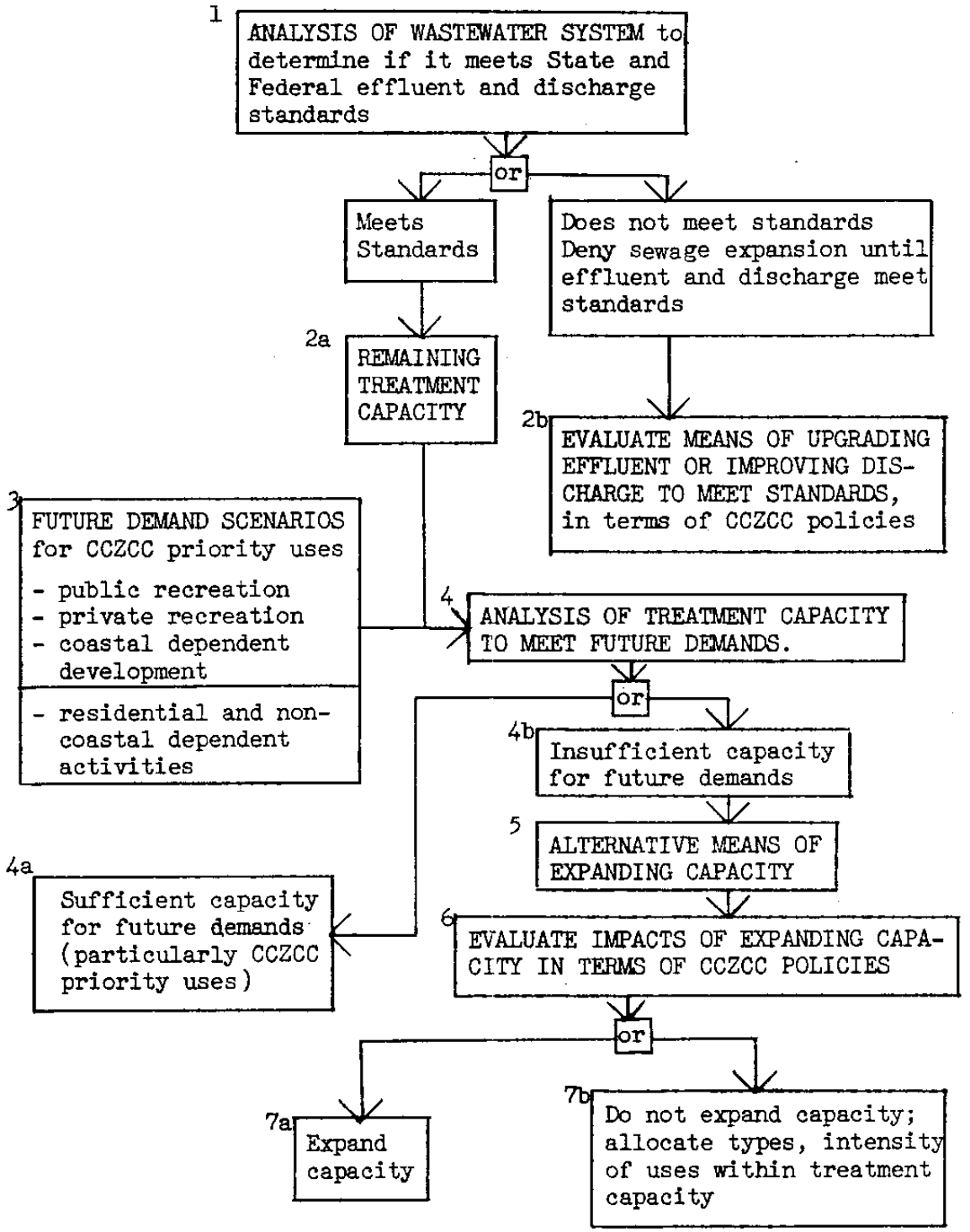
*This policy is considered as an extension of Coastal Act §30220 and §30221.

†These Coastal Plan policies could be considered as a means of achieving Coastal Act §30231.

Figure III-1

A Generalized Process for Applying the Coastal Commission Policies to Wastewater Treatment Allocation and Development



ANALYSIS OF WASTEWATER SYSTEMS

There are three wastewater utilities within the Half Moon Bay subregion: the City of Half Moon Bay, El Granada Sanitary District, and the Montara Sanitary District. Figure III-2 indicates the respective service limits of the three utilities. An extensive and prolonged study was conducted by a consortium of engineering consultants on consolidating, expanding, and upgrading the three utilities (Barrett and Asociates, 1974).

City of Half Moon Bay

The Half Moon Bay treatment plant was originally constructed in 1957 and was upgraded in 1973 with an extended aeration-activated sludge process.* Design capacity is 1.0 MGD for average dry weather flow and 3.5 MGD for peak wet weather flow.† Secondary treatment is given before ocean discharge. Construction has been funded by EPA for extending the present ocean outfall 1,000 feet offshore with a 200 foot diffuser at the terminus.+

The design capacity of the modifed outfall is 1 MGD. The outfall is located near the mouth of Pilarcitos Creek, in the center of Half Moon Bay (Figure III-3). The Department of Fish and Game has previously

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*Barrett and Associates. San Mateo County Mid-Coastside Supplemental Project Report, Phase I. October 1974. All figures on the alternative designs are from this report unless otherwise stated.

†Average dry weather flow - the average daily flow as recorded on days when the rainfall did not exceed 1/10 inch.
Peak dry weather flow - peak dry weather flow during a 24-hour period on a yearly average.
Peak wet weather flow - peak dry weather flow plus the peak infiltration recorded during a rainfall event on a yearly basis.

+State Water Resources Control Board standards prohibit discharge of treated wastes in areas of biologic sensitivity, within rocky bottom areas or within 1,000 feet of the shore (Reid, 1975).

FIGURE III-2

SERVICE BOUNDARIES OF WASTEWATER FACILITIES

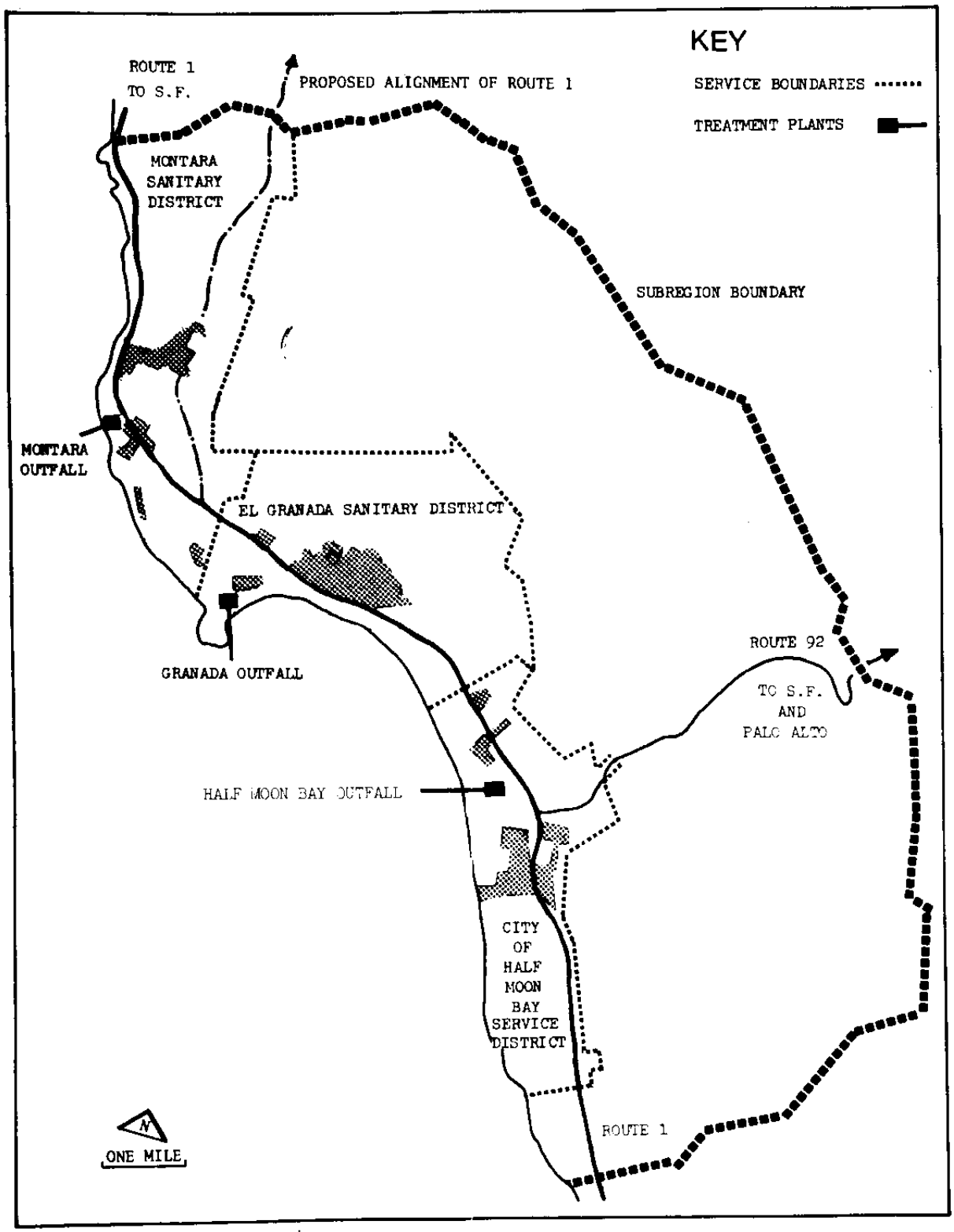
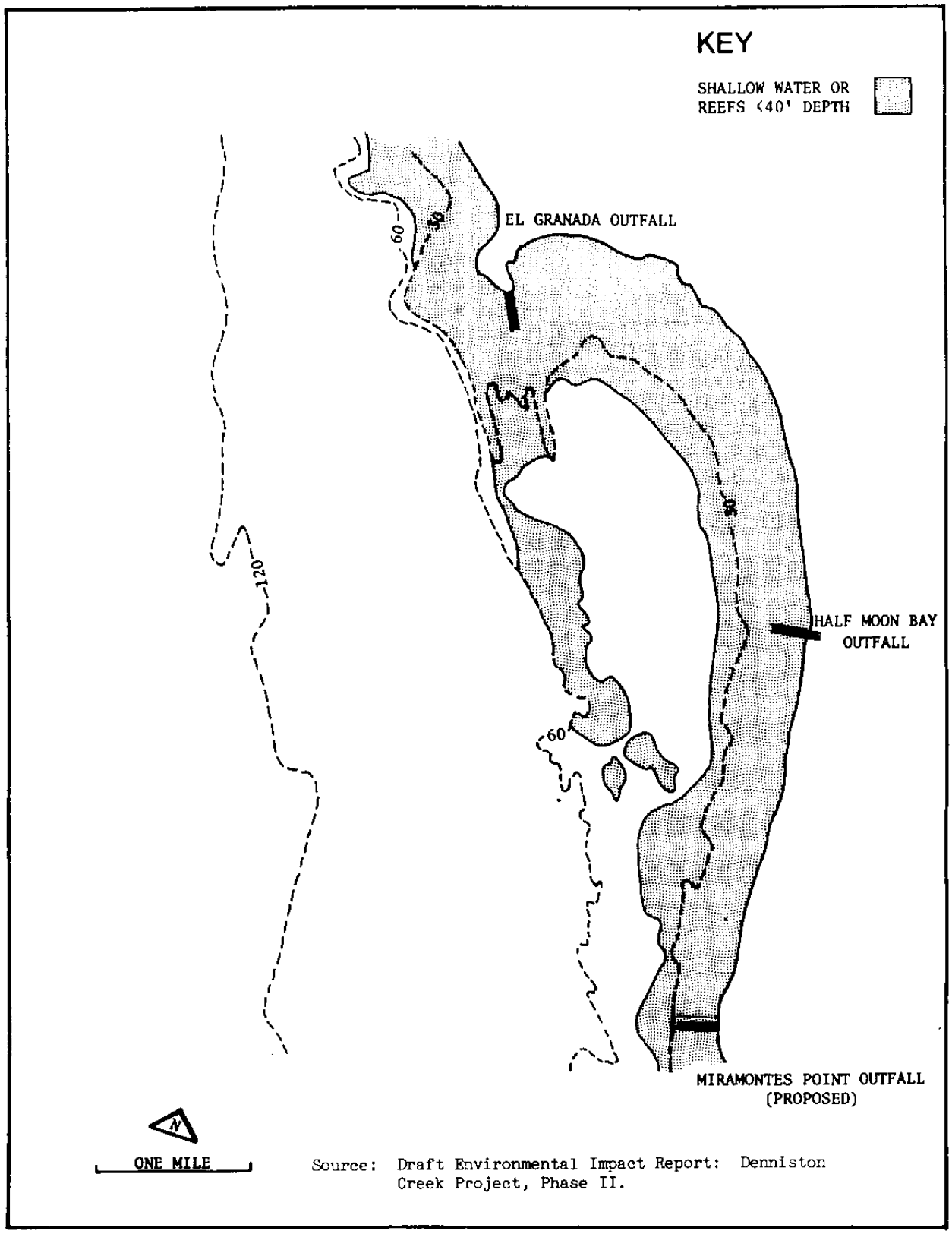


FIGURE III-3

HALF MOON BAY ENCLOSURE SHOWING WASTEWATER OUTFALLS



Source: Draft Environmental Impact Report: Denniston Creek Project, Phase II.

objected to shoreline pollution of discharges from the existing outfall. According to EPA the Half Moon Bay plant's effluent offshore discharge meets Federal and State ocean discharge standards.*

El Granada Sanitary District

The El Granada treatment plant was built in 1960. Design capacities of the plant are .3 MGD for average dry weather flow and 1.0 MGD for peak wet weather flow. The design consists of primary treatment and a discharge outside the west breakwater of Pillar Point Harbor. Chemicals are being added after primary treatment as a temporary measure to improve the quality of the ocean discharge. The addition of chemicals is an expensive and short-term operation until treatment can be upgraded by the construction of new facilities. Since neither present treatment of effluents nor the ocean discharge meet Federal or State standards, Coastal Plan policy 7e would not permit expansion of sewer service within the El Granada Sanitary District.†

Montara Sanitary District

The Montara treatment plant was built in 1962. Wastewater is given secondary treatment using the contact stabilization process. The design capacity of the plant is .5 MGD for average dry weather flow and

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*Bill Helpingstein, Environmental Protection Agency, Region IX, in an interview, October 17, 1975.

†It also should be noted that both the El Granada and Montara outfalls discharge in the vicinity of Fitzgerald Marine Preserve. The Preserve has been designated by the State Water Resources Control Board to be an "Area of Special Biological Significance." Discharge from these outfalls would appear to be in conflict with Coastal Plan policy 2 and Coastal Act §30230: "Special protection shall be given to areas and species of special biological or economic significance."

1 MGD for peak wet weather flow. The outfall extends 460 feet offshore from Point Montara. Proposals have been made to move the outfall to Montara Beach using 1,000 feet design to meet State standards. However, since the discharge is only 460 feet offshore and does not meet State standards, application of Coastal Plan policy 7e would not permit expansion of sewer service within the Montara Sanitary District.

REMAINING TREATMENT CAPACITY

In 1973 the loading of the Half Moon plant was approximately .3 MGD during average daily dry weather flow and 3.5 MGD during peak wet weather flow. The population within the service area in 1974 was estimated at 5,600 (Reid, 1975). The Half Moon Bay plant has the design capacity to treat another .7 MGD of wastewater during average daily dry weather flow.

It is estimated that the El Granada plant serves a population of 3,250 (Reid, 1975). Since the average dry weather flow is .2 MGD the plant has the capacity to accommodate another .1 MGD of wastewater.

The present loading of Montara's plant is approximately .2 MGD during peak daily dry weather flow and 1.3 MGD during peak wet weather flow. The Montara District serves a population of 2,850 (Reid, 1975). The facility has the capacity to treat another .3 MGD during peak dry weather flow. However, the peak wet weather flow exceeds the design capacity by .3 MGD, and therefore, Coastal Plan policy 7e could be applied to limit residential development to lots already serviced by sewers.

EVALUATE MEANS OF UPGRADING EFFLUENT OR IMPROVING DISCHARGE TO MEET STANDARDS

The three wastewater utilities in the subregion in a joint exercise of powers have selected Plan A (Reid, 1975), one of the seven alternative means of upgrading treatment and improving discharge proposed by the engineering consultants (Barrett, 1974). Alternative A would enlarge the existing primary treatment plant at El Granada to .5 MGD capacity secondary treatment facility. The facilities at Half Moon Bay and Montara would also be upgraded (but not enlarged). Three effluent pumping stations would carry treated wastewater to a common chlorination system which would discharge to an irrigation system for a local golf course or, during the rainy season, discharge at the existing outfall in Half Moon Bay or a new outfall near Miramontes Point.

Alternative A, selected by the three local utilities, differs from the alternative Plan F (Barrett, 1974) recommended by the Water Quality Control Plan, San Francisco Basin.* In Alternative F the treatment facilities at Montara and El Granada would be abandoned and a new 2.0 MGD secondary treatment facility would be constructed at Half Moon Bay. Treatment would be essentially the same as in Alternative A.

Wastewater reclamation potential, upgrading treatment, oceanfront location, and growth location emerge as the four major Coastal Plan policy areas distinguishing Alternatives A and F. Coastal Plan policy 8 states that:

> Reclamation and reuse of adequately treated wastewater... shall be fully considered as a preferred alternative to discharges into coastal waters as a desirable component of all water and wastewater management programs.

---

*State Water Resources Control Board, Regional Water Quality Control Board, San Francisco Bay Region. Water Quality Control Plan, San Francisco Bay Basin. April 1975.

This policy could be considered a direct extension of Coastal Act SEC. 15 g and §30231:

> 30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means...encouraging waste water reclamation....

According to the draft environmental impact report, Plan A, which includes a treated wastewater interceptor running the entire distance between Montara and Half Moon Bay, offers several advantages over Plan F for reclamation and land disposal (Reid, 1975).

However, Plan F offers a higher degree of treatment reliability than Plan A, since a failure of one small plant out of three is more likely than the failure of a single consolidated facility. The treatment reliability is important, not only in meeting effluent standards for ocean disposal, but also in a reclamation program where malfunction may result in economic damage to effluent users.

A regional plant proposed by Alternative F would be easier to upgrade if advanced treatment became necessary, either to meet additional disposal requirements (proposed by CCZCC or other agencies) or to implement an intensive wastewater reclamation program.

Abandoning the oceanfront plants at Montara and El Granada as proposed by Plan F would be encouraged by Coastal Plan policy 56:

> ...major public service facilities (such as...sewerage treatment facilities...pumping stations)...that do not require water or oceanfront locations shall not be located in the oceanfront area unless there is no less environmentally damaging alternative.*

---

*This policy is reinforced by Coastal Act §30255 on coastal-dependent development and §30251 on scenic qualities.

The draft EIR points out that growth patterns would be more flexible with Plan F. The design capacities of the three plants would allocate a 1:1:2 population ratio to El Granada, Montara-Moss Beach, and Half Moon Bay. This pattern of development may or may not be compatible with land use alternatives formulated by applying Coastal Policies. Policies on agriculture preservation and infilling the existing community may involve considerable density shifts in residential zoning within the subregion. The service district boundaries and associated capacities set by three separate facilities may not be compatible with the shifts in the density of residential development suggested by the Coastal Policies.

Ocean Outfall

A location for the outfall has yet to be recommended pending the outcomes of ongoing oceanographic surveys of Half Moon Bay. Both Alternatives A and F involve construction of a parallel pipe and diffuser next to the existing Half Moon Bay outfall (see Figure III-3). Miramontes Point to the south is being considered as an alternative site for an outfall. According to the environmental impact report:

> Potential impacts due to ocean disposal of the Half Moon Bay site include aesthetic problems at the beaches, potential health impacts due to recreational use of the Coastal area, disruption of shellfish in the northern Half Moon Bay area, contamination of benthic deposits and benthic organisms, and an inducement of algal or dinoflagelate blooms in the confined regions of the Bay. All these factors are likely to be more important north of the proposed outfall because there is greater potential for concentration of sewage effluent. There is generally low sensitivity throughout most of the remainder of the Half Moon Bay habitats. The primary impact of concern is that of aesthetic and health problems at the beach zones.

> To the south of the Half Moon Bay outfall lie several beaches and isolated reefs and rocky sections. At Miramontes Point, where the reefs become extensive and the coastline emerges from the protection of the Pillar Point reefs, the bottom characteristics change. The fine sands grade into course sands with loose large shell fragments. This substrate provides less opportunity for biological growth and benthic activity. There are also fewer beaches of recreational significance to the immediate south (Reid, p. 34).

Evaluating the impact of ocean outfall in context with Coastal Plan policies will have to await the findings of the oceanographic survey and the subsequent proposal for an ocean discharge facility. Coastal Plan policies (6 and 7 in particular) and Coastal Act SEC. 15 could be used to evaluate the impacts of an ocean outfall proposal.

Given the potential adverse impacts of ocean disposal, wastewater reclamation and/or land disposal would be encouraged by Coastal Plan policies. The demand for reclaimed wastewater is critically assessed by the environmental impact report.

> This project proposes reclamation of a portion of the treated wastewater for irrigation as a disposal alternative. One obvious benefit of reclamation is that it reduces ocean discharge, but under present conditions, the effectiveness of this alternative is limited and major reduction in ocean discharge will not be achieved in the near future.
>
> There are three types of potential use for the Mid-Coastside: lawn or landscape irrigation (inedible crops), floriculture irrigation, and intensive agricultural irrigation (truck crops). Lawn or landscape irrigation is the most feasible in terms of cost and poses the fewest problems from a public health standpoint....The demand for this water and hence its usefulness as a disposal technique is restricted to the summer dry season.
>
> Floriculture irrigation is unlikely at present because potential buyers are unsure of the effects of standard 2 percent effluent on their products. Without a demonstration project, the reluctance to incur the capital cost of a distribution system and

> fear of fluctuations in water quality or quantity may not offset the economic incentive of cheaper irrigation water ($.23/1,000 gallons versus $.81/ gallons for CCWD water now purchased).
>
> Intensive agricultural use of treated wastewater is highly unlikely in the foreseeable future. All truck crop farming on the Mid-Coastside is now economically marginal and its continuance is in part dependent on the availability of ample private water supply at minimal cost. Even at $.23/1,000 gallons, the growers could not afford to purchase the wastewater. Crop irrigation is also seasonal and would require winter ocean disposal. There is also the problem of the effect of the wastewater on the crops themselves. Insufficient chlorination can lead to the problem of bacterial contamination of an edible crop. Occasionally inadequate dechlorination (due to plant malfunction) can cause foliar burning. There are also the problems of build-up of dissolved solids in the soils, possible hardening of clay soils due to sodium ions, boron toxicity to certain sensitive crops, and algal formation in water distribution systems, permitted by nitrate and phosphate if the effluent is stored under light conditions. The nitrate and phosphate in the waste stream do have positive value in that they partially replace existing needs for fertilizer (Reid, 1975, p. 10).

The priority placed on wastewater reclamation by the Coastal Plan and Coastal Act §30231 suggests that the Commission would stipulate that a demonstration project be conducted on the feasibility of wastewater use by floriculture prior to the upgrading or consolidation of existing plants (as proposed by either Plan A or F) and the construction of a second ocean outfall.

FUTURE DEMAND SCENARIOS

Improvements of Routes 1 and/or 92 will accelerate the transformation of the subregion to a regional recreation destination. Chapter V, "Land Use and Recreation Alternatives" (Table V-13), estimates potential peak beach day use at 42,800 when all recreation facilities are fully developed. The impact statement for Pillar Point Harbor estimates peak day use of

5,700 visitors* (EIS. Pillar Point, 1972). There are also plans to develop a 593-unit overnight camper area (California Dept. of Parks and Recreation, 1975-1976).

Using Department of Parks and Recreation criteria of 5-10 gpcd for day visitors and 25-50 gpcd for campers (Muldavin, 1976), at least .3 MGD of wastewater treatment capacity should be reserved for recreation use.

There are no specific projections for private recreational development in the subregion.† Presently, there are a number of bars and restaurants that cater to tourists. Plans for a 52-unit motel have recently been approved. Recent plans for Pillar Point Harbor development propose leasing sites for restaurants, hotels, and tourist retail shops.

The development of Pillar Point Harbor may also attract coastal-dependent industries such as fish-processing operations and boat-repair yards. No estimates exist on coastal-dependent industries' generation of wastewater. Coastal Plan policy 8f and Coastal Act SEC. 15(4) state that all industries be required to pretreat toxic and hard-to-treat substances at the source if such substances would be incompatible with effective and economical treatment in municipal plants.

Future wastewater generation by recreation and coastal-dependent development should be estimated by the Half Moon Bay sewerage utilities

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*However, Pillar Point Harbor is within the El Granada Sanitary District, and therefore would not develop until the inadequate treatment and discharge situation is corrected (Reid, 1975).

†In Chapter II on Water Supply in the Half Moon Bay Subregion it was estimated that 7,000g was the average peak daily use and 1,330g was the average daily water use for the 60 commercial connections. It is assumed that in many cases, such as restaurants and lodging (without extensive lawns and pools), that domestic water consumption will be converted into an equivalent volume of wastewater.

in order to prevent future residential development from preempting the treatment capacity necessary for expansion of these priority uses within the subregion.

ANALYSIS OF TREATMENT CAPACITY TO MEET FUTURE DEMANDS

The remaining average daily dry weather treatment capacity for the subregion is 1.1 MGD* if the Montara plant's peak wet water flow treatment capacity is improved to meet state and federal standards. Applying the Coastal Act's policies on priority of recreation and coastal-dependent use (§30220, §30221, §30223, §30254) suggests that at least .3 MGD should be reserved for recreation and coastal-dependent industries. If .3 MGD is reserved for recreation and coastal-dependent industry, the remaining treatment capacity in the Half Moon Bay subregion to accommodate a residential population increase is approximately .8 MGD. Estimating the number of additional residents that could be served by the remaining .8 MGD capacity depends on the selection of a rate of wastewater generation per capita per day. The engineer consultant's report states:

> It is expected that per capital flows will continue their gradual upward trend and reach 100 gpcd by the year 1995....It is expected that per capita flows will level off after 1995 at an average flow of 100 gallons per capital per day for the entire region (Barrett, 1974).

Using 100 gpcd as a rate, .8 MGD capacity is sufficient to serve a residential population addition of 8,000. The draft environmental impact report on the Mid-Coastside Wastewater Management Plan used a rate of 70 gpcd to estimate future residential population (EIS, Pillar Point,

---

*City of Half Moon Bay's .7 MGD, Montara's .3 MGD, and El Granada's .1 MGD.

1972). Seventy gpcd is the present rate of wastewater generation. Using a 70 gpcd rate, .8 MGD capacity is sufficient to serve a residential population addition of 11,428. Assuming the present population served by the three utilities is approximately 11,700, the existing capacity of the treatment plants is sufficient to accommodate between 19,700 and 23,128 residents in the subregion (see Figure III-4). To further complicate the population estimates, the 8,000 to 11,400 increase must be divided among the three sewerage districts and the supply of developable lands. Until the Montara and El Granada treatment and disposal facilities meet state and federal standards, non-sewered areas within these districts should not be included in calculations of residential development potential.

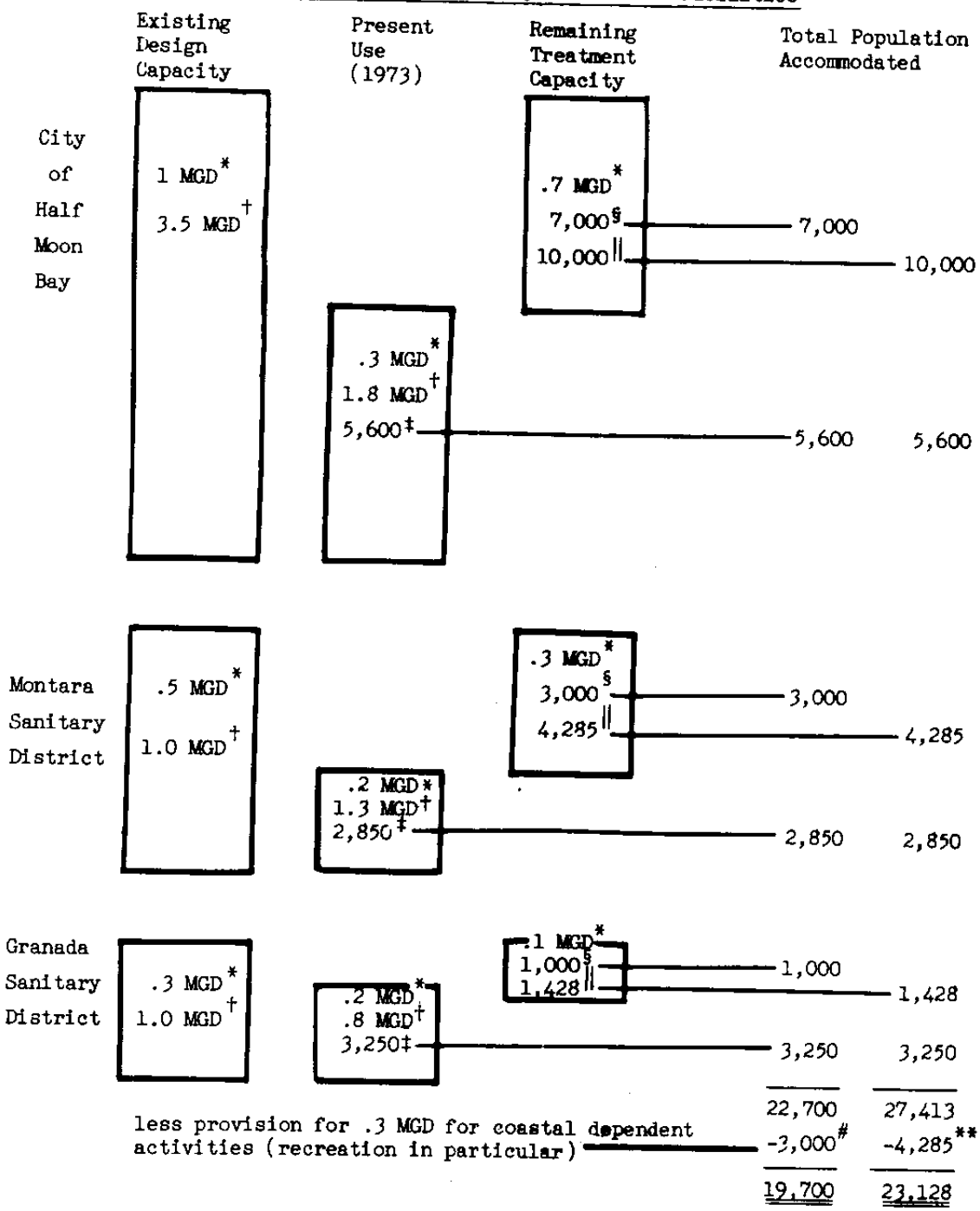
ALTERNATIVE MEANS OF EXPANDING CAPACITY

Plan A recommended by the environmental impact report (Reid, 1975) as well as the five other alternatives considered by the engineering report (Barrett, 1974) propose a .2 MGD increase in the subregion's wastewater treatment capacity from 1.8 MGD to 2.0 MGD. The .2 MGD added capacity converts into a 2,000 residential population increase using a 100 gpcd rate, or a 2,857 residential population increase using a 70 gpcd.

Expansion of the treatment capacity will depend in part on the population projections (termed E-Zero) made by the California Department of Finance (DOF). If a wastewater agency plans for facilities in excess of those required to meet the E-Zero population projections for the area, that excess capacity is not deemed eligible for 87½ percent State-Federal funding. E-Zero projections are 11,500 for 1976, 13,500 for 1986, and 14,600 for 1996. The residential growth accommodated by a 2 MGD treatment capacity (assuming application of Coastal Act and Coastal Plan

Figure III-4

Population Accommodated by Wastewater Facilities



*Average dry weather flow

†Peak wet weather flow

‡1974 population served within utility district

§Assuming a rate of 100gpcd

‖Assuming a rate of 70gpcd

#.3 MGD ÷ 100gpcd

**.3 MGD ÷ 70gpcd

priority of use policies) ranges between 21,700* and 25,985† (see Figure III-5). The 1996 E-Zero projection is 14,600 or 7,100 below the population service capacity of the Plan A alternative.

Expansion of treatment capacity in excess of DOF population projections must be funded in full by the local utility. If expansion of the wastewater system is considerably greater than the size eligible for funding by the Clean Water Grant Program, increased property assessment within the districts to pay for the excess capacity may force conversion of marginally economic agricultural lands. Futhermore, development that would be accommodated by the additional treatment capacity may encroach on agricultural lands, thereby restricting farming operations. Either effect may be in conflict with Coastal Plan policies 30, 33, 34, and 35 as well as policy 37:

> New development, land division, or the formation of urban assessment districts shall be allowed adjacent to agricultural lands only if the type of use proposed will not interfere or conflict with continued agricultural use and the development is designed to avoid conflict with the farming practices...and it will not have an adverse economic effect on the long-term preservation of agricultural lands. (37)‡

A convincing argument might be made to increase the sewage capacity of the El Granada Sanitary District, assuming secondary treatment, by .2 MGD (as proposed by Plan A) in order to accommodate the development of Pillar Point Harbor, associated recreational facilities, and coastal-dependent industry.

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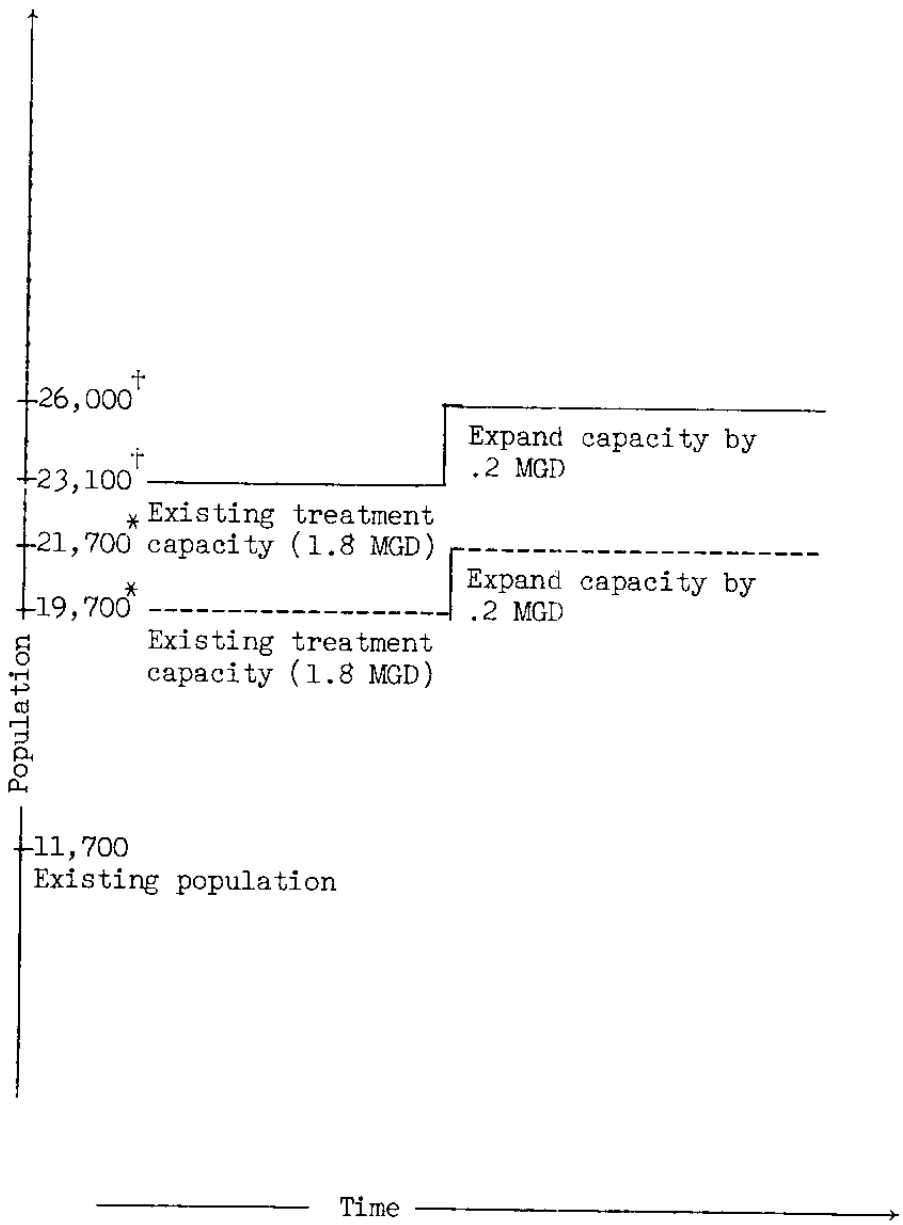
*100 gpcd

†70 gpcd

‡This policy is an extension of Coastal Act §30241.

Figure III-5

Future Population in the Half Moon Bay Subregion as a Function of Wastewater Treatment and Capacity



*100 gpcd

†70 gpcd

EVALUATE IMPACTS OF EXPANDING CAPACITY IN TERMS OF CCZCC POLICIES

Potential changes in the type, mix, intensity and distribution of land use induced by the additional .2 MGD wastewater treatment capacity must be estimated before a specific evaluation can be made of the impacts. Neither the consulting engineer's report nor the draft environmental impact report describes potential changes in terms of types, densities, and geographic distribution. This is due in great part to the failure of both the County and the City of Half Moon Bay to adopt a specific land use plan for their respective jurisdictions. The impact statement describes the land use changes in brief general terms. For example, the EIR states that:

> ...although development will not take prime agricultural land exclusively, there is nonetheless a significant threat to mid-coastside posed by the degree of residential growth anticipated by this project (Reid, 1975).

The State Water Resources Control Board's comments on the draft EIR recommended that the final EIR:

> ...contain a map or maps showing as accurately as possible where the growth to be accommodated by the recommended project will occur.*

Appendix E-2 is a framework of major impacts in context with Coastal Plan policies associated with expanding capacity.

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*California State Water Resources Control Board, "Review of Draft Environmental Impact Report (EIR)", State Clearinghouse No. 75090824 for San Mateo County Mid-Coastside Wastewater Management Plan, Project No. C-06-1022. September 30, 1975.

CHAPTER IV

TRANSPORTATION DEMAND AND CAPACITY ESTIMATION

A process for the development and allocation of transportation facilities has been devised which is consistent with the Coastal Act and Coastal Plan policies. The process is illustrated by Figure IV-1. Steps 1 through 9 correspond to the Coastal Plan policies listed in Appendix F. The data used in this analysis is described in Appendix B-4.

The scope of this analysis will be limited to the consideration of public transportation facilities including major arterials, recreational parking, and transit. The first aspect to be investigated will be the ability of a highway network to support a level of population based on an analysis of commute trips. The second phase of the analysis concerns the ability of existing highway facilities to support weekend recreational visitors from outside the subregion and local resident trips within the area.

EXISTING HIGHWAY CAPACITY

The Half Moon Bay subregion is served by two major two-lane highways: Route 1 (north/south) along the coast and Route 92 (east/west) connecting the subregion with the San Mateo Bayside area (see Figure IV-2). The amount of subregional population which can be served by these highways is measured by the relationship between highway capacities

Figure IV-1

A Generalized Process for Applying the Coastal Commission Policies to Transportation Demand and Capacity Estimation

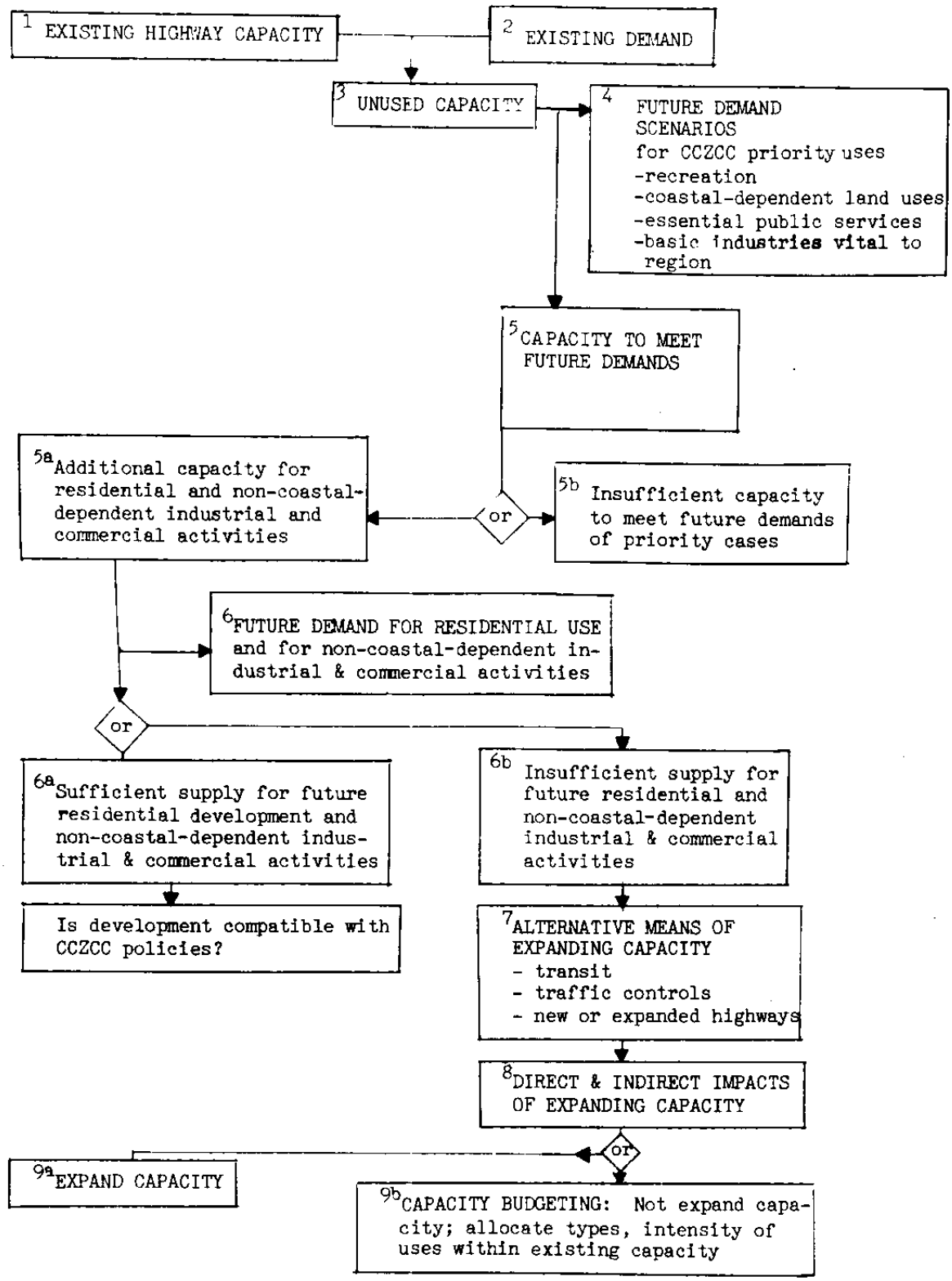
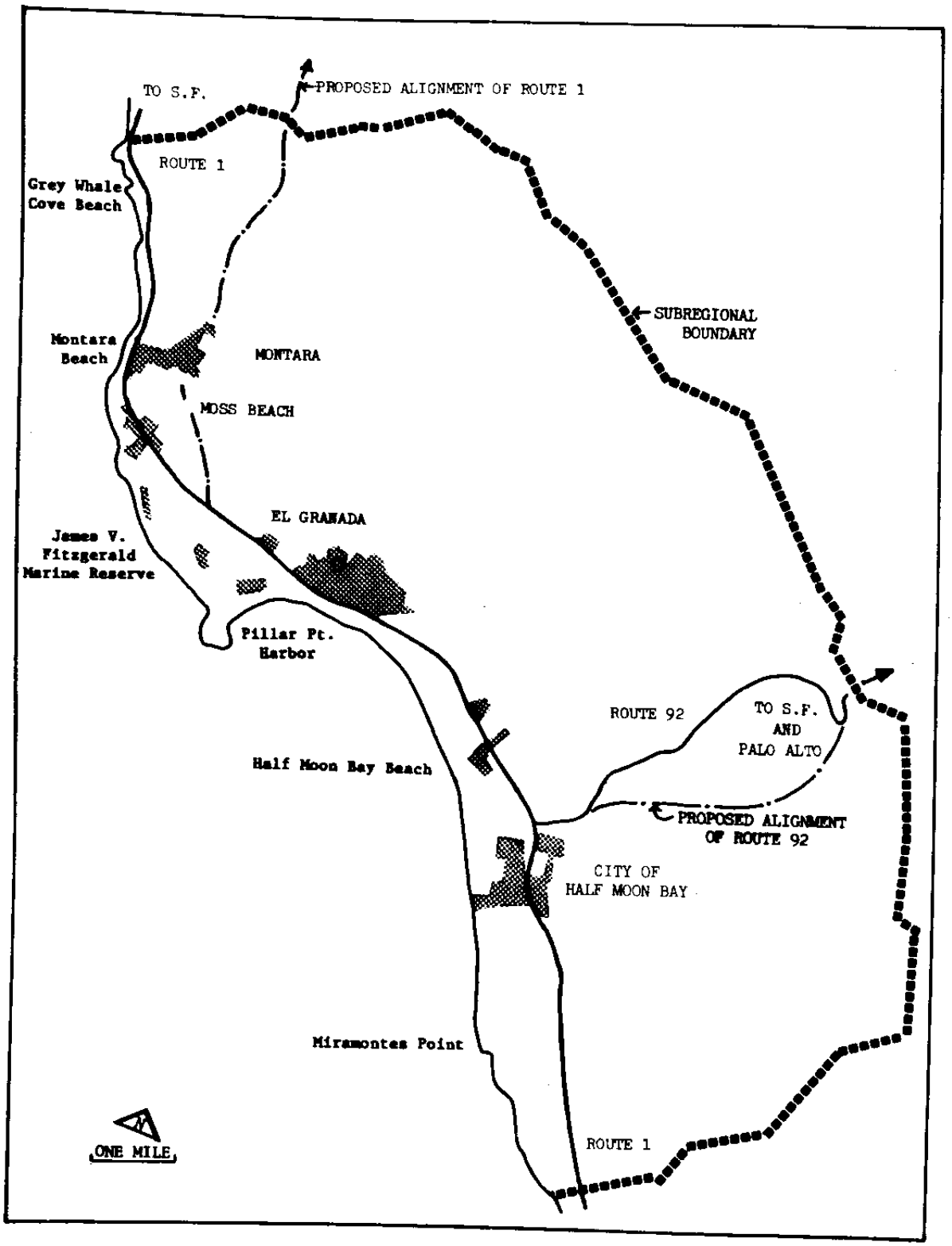


Figure IV-2

Major Highways and Shoreline Attractions



and the proportion of the population which commutes out of the subregion during the rush-hour period. This relationship is expressed in the model:

$$\text{population} = \left[\frac{\#\text{ of residents}}{\#\text{ of commuters}}\right] \times \left[\frac{\#\text{ of commuters}}{\#\text{ of rush-hr. comm.}}\right] \times \left[\frac{\#\text{ rush-hr. comm.}}{\#\text{ of vehicles}}\right]$$

$$\times \left[\frac{\#\text{ of vehicles}}{\#\text{ of peak hrs.}}\right] \times \{\#\text{ of peak hours}\} \times \{\text{competition factor}\}$$

Previous approaches to determining population in this manner, such as the ABAG/MTC analysis for the San Mateo Coast Corridor,* have employed a single number of each of these factors in order to arrive at one estimate of population supported by the highway network. The rationale for defining a range of factors instead of using a single number is based upon the large number of assumptions needed to make the estimates. Thus the range represents a more realistic appraisal of the possible outcomes. The approach used here produces a range in population from a spectrum of likely values for each factor. The procedure is similar to sensitivity analysis or the calibration of large-scale models used in several regional modeling efforts.

In establishing the range of values for each factor it is assumed that the most likely values occur on the middle of the distribution range of each variable. The most likely resulting population will therefore be produced through the use of these mid-range values in the above equation.

Estimating the Variables in the Model

The six variables of the model are:

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*Norman Steinman, "Analysis of Transportation Capacity and its Effect on Population Growth." Prepared for San Mateo Coast Corridor Study, ABAG/MTC Joint Planning Program, Berkeley, May 15, 1975.

The residents per commuter ratio. There are two approaches for determining the resident per commuter ratio. The first, as shown in Table IV-1, uses population and journey-to-work data from the 1970 U.S. Census. This indicates a range from about 3.0 to 5.5.

The second approach uses a relationship derived for the ABAG/PLUM methodology, defined as follows:

$$\#\ \text{residents/commuter} = \frac{\text{total area residents}}{\text{local residents employed out of area}}$$

$$= \frac{\text{total area residents}}{\text{total employed residents} - \begin{matrix}\text{local residents}\\ \text{locally employed}\end{matrix}}$$

$$= \frac{\text{total area residents}}{\text{total employed residents} - \text{total locally employed}\left(1 - \frac{\begin{matrix}\text{outside residents}\\ \text{local employed}\end{matrix}}{\text{total locally employed}}\right)}$$

$$= \frac{1}{\left(\frac{\text{total empl. res.}}{\text{total area res.}}\right) \times \left[1 - \frac{\text{total locally empl.}}{\text{total empl. resid.}}\left(1 - \frac{\text{out. res. loc. emp.}}{\text{total local empl.}}\right)\right]}$$

The ABAG/MTC analysis used this approach to derive a resident per commuter ratio of 2.6 (Steinman, 1975). This was then amended to 2.3 to reflect a predicted decline in household size from 3.6 (1970 Census figure for the San Mateo Coast corridor, including Pacifica) to 3.2 in 1990, that is, $\frac{3.2}{3.6} \times 2.6 = 2.3$ residents per commuter (Steinman, 1975).

Whether one uses 2.3 or a value from Table IV-1, it appears that there is a wide range of values for the number of residents per commuter. In an attempt to estimate likely values for this factor, the areawide value of 2.6 found in 1970 census figures for the San Mateo

Table IV-1

1970 Population and Person-Work Trip Analysis for the Half Moon Bay Subregion

Census Tract	Geographical Area	Population	# of Person-Trips to Work	Unidentified Trips	# of Residents Commuting out of Subregion*	# of Local Person Trips†	Total Resident to Commuter Ratio
6135	El Granada & Inland Region	2,699	1,247	169	867	380	3.12‡
6136	Montara, Moss Beach, Pillar Point	2,811	1,131	323	717	414	3.92
6137	Half Moon Bay	4,023	1,375	328	735	640	5.47
Subregion	All of Above	9,533	3,753	820	2,319	1,434	4.11

*1970 journey to work - U.S. Census/Federal Highway Administration data. From ABAG/MTC's "Travel Patterns Analysis for the San Mateo Coast Corridor Evaluation," by Nancy Hammond, March 20, 1975.

†Unidentified trips (trip destination unidentified) were divided between commute trips out of the subregion and local trips.

‡e.g., 2,699/867 = 3.12

Coast corridor is the most representative for the area as a whole. A "middle" value of 3.5 is therefore selected from a range of 2.0 to 5.5 for the resident per commuter factor.

The rush hour commuter ratio. The BATSC* survey conducted in 1965 indicated that only .70 of all work trips occur during the peak period. The ABAG/MTC study uses this figure as well as a .8 peak period travel figure in the analysis of the mid-coast subarea (Steinman, 1975).

In the following analysis, a low of .60 and a high of .90 peak period trips are considered as a likely range. Their reciprocal values (1.66 and 1.11) are shown in Table IV-2.

The number of rush hour commuters per vehicle ratio. This ratio was found to be 1.18 in the BATSC study, 1969. From the 1970 Census for census tracts 6135, 6136, and 6137, which correspond roughly to the Half Moon Bay subregion, the ratio of drivers and passengers to drivers for all work trips is 1.12. ABAG/MTC uses a value of 1.25 (Steinman, 1975). However, this factor is very sensitive to increases in the price of gasoline. In addition, local authorities such as bridge districts and state and national agencies realize that one effective way to encourage energy conservation is by penalizing single passenger vehicles through differential toll rates, and/or a mass media campaign to encourage the formation of car pools. Every indication is that these measures which reduce the number of commuters per vehicle will prove successful. Therefore, the range of values considered is between 1.10 and 1.40 to account for the possibility of increased carpooling.

*Bay Area Transportation Study Commission. Bay Area Transportation Report. Berkeley, May 1969.

The number of vehicles per peak hour ratio. This factor is more commonly known as the "one-direction peak hour road capacity." Road capacities can easily be determined by a method described in the Highway Capacity Manual when actual highway capacities cannot be determined by traffic counts.* The procedure holds that road capacity is dependent upon:

1. the number of lanes
2. lane width
3. side clearance
4. sight distance
5. percent of trucks using the road
6. type of terrain the road passes through

Road capacities are determined for different levels of service, from "A" (light traffic) to "E" (full capacity). Since a population forecasting method based on road capacities is measured by peak range during the rush hour, level "D" or "E" is most often employed. Depending upon whether capacity estimates "D" or "E" or observed counts are used, the range of one-direction peak capacity will vary from 1,100 to 1,400 vehicles per hour for Routes 1 and 92. Thus the peak number of vehicles which could leave the area in one hour with the existing highway network will vary from 2,200 to 2,800.

The number of peak hours. Transportation studies like BATSC use a peak period of two hours. And since major transit operators also use this figure, it seems that this one is the least variable. For the purposes of this analysis a variable range of 1.75 to 2.25 for number of peak hours is a reasonable approximation.

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*Highway Research Board. Highway Capacity Manual. Washington, D.C., 1965.

Capacity competition. Competition for roadway capacity occurs on a link connecting a subregion to the regional highway network. From a theoretical standpoint, the traffic on each link in the regional network will affect the level of service on every other link. However, the effect on population growth in a subregion is assumed to be affected solely by growth of those other subregions which are connected to the major highway grid by the same link. That is, two or more subregions connected to the regional grid along a common link will compete for its capacity.

The highway system linking the subregion to the surrounding area will probably be subject to other travel patterns at the same time that subregion commuters go to and from work. This competition for highway capacity can take two forms. First, local work trips will compete for capacity within the subregion. This may limit the number of, or increase the level of congestion for commuters who choose to leave the subregion during the peak hours. Second, communities outside of the subregion may use the same arterial link for commute trips, thus competing for capacity and lowering the number of subregional commuters who can use the link per hour during the peak period.

In the view of the subregional commuter, it appears that if one of these forms of competition occurs, it will not matter whether a second pattern occurs, because either case will result in capacity competition. Therefore, one figure, the proportion of subregional commuters to total users of the link measured either in or out of the subregion at its lowest point, could be used as a capacity competition factor.

Of course, it is not easy to estimate capacity competition, since this figure is partially dependent upon the accuracy of measures of the growth rates of other subregion communities using the link. Since adjacent communities will probably grow at different rates, the degree of accuracy of the capacity competition estimates will vary over time and geographic area. The ABAG/MTC study mentions this problem when considering the growth rates of Pacifica and the Half Moon Bay subregion and the proportionate use of Route 1 by commuters (Steinman, 1975). The study implies that any growth in Pacifica will affect the allowable growth in the Half Moon Bay subregion.

In addition, if Pacifica grew at a higher rate than the subregion, the competition for the use of Route 1 would increase. But when faced with this situation the subregional commuter could simply use Route 92 to avoid the congestion.

Therefore, at the present time the capacity factor is not easily estimated. A value of "1.0" indicates no competiton, while values approaching zero indicate heavy congestion. For this analysis, competition factor values of 1.0 and 0.75 are considered.

Computed Population

Since each variable can have different values assigned to it, a range of values will be used to compute population. Four variables are multiplied to produce a capacity factor: the product of residents per commuter ratio, commuter per rush hour commuter, the rush hour commuter per vehicle and the number of peak hours. Different populations are then derived for high, medium, and low capacity factors and road capacities and for the no-competitcn and some-competition conditions as shown in Tables IV-2 and IV-3.

Table IV-2

Summary of Estimates for Each Factor

	High	Medium	Low	ABAG/MTC
Total Capacity Factor (=a x b x c x d)	28.8	11.64	4.27	8.2
a. Residents per commuter	5.5	3.5	2.0	2.3
b. Commuters per rush hour commuter	1.66	1.33	1.11	1.438
c. Rush hour commuter per vehicle	1.40	1.25	1.10	1.25
d. Number of peak hours	2.25	2.0	1.75	2.0
Total maximum single lane capacities --Routes 1 and 92 (e x 2 roads)	2800	2500	2200	2800
e. Maximum single lane capacities (one way per hour)	1400	1250	1100	1400
Capacity competition	1.0		.75	(1.0)*

*Not considered as variable

Table IV-3

Number of Residents in the Half Moon Bay Subregion for Various Total Road Capacities, Capacity Factors, and Capacity Competitions

Local Trip Competition	Capacity Factor	Total Road Capacity* (in vehicles/hour)		
		2200	2500	2800
No Competition (1.0)	High	63283	71912	80542
	Medium	25608	29100	32592
	Low	9402	10675	11956
Some Competition (.75)	High	47453	53934	60407
	Medium	19210	21829	24445
	Low	7052	8006	8967

*Into or out of the subregion during "rush hour" on the existing network.

EXISTING DEMAND

Existing Work Trips

The potential local population analysis is based upon the number of work trips commuting out of the subregion. Table IV-1 shows commute trips as well as local work trips. A total of 2,319 residents commuting out of the subregion corresponds to approximately 1,299* vehicles leaving the subregion during a two-hour peak period.

On June 28, 1974, 1,700 vehicles left the area during a two-hour morning commute period (CALTRANS, 1974). The difference between the 1970 and 1974 figures may be attributed to population growth which has increased from 9,500 to approximately 12,000, a net gain of 20.8 percent,† while the estimated commute trips has grown by 23.6 percent.‡

If the above mentioned 1,700 two-hour commute trips support a population of 12,000 persons, then the subregion resident to commuter ratio is four residents per commuter§ (see Table IV-1). And this ratio is within the proposed range of two to five.‖

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*$(2,319/1.25) \times 0.7 = 1,299$

†$\frac{(12,000 - 9,500)}{12,000} \times 100 = 20.8\%$

‡$\frac{(1,700 - 1,299)}{1,700} \times 100 = 23.6\%$

§$\frac{12,000}{(1,700/0.7) \times 1.25} = 4$

‖It is interesting to note that as the population of the subregion increases, the relative proportion of commuters may also be increasing thus lowering the residents per commuter factor. This change could be interpreted as a measure of "suburbanization" of the previously rural community. The suburbanization of the Pacifica subregion appears to have already taken place as reflected by the 2.6 residents per commuter ratio calculated using 1970 census figures.

Unfortunately, there are not sufficient data to determine with certainty the distribution of local work trips within the subregion. Table IV-1 shows that in 1970 an estimated 3,753 person work trips were made each day in a population of 9,533 persons. If it is assumed that the proportion of local work trips is the same in 1974 as it was in the 1970 estimate, then the corresponding number of local work trips is 1,865* or 1,399† vehicles in a two-hour period. If it is assumed that half of these vehicles traveled along Route 1 and half on Route 92 in a one-hour commute period, representing highest possible capacity; then according to the June 28, 1974 data (where the peak hour number of commuters leaving the region was 623 on Route 92 and 295 on Route 1), the corresponding traffic volumes on Routes 1 and 92 would be 1,323‡ and 918‡ respectively.

Existing Recreation Trips

Recreational attractions in the Half Moon Bay subregion include Gray Whale Cove, Montara, and Half Moon Bay State Beaches, Pillar Point Marina, the Fitzgerald Marine Reserve, and other facilities such as vegetable stands and gift shops.

The important factor to be considered is the occurrence of a peak recreation day and its accompanying effects on the subregion. Peak recreation days may occur at any time from March through October, depending on where the day falls on the calendar and on the weather.

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*From Table IV-1: $\frac{3753 - 2319}{9533} \times 12{,}000 = 1{,}865$

†$1865 \times \frac{.75 \text{ rush hour commute trips}}{\text{commute trips}} = 1{,}399$

‡$623 + \frac{1{,}399}{2} = 1{,}323$; $295 + \frac{1{,}399}{2} = 918$

A warm holiday period such as spring vacation for schools or a hot weekend may result in peak recreation visits to the Half Moon Bay subregion.

On a peak recreation day most recreationists enter the subregion by auto. But many other recreationists will pass through the area, heading for beaches farther south. Limited data is available for the analyses of these trips, but the following estimates of recreation travel have been made* (CALTRANS, 1975).

On a peak recreation day it was estimated that 67 percent of the traffic coming into the subregion on Route 1 was recreation oriented, and 30 percent of that traffic passed through the subregion on the way to areas farther south such as Pescadero, Pomponio, and Año Nuevo. It was estimated that 75 percent of the traffic entering the subregion on a peak recreation day on Route 92 was recreational and that 30 percent of that traffic would pass through the area.

On July 4, 1974, approximately 10,000 trips were made into or through the subregion. This would indicate that approximately 30,000 persons entered the subregion on that day. According to the estimates developed in this study, 12,420 of the person-trips were to recreation areas in the subregion. This figure corresponds to the California Department of Parks and Recreation and San Mateo Parks and Recreation figures for the same day of approximately 12,100 visitors to State beaches and 515 visitors to the Fitzgerald Marine Reserve.

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*Two-way traffic counts were taken at four locations for a one week period on or about July 4, 1974. In addition, license plate surveys of cars at the subregion beaches were taken during August 1972 and May 1975. State Beach usage data is available from California Department of Parks and Recreation.

What has not been measured is the proportion of recorded recreationists who are local and the proportion of out-of-area recreationists who participate in non-recorded activites such as sightseeing and hiking. Neither traffic nor recreational data is divided into local/visitor categories. It is possible to estimate that on a peak recreation day in 1974, 14,000 recreationists participated in various activities in the subregion.* Approximately 12,500 of these arrived by car from outside the area and the remainder were local.

Other variables which may complicate the analysis include the probability that many locals drive to beach facilities, and that out-of-area visitors participated in non-recorded activities (i.e., sightseeing, boating at Pillar Point).

An ABAG analysis estimates that on July 4, 1975 there were 1,424 cars at Half Moon Bay Beach at one time (Steinman, 1975). The overflow from the 510 space parking lot extended to nearby streets and private lots. The data indicates that the available parking was also exceeded on this date in 1974, as shown in Table IV-4. On this day, 4,041 vehicles were counted at the beaches. This means that 1,347 to 2,693 cars were there at any one time depending on the turnover rate† (3.0 or 1.5).

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*The Pumpkin Festival is considered to be an atypical event. On October weekends preceeding Halloween as many as 50,000 people may visit the City of Half Moon Bay.

†The turnover rate indicates the hypothetical number of persons who would use the facilities designed for one person in one day.

Table IV-4

July 4, 1974 Vehicle Parking Estimates

Beach	Total Daily Vehicles	Instantaneous Parking Requirements with Two Turnover Rates		Parking Lot Capacity
		1.5	3	
Gray Whale Cove	-	-	-	410*
Montara	323	215	108	30
Half Moon Bay	3,557	2,371	1,186	510
Fitzgerald Marine Reserve	161	107	54	0
Total	4,041	2,693	1,347	950

*Private concessionaire, no user data available

UNUSED CAPACITY

Unused capacity is the difference between existing highway capacity and current use. However, a translation of unused capacity into a projection of new residents which can be accommodated by the present highway system will vary according to the assumptions discussed at the beginning of this chapter.

Work Trips and the Corresponding Population

Based on the number of commuters using the present highway, there is enough excess highway capacity to accommodate a substantial increase in the population of the Half Moon Bay subregion. From the data for June 28, 1974, there is a surplus capacity for 2,700 to 3,900 work trips during the

two-hour commute period.* This indicates that 15,174 to 22,698 more residents could be accommodated in the subregion.† This result corresponds to the figure derived by subtracting the current population of 13,600 from the "mid-range" levels of Table IV-3, generating a range of 12,018 to 18,992 more residents. The latter represents a "no competition" case.

Even under the "worst" case assumption of local work trip competition, there is still a surplus highway capacity for 1,300 to 2,500 work trips. To state this another way, the highways are capable of handling 7,566 to 14,500 more residents. A correspondence exists between this excess capacity figure and the difference between the "mid-range" level figure (see Table IV-3) and the current population. The result is a "some competition" level which has a range of 5,610 to 10,845 more residents.

Recreation Trips on Holidays and Weekends

The analysis of beach parking indicates that parking areas have been used to capacity on at least one major holiday, July 4th. The data available also suggest that highway use was near capacity at peak hours during holidays and weekends. However, traffic volumes were not disaggregated by hour to allow for validation of this point. But in cases where hourly volumes are known, it is possible to subtract these values from

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*Level of service D capacity (from Table IV-2) 2,200 x 2 hours = 4,400 - 1,700 vehicles leaving the area on that day = 2,700; for level E: 2,800 x 2 = 5,600; 5,600 - 1,700 = 3,900. This estimate should be correspondingly reduced to account for any local work trips competing for the road usage.

†(2,700 x 11.64)/2 = 15,714; (3,900 x 11.64)/2 = 22,698; based on the medium assumption of Table IV-2 (capacity factor of 11.64 and no competition).

the highway vehicle capacity (1,100 - 1,400 cars per hour one way) to determine how much capacity remains. Of course, if this remaining capacity occurs at off-peak hours, then it is not a real increase in capacity unless there is a change in recreational travel patterns.

FUTURE DEMAND SCENARIOS FOR CCZCC PRIORITY USES

Special, High Priority Transportation Needs

According to Coastal Plan policy 101c,* first priority for remaining highway capacity is to be given to coastal-dependent land uses, essential public services, and basic industries which are determined to be vital to the economic health of the region, state, or nation by the coastal agency. The proposed Pillar Point Marina would be the only sizeable coastal-dependent use in the area. The Marina is included in the recreation analysis described below. There are no vital basic industries in the subregion. Essential public services should not require much road capacity, but adequate shouldering or traffic control would be necessary for passage of emergency vehicles during peak hours.

Estimating Future Recreation Trips and Beach Parking

Second priority is for public recreation, commercial recreation, and visitor-serving land uses. In order to project the traffic generated by these uses and the potential conflict between visitor recreationists and local residents, a transportation network model was developed to simulate peak recreation and local trip traffic patterns. The methodology was developed with three objectives in mind: the explicit

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*Coastal Plan policy 101c could be considered as an extension of Coastal Act §30254.

disclosure of assumptions, simplicity, and low-cost operation.* The following paragraphs briefly review the components of the analytical process. Appendix G more fully describes the model.

The network. The Half Moon Bay subregion is represented by a simplified network with nodes representing the beaches at Gray Whale Cove, Montara, Half Moon Bay, and Miramontes Point areas (see Figure IV-3). Four nodes represent the local population centers at Montara/Moss Beach, El Granada, Half Moon Bay, and South Half Moon Bay.† Three nodes represent the area outside the subregion. These were placed at the northern and southern boundaries of the subregion, on Route 1 and on the eastern boundary on Route 92. Trips were generated to and from these nodes to simulate the influence of the "outside world" on peak recreation day traffic patterns in the subregion. Nodes were also established for the Central Business District (CBD) in the area of Route 1 and Route 92 intersection and the Pillar Point Marina.

Trip generation in the network. On a peak recreation day, trips were generated for each hour over an eight hour period (from 11 a.m. to 7 p.m.). Initially, trips were generated at the outside of the subregion

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*The available data on recreational travel in the California Coastal Zone is very limited. In order to consider the issues raised in this chapter in a more comprehensive manner, additional detailed studies of recreational travel such as those occurring at CCZCC are encouraged.

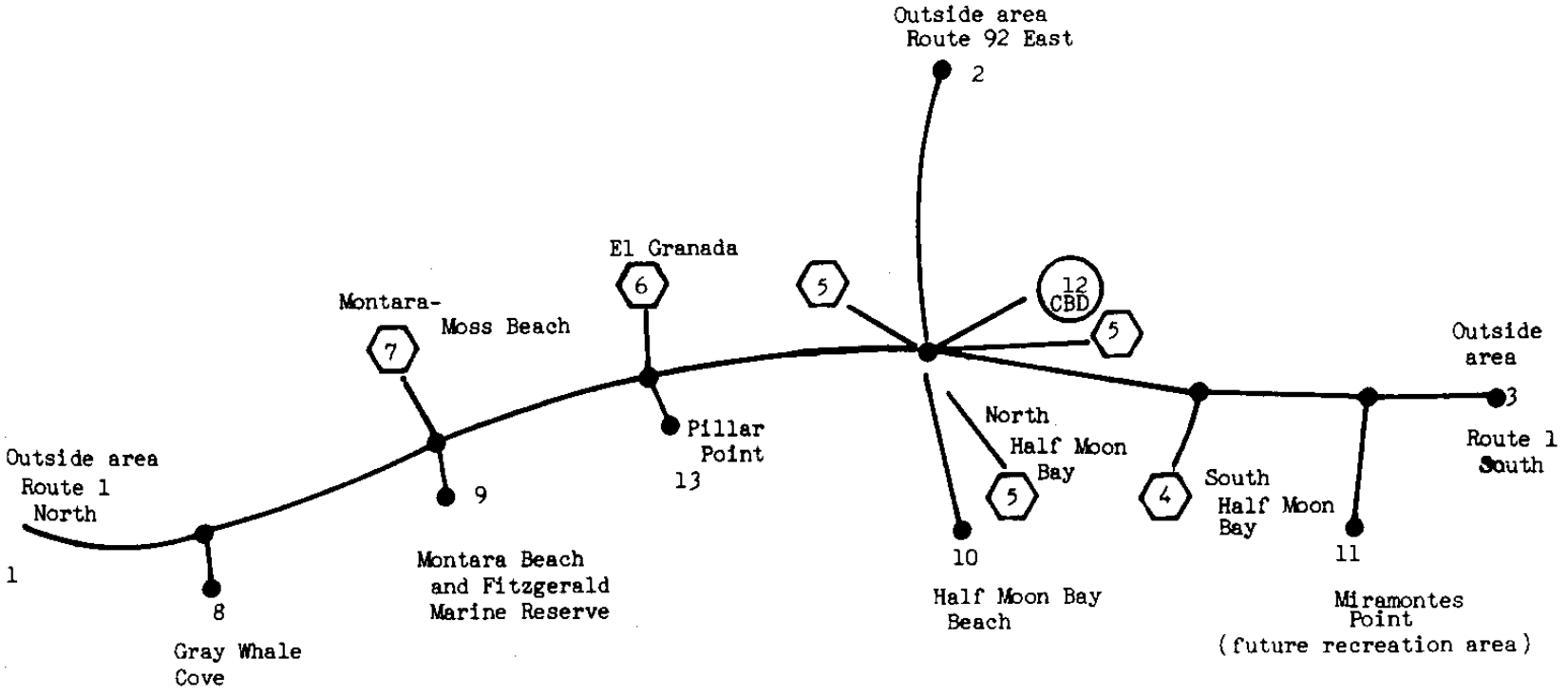
The Half Moon Bay case study illustrates that the data from one peak recreational day can be used to make an initial approximation of the existing conflicts. However, additional recreational travel data will serve to validate these approximations.

Even though the analysis was undertaken with limited data and with some debatable assumptions concerning recreation behavior, it was felt that the resulting disaggregation of the recreation participation and transportation analysis into an hour by hour format would lead to a clearer understanding of the phenomena involved.

†A population node at South Half Moon Bay is only considered when using existing commitment levels of population (i.e., Alternatives 4a and 4b).

Figure IV-3

The Simplified Half Moon Bay Network
for Use with Peak Day Recreation Simulation



and at local residence nodes. As the analysis progressed, trips were generated from special nodes and beaches as well. The method of estimating the total number of trips differed for the local resident, special attraction (CBD and Pillar Point), and "outside world" components.

Local and special nodes. Suburban California residents usually make between five and seven round-trips per weekend day,* but the simulation model indicated that subregion residents engaged in at most four round-trips per peak recreation day.

Local non-recreation trips on a peak recreation day were originally assessed using a conservative seven round-trips per household per weekend day which were assumed to take place over a ten hour period. When these trips were added to the network, an excess capacity condition was found to exist in a link on Route 1 adjacent to the Route 1 - Route 92 intersection. It was therefore assumed that a lower number of local trips than expected was generated during the peak recreation day. The lower number of trips might be interpreted in two ways. Either local residents planned ahead so that they would not have to make unnecessary trips on days which recreational traffic was expected to be high, or for some of the local trips they made did not actually use Route 1 or Route 92. For example, there might be trips to the local stores in the Moss Beach or El Granada areas or trips to downtown Half Moon Bay which did not use the main highways.

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*See CALTRANS, District 4. "Sixth and Seventh Progress Report," December 1970, for trip ends generation research counts.

Under the assumption that the trips would take place over a ten hour time span, from 9 a.m. to 7 p.m., each local housing node generated 0.4 trips per housing unit each hour during the peak recreation day.

The proposed new facilities at Pillar Point Harbor will attract trips from outside the subregion and from local users. Estimation of trips to the Pillar Point Marina is based upon the same hourly distribution as existing recreational usage in the subregion. Total trips into the Marina are determined from CALTRANS trip generation coefficients based upon the facilities proposed in Phase 1 of the Harbor District project.

Trips to the CBD were assumed to return to their origin in the following hour. Again, there would be little or no peaking in these trips over the peak recreation day.

Recreation trips generated outside of the subregion. In projecting the increase in the use of recreation facilities in the Half Moon Bay area, the following assumptions were made: (1) population in the Bay Area would increase at one percent per year over the next twenty-five years;* (2) an increased interest in recreation would reflect a 1.2 percent per year growth in recreation activity,† in addition to the effect caused by population growth; (3) all of the existing beach would come into public control; (4) a new beach service area would be established in the Miramontes Point area. This is

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*This figure is consistent with the ABAG Series III population projections for the Bay Area.

†This figure is derived from 12.5 percent per decade increase in activity due solely to increased interest, used in PARIS recreation projection, California Parks and Recreation.

consistent with Coastal Plan and Coastal Act policies which support increased recreational opportunities and present local and state acquisition plans.

Trip generation probabilities. The probability that a trip would end at a particular node was estimated by constructing a simulation model for present peak day usage and heuristically changing the probabilities until the simulation matched the existing usage data for the subregion (CALTRANS, 1975). For example, it was assumed that 67 percent of the traffic entering the subregion on Route 1 was recreation oriented, and that 30 percent of this traffic would pass through the area for destinations farther south (Pescadero, Pomponio, Año Nuevo, etc.). It was estimated that 75 percent of the traffic entering the subregion from the east on Route 92 was recreational in nature and that 30 percent of this traffic would pass through the area.

Beach uses: decision rules and assumptions. The number of persons using a beach depends on the degree of crowding that individuals are willing to accept, the turnover rate, the available parking, and the access road capacity.

One measure of the beach capacity is a standard measure in square feet per person. Standards recommended by the National Park and Recreation association are well documented.* These standards are based upon observations of beach use nationwide and the relative degree of crowding. From data on beach areas and beach recreationists, it was estimated that on a peak recreation day Half Moon Bay Beach had an

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*R.D. Buechner, Ed. National Park Recreation and Open Space Standards. Washington, D.C.: National Park and Recreation Association, 1971.

effective standard of 100 square feet per person while the beaches in the subregion had effective standards that ranged up to 600 square feet per person (see Table IV-5). These higher standards assumed in this analysis were due to the current limitation on beach use because of insufficient parking facilities. Access road capacity and the turnover rate did not appear to affect beach use as dramatically.

In the model, recreationists would arrive at the beach, three per car, throughout the eight hour day. After an increase over the first several hours, the number would decrease until the final hour when there would be few or no arrivals. This trip-making behavior approximates that observed in CALTRANS data available for the study area.

Table IV-5

Beach Capacity

		Capacity at 600 ft^2 per person standard		Capacity at 100 ft^2 per person standard	
	Area (ft^2)	People	Vehicles	People	Vehicles
Gray Whale Cove	320,000	534	178	3,201	1,067
Montara	960,000	1,599	533	9,600	3,200
Half Moon Bay	790,000	1,317	439	7,899	2,633
Miramontes	1,110,000	1,734	578	10,401	3,467
TOTAL	2,110,000	5,184	1,728	31,101	10,367

Arrivals at beaches other than by car (e.g., walk-ins or bicyclists) were not accounted for in the computerized version of the model because almost no data is available for these categories. The walk-in users counted at the state beaches are generally persons who park their cars (sometimes at a slight fee) and then walk into the park for free. However, one attempt is made to account for the non-auto users in the following analysis of the computerized results.

Autos leave the beach for three reasons. First, due to access road congestion, they proceeed to another beach as part of the overflow. Second, due to a full parking lot or a full beach, as determined by beach use standards, there will be an overflow to another beach. In either case, an aggregate decision rule is used which is a measure of crowdedness. In effect, the beach users will head to the least crowded beach or the beach where the ratio of available area to total area of the beach is at a minimum when compared to the other remaining beaches. Third, there is a normal departure from a beach with a probability that recreationists will return to their origin based on the fraction of arrivals to all beaches from that origin. This general approach allows overflows to be handled in a straightforward manner. If all beaches are full, then the recreationists will head for their initial origin according to the normal departure rule.

The beaches represent nodes where arrivals occur every hour from outside the subregion, from other beaches and from local population centers. After a period determined in part by the turnover rate, recreationists return to their origins.

Recreation parking and traffic (results of model). The results indicate that the number of vehicles expected at each of the beaches during the peak hour of the peak day does not approach the limit imposed by a beach use standard of 100 square feet per person, but causes an overflow in each case where a standard of 600 square feet per person is considered (see Table IV-5). Therefore the remainder of this analysis uses the 100 square feet standard and the beach areas given in Table IV-5.* Table IV-6 shows the parking requirements and "deficits," for the Half Moon Bay beaches. In addition to projecting information regarding beach use and parking, the model also gives one-way traffic volumes for each of the links in the network.

Using the assumed trip generations and trip distribution characteristics, the trips between each origin and destination are assigned to "trip paths" in the network. Overflow trips from beaches add to the trips along these paths. When all of the trips are accounted for in a time period (one hour), then all of the trips on paths which use a link in one direction are aggregated. Thus the trips on each link are added together to obtain an estimate of the link's one-way traffic flows. This computation occurs for each hour of a peak recreation day (see Figure IV-4).

The analysis is not constrained by the existing capacity of each link when evaluating future scenarios. This allows for an identification of where the greatest pressure on the network occurs. And in relation to the present capacity of the system, it identifies the weakest link of the network.

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*In this case the model determined required parking, but available parking itself can be entered along with beach capacity and access road capacity as a recreation constraint.

Table IV-6

Recreational Parking Requirements

	Projected Cars at Beach*		Parking in Acres†		
	Turnover=3	Turnover=1.5	Required	Present	Deficit
Gray Whale Cove	240	338	2.3	2.8(410)‡	---
Montara	387	546	3.8	0.2(30)	3.6
Half Moon Bay	890	1247	8.6	3.5(510)	5.1
Miramontes	821	1150	7.9	0	7.9
TOTAL			22.6		

*For the year 2000 with a subregional population remaining at 15,000.

†Based on turnover rate of 1.5 and on 145 parking spaces per acre. J. deChara and L. Kippleman. Planning Design Criteria. Van Nostrand, 1969, pp. 138-139. Number of spaces in parentheses.

‡Parking concession is privately owned and not permanently guaranteed.

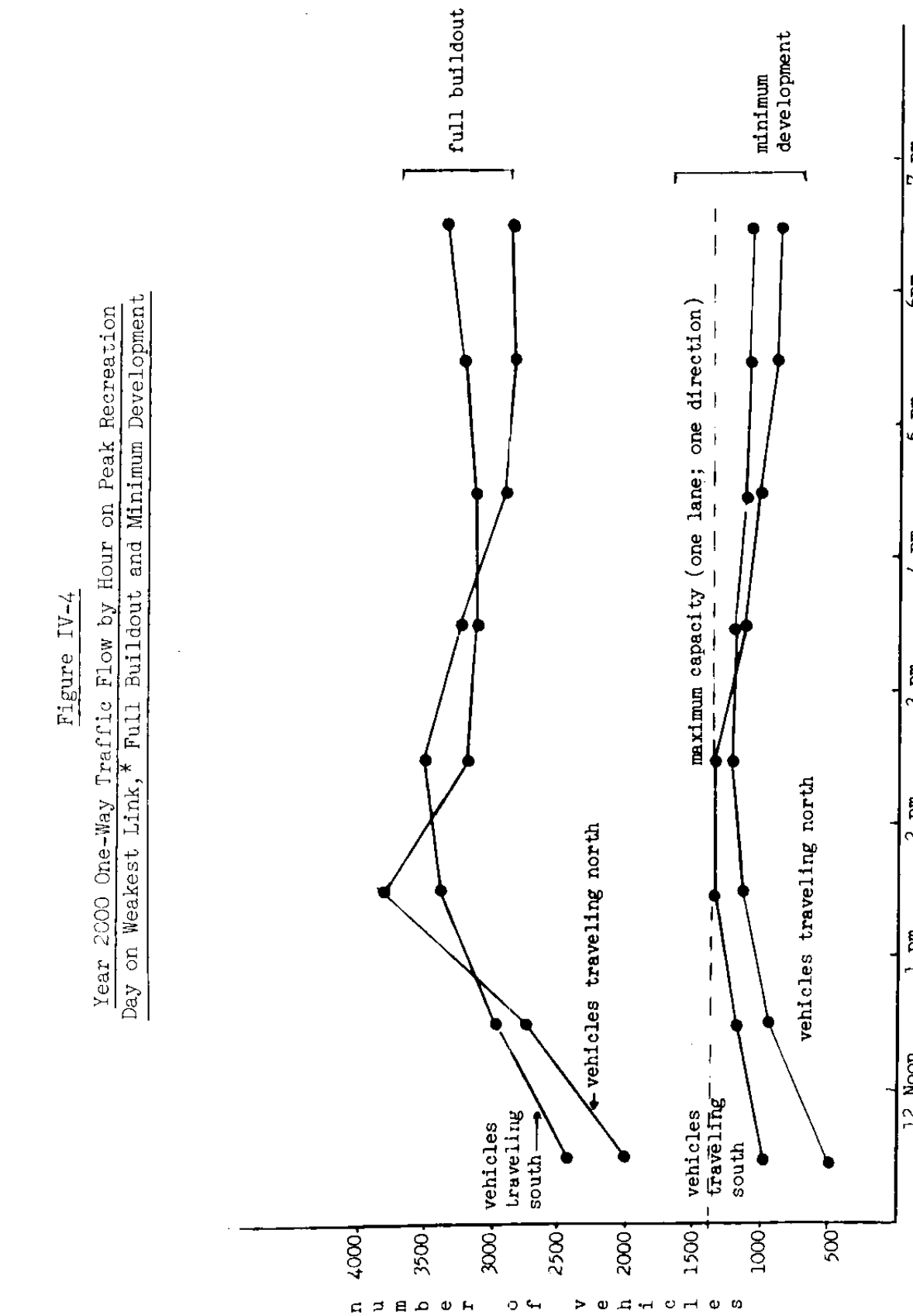
CAPACITY TO MEET FUTURE DEMANDS WITHIN CCZCC POLICY FRAMEWORK

One of the primary roles of the CCZCC is to control development within the coastal zone as guided by the Coastal Act and Coastal Plan policies. One consideration of the Coastal Policies is the effect of land use decisions on coastal highway traffic volumes.

> 30254. New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of the division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.

Figure IV-4

Year 2000 One-Way Traffic Flow by Hour on Peak Recreation Day on Weakest Link,* Full Buildout and Minimum Development



*Route 1, north of Route 92 intersection

At the present time, peak day recreation trips exceed peak work hour trips by as much as 70 percent according to the limited data available. For example, on June 28, 1974 there were approximately 1,700 trips leaving the subregion during a two hour morning commute period. On July 4, 1974 there were 2,870 trips leaving the area during a two hour late afternoon period. It is clear that recreational trips and not work trips are of most immediate concern. Yet, recreation traffic volumes vary greatly over the course of the day, week, and year. And the question of whether or not the network has reached capacity overall must be answered in a timely, inexpensive, and understandable manner. With this in mind, the concept of "weak-link" analysis has been developed. The weak link refers to that link in the network which would have the highest traffic volume in excess of its capacity as computed from unconstrained estimates of traffic volumes.

The determination of a weak link can also be made on the basis of trip type, time, and lack of possible mitigating options, or a combination of the three. Total trips on a link can be disaggregated by local trips (either originating or ending at a local residence) or outside trips (other than local trips). Alternatively, trips could be disaggregated as recreational versus non-recreational. However, it must be assumed that Coastal Plan policies are directed towards outside recreationists which comprise essentially all of the outside travelers in the Half Moon Bay subregion. In any case, a weak link decision rule which determines when the system is over capacity could be based on an estimate of the percentage of outside recreationists who would use the link.

A weak link can also be identified by a temporal factor. For example, excess or over-capacity traffic during a peak hour, or during a peak period, or at a certain season of the year such as summer may

comprise an over-capacity. It may also be decided that excess capacity would be acceptable for one or more hours, or on weekends, or during all or some of the summer weekends. Finally, a weak link may be identified by its inability to support an increased capacity either through traffic controls or because of highway expansion. In fact, some links may never be increased in capacity if the Coastal Policies are strictly applied.

Some examples of weak link* decision rules which may be applied in the analysis of land development decisions are:

1. one-time excess (yearly or average of six peak days) of link capacity during any hour (or 2 to 6 consecutive hours)
2. the estimated percent of outside recreationists falls below a pre-established standard such as 50 percent during the peak hour, or peak period of the peak recreation day
3. the link is over-capacity for some arbitrary number of peak recreation days, possibly 8 days
4. the link is over-capacity for some percentage of days during a particular season, most likely summer.

Many other combinations of conditions could be used to determine when a weak link would deny development.

For the Half Moon Bay subregion, the weakest link is defined as the one which exhibits the greatest over-capacity during the peak hour of the peak recreation day. The link north of the Route 1/Route 92 intersection has been identified as the weakest link in the Half Moon Bay network. Using the Highway Capacity Manual the capacity of this link, assuming lowest service level (E), was computed at 1,375 vehicles per hour.†

* The weak link is selected by estimating the volumes for each link during the peak hour and selecting the link(s) where traffic volumes most exceed a specific service level. In other areas with a more complex network, more than one link may be identified.

† This figure takes into consideration the effect of the stoplight at the intersection.

For the peak recreation day, it is estimated that peak hour traffic approximates, or is slightly below, this capacity (see Figure IV-4). Peak hour traffic volumes are lower on the other links. Again, it should be noted that this analysis is made with the qualification that local residents make less weekend trips than expected. Also, the question of competition between work trips, recreation trips, and local trips must be considered, especially in other areas. In the Half Moon Bay subregion, work trips and recreation trips do not appear to conflict except possibly during warm-day (fall, spring, summer) periods when both recreationists and workers would leave the subregion during the evening commute period. Presumably these trips would compete with local trips as well.

In conclusion, the determination of the highway's capacity to meet future demand for CCZCC priority uses (i.e., recreation) and thus whether any capacity remainds that can be allocated to non-priority uses, depends on the choice of a weak link decision rule. In selecting a decision rule, it should be remembered that peak recreation traffic flows will not occur on a regular basis throughout the year. For example, Half Moon Bay Beach exceeded 8,000 visitors on only eight occasions in 1973, with a high of 9,600 persons. This poses the question of whether the implied level of peak recreation traffic merits highway construction for the purpose of increasing road capacity. If the road capacity were to increase to satisfy the peak recreational demand, this might invite a residential buildout of the subregion to a level corresponding to the new network capacity.

FUTURE DEMAND FOR RESIDENTIAL USE

According to existing zoning, as many as 61,300 people could be accommodated in the Half Moon Bay subregion at full buildout. Assuming this level of population, the transportation model was also run for the year 2000. The results, showing the peak hourly traffic on the peak day at full buildout, are represented in Table IV-7. Figure IV-4 (top graph) depicts the traffic flow on the peak day over an eight hour period at full buildout. The results indicate that on weekends when peak recreation days occur, the combination of local trips and recreation trips would theoretically overload the highway network. Additionally, the beach parking lots would overflow (see Table IV-8). The transportation model was also run for other population levels, and the results are contained in Figure IV-5.* It illustrates that a population exceeding approximately 15,000 will result in congestion on the weak link during peak periods.

Figures IV-6 and IV-7 which are derived from Tables IV-3 and IV-9, show a continuum of highway capacities and the corresponding local population levels which the highways would support (see equation and the supporting discussion, p. 74).

Figure IV-6 represents the "competition free" case and Figure IV-7 the "some" competition case. In each figure, the vertical axis indicates the population level that is associated with the total road capacity of Routes 92 and 1, which is given on the horizontal axis. For each highway configuration a population-capacity space is

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*The levels with which the model were run correspond to the alternatives described in Chapter V. To arrive at an estimate of future recreational traffic before generating the alternatives, estimates of likely future population levels (based on such factors as historic buildout rate and locational trends) can be used in the model.

Table IV-7

Peak One-Way Hourly Traffic During Peak Recreation Day at Full Buildout

Traffic location and direction	Number
Traffic entering subregion	
from N on Route 1	1,657
from S on Route 1	938
from E on Route 92	2,200
Traffic leaving subregion	
to N on Route 1	1,005
to S on Route 1	1,296
to E on Route 1	1,475
Traffic near Route 1-Route 92 intersection*	
S on Route 1	3,402
N on Route 1	3,850

*on "weak link"

Table IV-8

Recreational Parking Requirements at Full Buildout

	Projected cars at beach		Parking in acres*		
	Turnover=3	Turnover=1.5	Required	Present	Deficit
Gray Whale Cove‡	602	854	5.9	2.8(410)†	3.1
Montara	1509	2259	15.6	0.2(30)	15.4
Half Moon Bay	1200	1725	11.9	3.5(510)	8.4
Miramontes	2124	2851	19.7	0	19.7

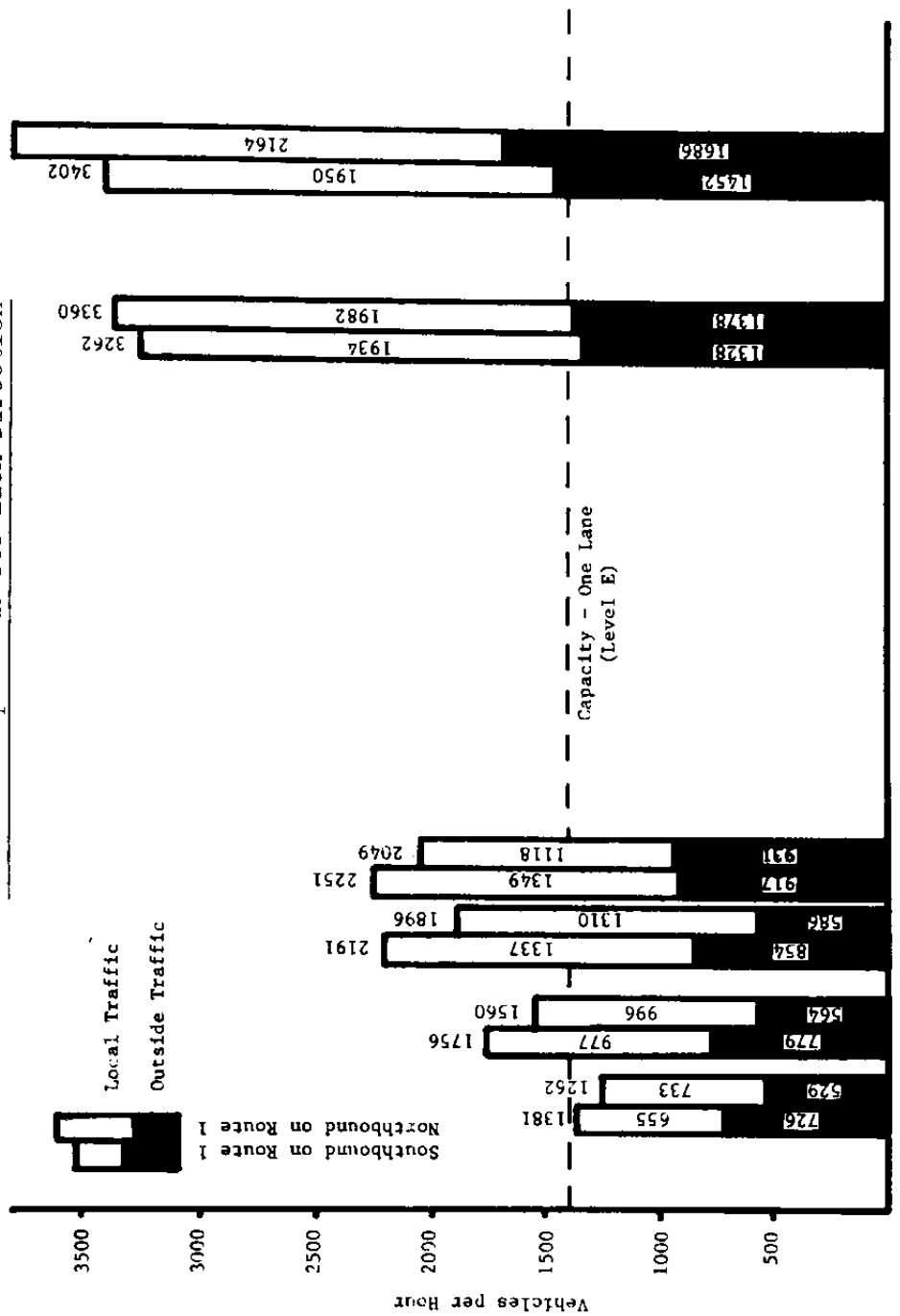
*Based on turnover rate of 1.5 and on 145 parking spaces per acre from J. deChara and L. Koppleman. Planning Design Criteria, Van Nostrand, 1969, pp. 138-139.

†Number of spaces in parentheses.

‡Parking concession is privately owned; not permanently guaranteed.

Figure IV-5

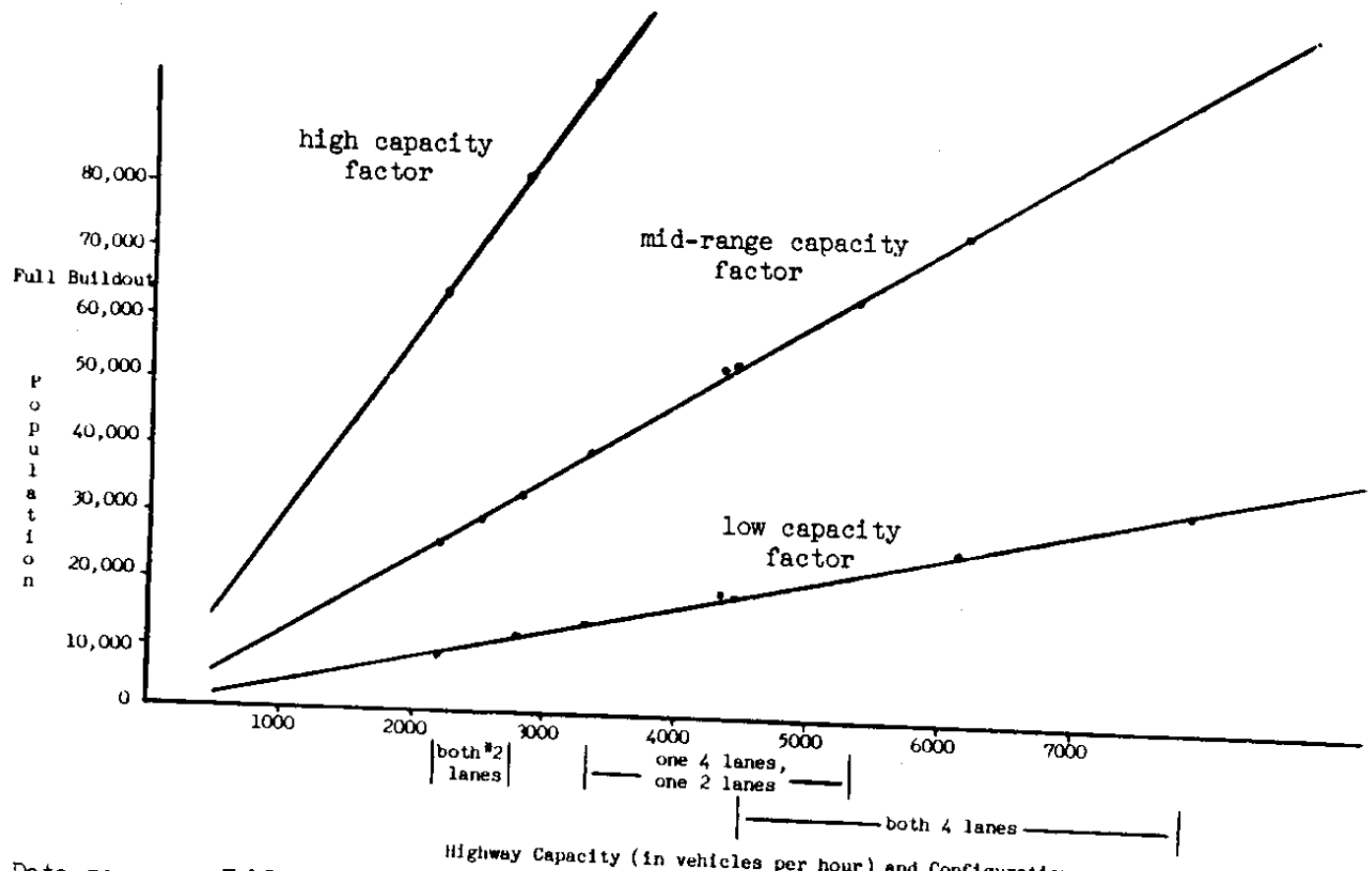
Year 2000 Peak Hour Traffic on the Weakest Link in Vehicles per Hour for Each Direction



Beach use = 100 ft.^{2}/person; Turnover = 1.5; Peak Hour = 2-3 pm (except for full buildout, which is 1-2 pm due to beach overflow conditions)

Figure IV-6

Local Population That Can Be Supported by Total Highway Capacity for Three Highway Configurations with No Competition (Competition Factor=1)



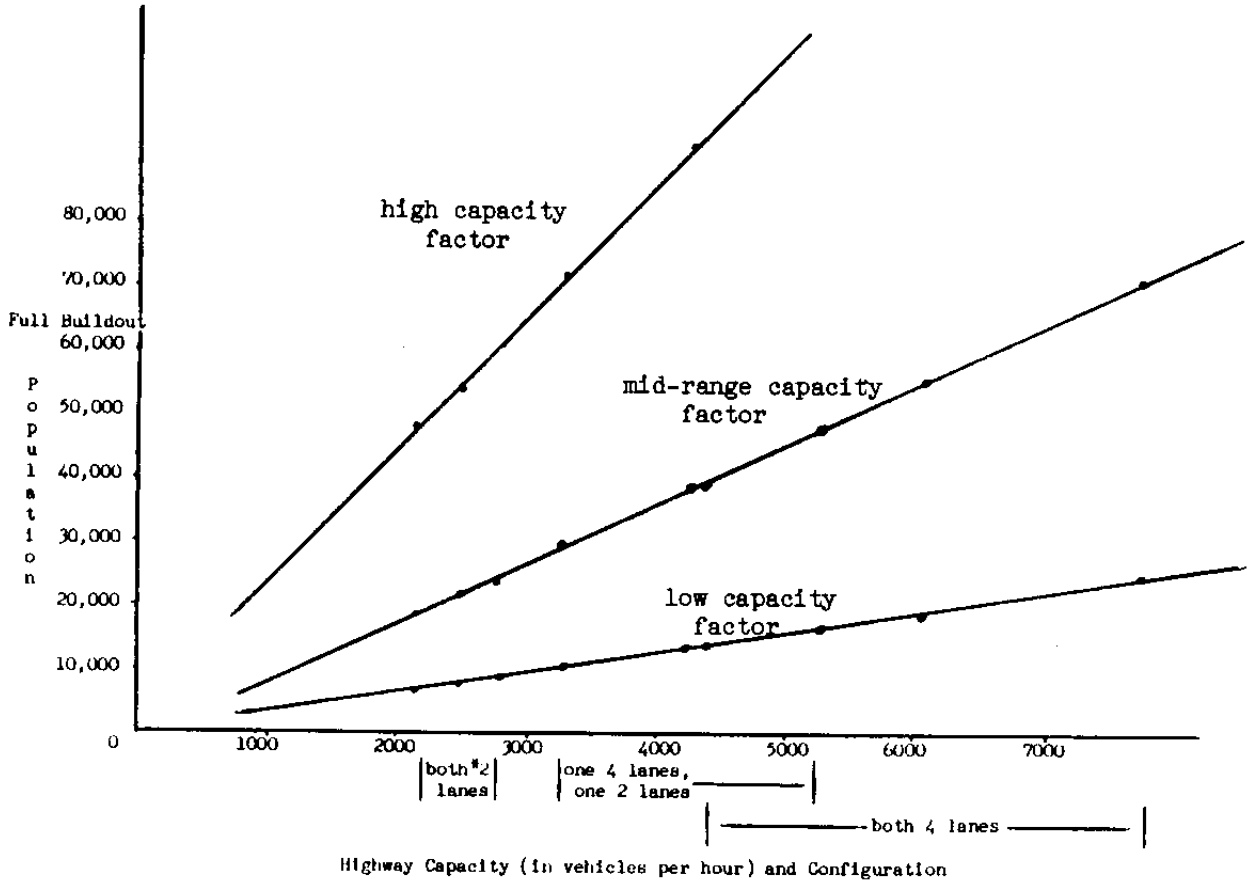
Data source: Tables IV-3 and IV-9

*Routes 1 and 92

Figure IV-7

Local Population That Can Be Supported by Total Highway Capacity for Three Highway Configurations with Some Competition

(Competition Factor=.75)



Data source: Tables IV-3 and IV-9

*Routes 1 and 92

Table IV-9

Number of Residents Supported by Different Road Configurations Based on Varying Service Levels, Capacity Factors, and Competition from Local Trips

Local Trip Competition	Capacity Factor	Total Road Capacity (in vehicles/hr)*			Total Road Capacity (in vehicles/hr)†		
		3300	4300	5300	4400	6100	7800
None (x1.0)	High	94,915	123,690	152,455	126,566	175,467	224,367
	Mid-range	39,864	51,944	64,024	53,152	73,688	94,224
	Low	14,091	18,361	22,631	18,788	26,047	33,306
Some (x.75)	High	71,193	92,764	114,341	94,925	131,600	168,276
	Mid-range	29,898	38,958	48,018	39,864	55,266	70,668
	Low	10,568	13,771	16,973	14,091	19,535	24,980

*Either Route 1 or Route 92, 2 lanes (one each direction); the other, 4 lanes.

†Route 1 and Route 92, both 4 lanes.

constructed, so that one can determine a range of populations from a specific highway capacity. In the cases of the "both four-lane" or "one two-lane/the other four-lane," the total capacity overlaps for some values. The "mid-range" values from Tables IV-3 and IV-9 are shown on corresponding "mid-range" lines in Figures IV-6 and IV-7. It is expected that the population level will be near the "mid-range" line for a corresponding road capacity. The ABAG/MTC analysis of highway capacity in the San Mateo coast corridor has made the same assumption (Steinman, 1975).

At full buildout, Figures IV-6 and IV-7 illustrate that two four-lane highways would probably be necessary to accommodate commuter traffic. These figures also indicate that a range of alternative configurations is possible depending on the assumptions used (see Table IV-9).

ALTERNATIVE MEANS OF EXPANDING CAPACITY

There are several means available to increase the level of residential or recreational population which can be accommodated by the existing highway configuration. These means include providing transit, specialized traffic controls, alternative local roads, inducements to change travel patterns, and increased beach parking.

Transit

The previous discussions of commuter and recreational traffic have assumed that cars are the only mode of transportation. If transit service such as buses is available, the number of persons carried through the network is increased at each level of service even though the number of vehicles that the roadway can carry is actually reduced. This is due

to the interference caused by buses (low speed on hills; view blockage, etc.).

At present there is very little bus service in the subregion. Two buses per day travel to San Francisco, three per day to San Mateo. However, there are plans to provide hourly service to San Mateo and to the BART station in Daly City during the work-day.

To determine the possible effect of transit on the roadway network, it is assumed that one bus with a ten-minute headway is the maximum frequency likely to occur in peak periods of both commuter and recreational traffic. An adjustment factor for highway capacity has been computed from the Highway Capacity Manual. This adjustment factor lowers the traffic volumes by the amount of cars that buses will replace. It is used in the calculation for new population levels.

Bus frequency is assumed to be six per hour. This approximates existing peak period commuter service for several comparable locations in terms of population and highway systems. Even with this frequency of bus usage, car volumes are not greatly reduced, that is, buses do not replace many cars. At most, when buses are used car volumes are reduced 5 percent from the existing volumes.

The net effect at the mid-range level of analysis is that 125 vehicles (2,500 vehicles per hour x 5%) carrying 156 commuters are replaced by twelve buses carrying 600 commuters (six per highway at fifty people each). A net increase is achieved of 444 commuters each hour. This will increase the estimated future population capacity by 1,554 persons, approximately 13 percent over the present population. This is essentially the same as the "maximum" population level with "some competition" for two lane Routes 1 and 92. Such an increase would bring the "some competition" case up to a road capacity capable

of handling 13,554 residents, and the "no competition" case to a level of 17,954 residents.

Mass transit would be less effective in replacing recreational auto trips than commuter auto trips, but would provide access to coastal resources for people who are dependent on public transportation.

Coastal Plan Transit Policies

Coastal Plan policy 108 and Coastal Act §30252 in particular encourage transit development as an alternative for new roads. One situation is where transit is feasible due to high concentrations of both resident and recreational populations. Transit districts exist both in San Francisco and San Mateo counties which could expand service into the Half Moon Bay subregion. Another part of the policy encourages transit links between coastal communities. At present, no such service is available between any of the communities from Pacifica to Santa Cruz. Another situation where Coastal Plan policies encourage transit priority is when air pollution levels are critical. Air pollution levels are not critical now, but may be in the future if automobile traffic continues to increase. Half Moon Bay is in an air quality maintenance area, which under Coastal Plan policy 109, should require expansion of the transit system.* All of these policies, plus the existing conditions in the subregion, point to the need for expanding transit.

Specialized Controls

One possible method to alleviate any congestion that might occur would be to implement specialized construction programs and controls.

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*Policy 109 could be considered as a means of achieving Coastal Act §30253(3).

In the Half Moon Bay area, as many as 30 percent of the recreationists entering the area pass through it on the way to beaches located to the south. One solution to the congestion at the Route 1-Route 92 intersection would be to construct a bypass from Route 92 to Route 1 at a point to the south of Half Moon Bay. Traffic controls might also be considered during peak recreation periods. Certain sections of Route 92 or Route 1 could be designated as one-way highways for short periods of time on traditionally heavily traveled holidays.

Alternative Local Road Patterns

While this analysis has been limited to a consideration of the main arterials and recreational parking, it is appropriate to mention the secondary road system. Although all commuter trips will utilize Routes 1 and 92, an adequate secondary system could serve to divert commuter trips from those highway segments which pass through developed areas. In addition, this system could allow local access to commercial areas without using Routes 1 and 92. If new development is of the subdivision type, appropriate design would include: adequate internal parking, provisions for internal circulation, access to transit, and provisions for commercial uses or non-congested access to external shopping areas. Such provisions would comply with Coastal Plan policies 106 and 59 and Coastal Act §30252. It will be far easier to reduce automobile dependence if development is originally designed for such an objective.

Inducing Travel Pattern Changes

Those variables influencing transportation facility usage that are most susceptible to variation due to social inducements are the

number of commuters per vehicle, the number of off-peak commuter trips, and the number of transit riders. Unfortunately, most attempts to increase car pool and bus use and to stagger work hours have had only minor success.

The variability of recreational travel is due to exogenous factors such as weather and unusual work schedules that cannot be readily changed. Therefore limited success may be expected in changing recreation patterns. However, change does occur under some conditions. As previously mentioned, the data imply that local residents have already deviated from the norm of travel behavior due to the influx of weekend recreationists.

Parking

While parking facilities are currently the most limiting aspect of the transportation system, the Coastal Policies do not directly prohibit the construction of new lots. The Coastal Act states:

> 30252. The location and amount of new development should maintain and enhance public access to the coast by...(4) providing adequate parking facilities or providing substitute means of serving the development with public transportation....

The problem arises when considering the magnitude of parking necessary to satisfy the projected demand. As Table IV-6 shows, at least 22.6 acres would be needed. This parking space will be costly to provide, it may not be the best economic use of the land, and it will be utilized only for a few days of the year. Additionally, this amount of parking would be likely to produce adverse impacts, including visual degradation and preemption of agricultural or recreational land, thus conflicting with Coastal Policies and other environmental regulations. In urban and suburban areas all along the coast, parking is expected to be one

of the major issues which must be addressed in the development of subregional and local coastal plans.

DIRECT AND INDIRECT IMPACTS OF EXPANDING CAPACITY

Appendix E-3 is a framework for assessing the direct and indirect impacts for different transportation alternatives, including the maintenance of present facilities, the provision of mass transit, and the construction of new roads or parking facilities. The ABAG/MTC study produced a report for its alternative growth scenarios entitled "General Environmental Impact Analysis of San Mateo Coast Corridor" (ABAG/MTC, 1975). While this provides some general environmental information, detailed impacts from highway construction and use are not mentioned. Such an analysis is currently being completed by CALTRANS for Route 1's proposed Devil's Slide bypass. Detailed impact assessment could be conducted which would be based only upon specific alternative alignments in the study area. However, such a consideration is beyond the scope of this analysis.

CAPACITY BUDGETING OR HIGHWAY EXPANSION

The situation in Half Moon Bay requires that immediate attention be given to the option of Coastal Plan policy 101 and Coastal Act §30254 which require that land use decisions be related to transportation capacity.

At the present time in the Half Moon Bay subregion, CALTRANS proposals include a four or six lane bypass freeway at Devil's Slide to replace Route 1.* A future proposal replaces Route 92* with a six lane highway. However, the Coastal Plan and Coastal Act place a clear priority on transit and other alternatives to highway construction or expansion in order to increase capacity. If highway capacity is

*See Figure IV-2

inadequate, construction may be allowed, providing it meets a series of tests outlined in Coastal Plan policy 102 (see Figure IV-8). These tests provide a general basis for expansion. Other Coastal Plan policies such as 104a may recommend against expansion.

Need for Traffic Safety Improvements

Coastal Plan policy 102b makes provision for improvements in existing highways when need is demonstrated based on safety considerations {3}). Table IV-10 was compiled to assess whether such a need exists in the Half Moon Bay study area. This table lists variables for property damaged, injury, and fatal accidents on state Routes 1 and 92 for the three years from 1972 through 1974. Data for the Devil's Slide area of Route 1 is displayed separately for illustrative purposes. The averages for similar two-lane highways in the state for 1972 and 1973 appear in the last two rows of the table. In all cases the study area routes exceed statewide averages in terms of accidents involving either property damage and/or injury.

On the average, Route 1 exceeded the statewide average for total accidents by 23 percent and Route 92 exceeded the statewide average by 65 percent. Route 92 had fewer persons killed per 100 million vehicle miles than the statewide average of 8.8, while Route 1, including Devil's Slide, exceeded the statewide average in two out of three years. The Devil's Slide area contributed 50 percent of the fatal accidents on that highway in 1973. This fact, coupled with a 23 percent greater accident frequency than the statewide average, would indicate that some improvement is needed in that section of Highway 1. Route 92, though lower in fatal accidents, is higher in overall accidents by a significant amount which indicates possible need for design improvements.

Figure IV-8

Summary of Criteria for Highway Expansion*

	Criteria Met in HMB		
	No	Uncertain	Yes
Not open rural areas for development (102a)†		x	
Existing use in excess of service volumes (102b{1})	x		
Provide recreation access if transit infeasible (102b{2})	x		
Necessary for traffic safety improvements (102b{3})		x	
Eliminate adverse impacts to coastal resources (102b{2})	x		

*Coastal Plan policies listed in the table could be considered as means of achieving Coastal Act §30254, §30212.5, and §30252.

†Numbers in parentheses refer to Coastal Plan policies.

Table IV-10

Accident Rates - Routes 1 and 92 and Statewide Averages*

Route and Year	Mean Number of Daily Trips	Total Vehicle Miles Per Year	ACCIDENTS								Deaths*
			Property Damage		Injury		Fatal		Total		
			Number of Incidents	Per million VMT†	Number of Incidents	Per million VMT	Number of Incidents	Per million VMT	Number of Incidents	Per million VMT	
Route 1 1972§	8,600	37,775,000	62	1.64	41	1.09	3	0.08	106	2.81	13.24
Route 1 1973	9,600	41,275,000	90	2.18	55	1.33	6	0.15	151	3.66	16.96
Route 1 1974	9,500	40,443,000	64	1.58	50	1.24	2	0.05	116	2.87	4.95
Devil's Slide 1972‖	8,700	3,493,000	10	2.86	5	1.43	0	0.00	15	3.29	0.00
Devil's Slide 1973	9,000	3,613,500	9	2.40	7	1.94	3	0.83	19	5.25	83.02
Devil's Slide 1974	8,800	3,533,000	6	1.70	6	1.70	0	0.00	12	3.40	0.00
Route 92 1972#	10,500	27,556,000	88	3.19	32	1.16	1	0.04	121	4.39	3.63
Route 92 1973	11,900	31,230,000	85	2.72	56	1.79	1	0.03	142	4.54	3.20
Route 92 1974	11,700	30,705,000	71	2.31	36	1.17	2	0.07	109	3.55	6.51
Statewide average 1972**				1.53		1.07				2.60	8.90
Statewide average 1973				1.43		1.01				2.44	8.70

*CALTRANS, Highway Operations Branch, San Francisco

†Vehicle miles travelled

*Number of persons killed per 10 million VMT

§Route 1 is from Route 92 to San Pedro Road (mile posts 29.02 to 40.75)

‖Devil's Slide is on Route 1 from mile post 38.40 to 39.50

#Route 92 is from Route 1 to the freeway (mile posts 0.00 to 7.19)

**Statewide averages are for two-lane volumes. The injury figure includes the total of injuries plus fatal accidents.

Besides new construction, the elimination of sharp curves, widening of lanes, the provision of additional passing lanes, and wider shoulders can also be effective in increasing safety while being faster and less costly to implement. Given these possible alternatives, it is likely that allowed construction improvements would be limited to a Devil's Slide bypass. Improvements throughout the subregion network may not be justifiable on the basis of safety and may be denied on the basis of other Coastal Policies.

How Much Expansion?

If highway expansion is allowed under Coastal Policies, how much expansion should occur? Expansion of roadways takes place in increments and so its effects can be investigated for explicit levels of traffic and for environmental impact. It appears that the policies in Figure IV-8 and others, such as Coastal Plan policy 104, will determine the extent of allowable highway expansion.

The key question in considering the expansion of highway capacity is the extent to which additional capacity would provide access for recreational use. As shown in Figure IV-5, population scenarios in the 53-60,000 person range would use all of the remaining highway capacity (at the peak hour on the weakest link) considering only the requirements for permanent residents. In contrast, for alternatives in the 15-27,000 person range, an excess capacity of 400-700 vehicles over that required for local residential traffic is present. This capacity would be available for recreational use. Thus, expansion of highway facilities would be required to accommodate the existing level of recreational use if the permanent population exceeds the 28,000 level.

The expansion of highway facilities may also be required to service major recreational facilities such as the Pillar Point Harbor project, if permanent resident populations exceed the 28,000 level.

Another approach within this policy framework is to consider incremental improvements in the highway system such as the expansion of the weakest link up to the capacity of the second weakest link.* This approach may have the effect of spreading the congestion within the network rather than just shifting it to another part of the network. It would also have the effect of forcing planners to investigate all other potential problems in the network in addition to the weakest link. A broader approach to problem assessment might eliminate possible unforeseen consequences that could arise with an expansion of only the weakest link. The argument against the use of the second weakest link as an expansion standard is the cost of incremental capital investment when the network is expanded in the future.

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*See section above, "Capacity to Meet Future Demands within CCZCC Policy Framework."

CHAPTER V
LAND USE AND RECREATION ALTERNATIVES

This chapter establishes a process for developing alternative land use plans consistent with Coastal Policies.* Figure V-1 summarizes this process. These plans serve three purposes:

1. To interpret the meaning of specific Coastal Plan and Coastal Act policies, particularly the non-geographically specific policies concerning the priority of land use and the provision of coastal access;
2. To spatially define the alternatives which are consistent with existing service capacities and geographically specific policies;
3. To facilitate public participation in decision making regarding the allocation of coastal resources by providing specific alternative interpretations of coastal policies as a basis for choice and debate.

The preceding analyses of conflicts between the existing commitment to growth in the Half Moon Bay subregion and Coastal Policies governing geographical areas and services revealed the need for revision of local plans. The next step in the process is to develop alternative land use plans consistent with resource conservation and concentration

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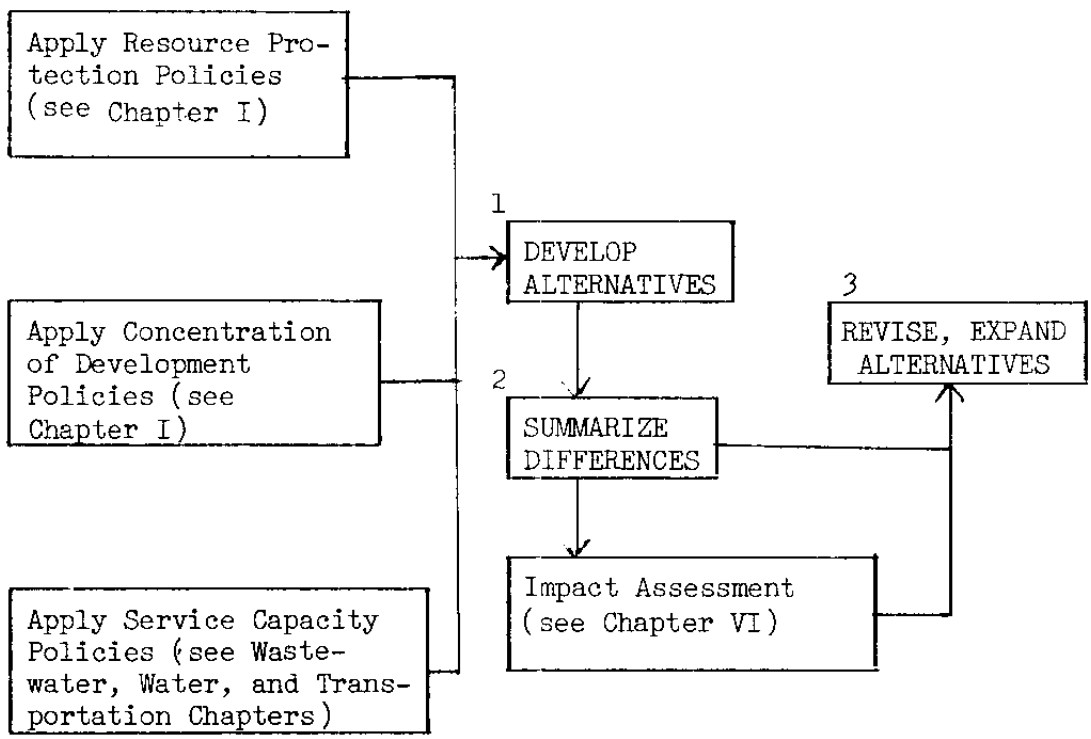
*"Coastal Policies" refers to the policies contained in Chapter III, Articles 1-7 of the California Coastal Act of 1976 and the California Coastal Plan.

Figure V-1

Process to Determine Alternative Subregional Land Use Plans



of development policies. These alternatives are options to the existing plans and zoning patterns described for the Half Moon Bay subregion in Chapter I.

The second part of this chapter presents the recreational data collected on the Half Moon Bay subregion and describes the way in which recreational considerations can be integrated into alternative land use plans.

DEVELOPING THE ALTERNATIVE LAND USE PLANS AND POPULATION LEVELS

Formulating alternative development scenarios necessitates incorporating all the previously gathered information into plan alternatives using Coastal Policies. Some land use designations will follow from specific mandates, others will be discretionary based on policy interpretation or emphasis. In the case of Half Moon Bay, the existing commitments to growth represented an unacceptable upper limit of development density because this level of development was in substantial conflict with many Coastal Policies (see Figure I-12). The service capacity analyses provided rough indicators of acceptable, reduced population levels. Four alternative population level and land use combinations were then developed, which differ according to the category of policies being emphasized.* For example, policies that emphasized resource protection and hazard avoidance would result in very different land use patterns from those which stressed concentration of development. Yet, all alternatives are considered to be consistent with

*After the four alternatives were developed, further service analysis resulted in revised capacity estimates. See discussion below under "Appropriateness of the Alternatives." Service district boundaries should also be considered in future alternative development. As an example, the capacity limitations of the Coastal Utilities Corporation (Water) in Montara and Moss Beach and the El Granada Sanitary District (Wastewater Treatment) may preclude development in those localized areas, and should be incorporated in at least one alternative.

the Coastal Policies, since in most cases the Coastal Plan does not clearly set priorities with respect to specific policies. This approach enables cities and counties to account for local variability and still conform to the Coastal Policies.

The four alternatives presented do not represent all possible interpretations of Coastal Policies. Other adjustments and emphases could be used which would result in different land use mixes and intensities. However, the four alternatives appear to be responsive to the intent of the Coastal Plan and Coastal Act as well as to local needs and desires for development. Alternative plans should avoid the use of low, medium and high option designations. Often the medium option is the only favorable one and the other two represent unlikely and impractical extremes.

Given time and budget constraints, it is expected that no more than four or five alternative plans could be formulated, unless an automated data bank is available.* In some areas, fewer alternatives may be sufficient if there is substantial agreement on development policy and pre-existing commitment to coastal resource protection. In areas where extensive planning has been undertaken by local governments, there may not be a need to develop a number of alternatives. While existing commitment to development, extent of resource lands, and service capacities are basic reference points to formulate alternative plans, each local government will have specific issues and specific areas which will demand special attention and will influence the formulation process.

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*An automated geographic data bank would allow a greater number of alternatives to be proposed, as well as facilitate evaluation and measurement of impacts. The automated assessor's records (discussed in Chapter I) were extensively used in developing acreage totals and acquisition costs for the alternatives.

Data Base and Organization

Where the analysis of the existing commitment (see Chapter 1) was accomplished with a minimum of data, a more refined and detailed data base was needed in order to construct reasonably detailed inventories of land use mix as well as to establish development limit lines based on the criteria of the Coastal Policies.* Updated orthophotos (1":400' scale) with an overlay of existing zoning were used as base maps. The eight coastal districts were further divided into subdistricts, each containing a single zoning classification (see Figure V-2). The following information was recorded for each subdistrict:

1. district in which subdistrict was located;
2. existing zoning;
3. total area of the subdistrict in acres;
4. assessor's map book in which subdistrict was located;
5. number of existing developed lots--either already built or previously committed for development;
6. number of acres of undeveloped and unsubdivided lands (all parcels over one acre in size);
7. existing undeveloped lots which conformed in existing zoning;
8. the potential number of new units that could be built on the lands found in numbers (6) and (7); and
9. the additional population that would occupy these units based on multipliers for residences obtained from the Cabrillo Unified School District Special Census of April 1972 (3.22, 2.46, and 1.92 respectively for single family, two-family, and multiple family (5+) units).

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*See Chapter I, "Calculation of Improved and Unimproved Residential and Non-residential Parcels."

Since all mapping of the alternative land use plans was to be performed at 1":800' scale, a master overlay was made on clear acetate of the 105 subdistricts at the 1":800' scale to enable easy transfer and interpretation of data (see Figure V-2). Another master overlay was made of the assessor's book and page maps at the 1":800' scale (see Figure I-6). Using these overlays, it was possible to determine land uses and land values in any subdistrict, and then to specify alternative uses of vacant parcels.

Since the assessor's data is already broken down into small segments, page maps, it is recommended that future planning efforts consider using this existing categorization for subdistrict delineation because it makes data manipulation easier. Where zoning districts do not coincide with the assessor's page maps, the page designations could be further segmented (e.g., divide assessor's page 18 into: page 18a - R-2 zoning; page 18b - R-3 zoning).

Descriptions and Discussions of the Four Alternative Land Use Scenarios Consistent with the Coastal Plan

Four alternative land use patterns and development intensities will be considered for the Half Moon Bay subregion and then evaluated with respect to Coastal Policies. The alternatives are:

Alternative 1a: "Resource Protection Allowing Infill According to Existing Zoning,"

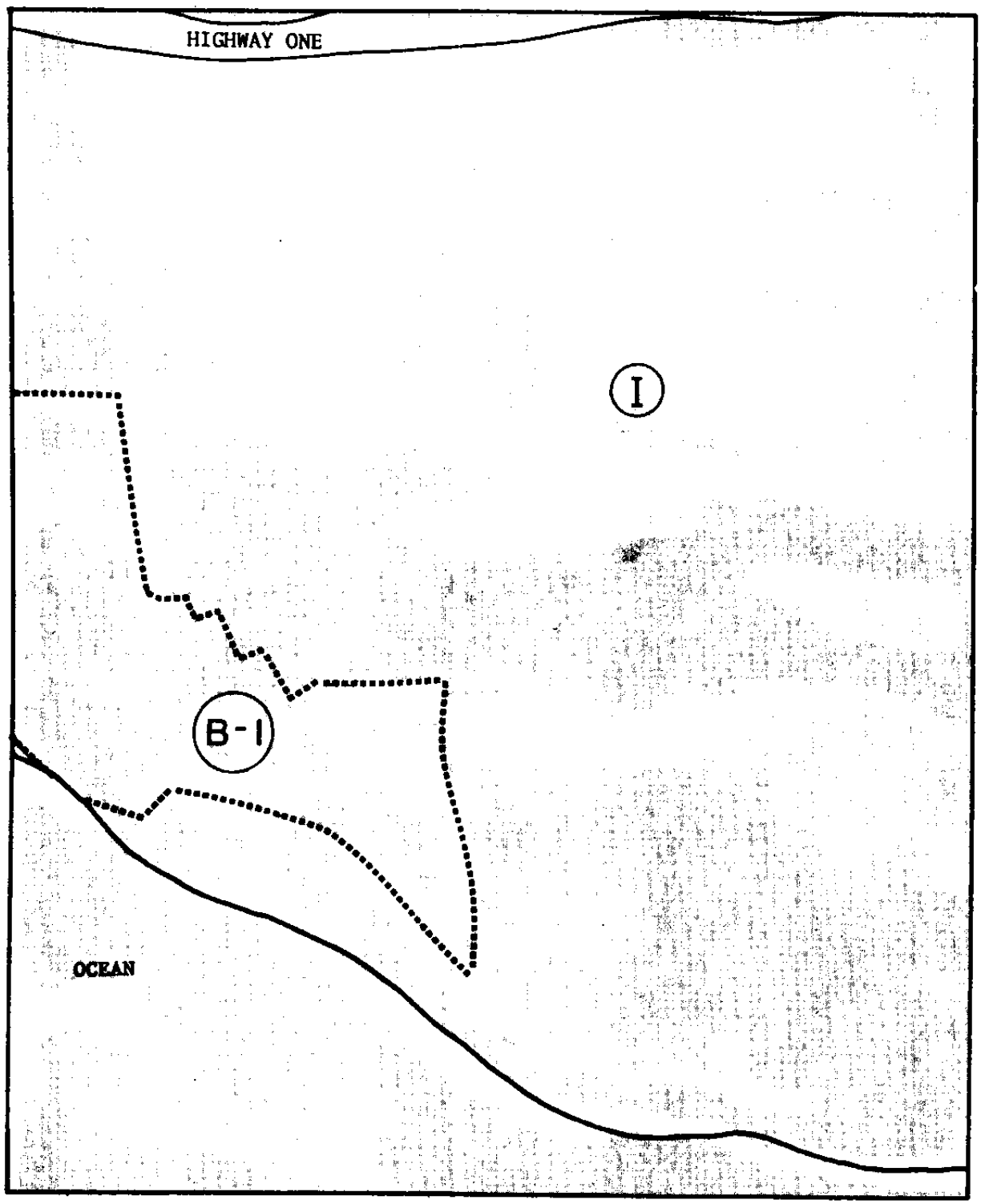
Alternative 1b: "Resource Protection with Reallocation of Densities and Use Mix in Accordance with Coastal Policies on Water and Wastewater Constraints,"

Alternative 1c: "Resource Protection Allowing Concentrated Infill Constrained by Transportation Capacity," and

Alternative 2a: "Limited Growth-Concentrated Development Utilizing Existing Zoning."

Figure V-2

Subdistrict Boundaries



Alternatives 1a and 2a differ from one another with respect to the pattern of development and the total number of acres allotted to development. These two alternatives do not change city and county plans' land use mix. or density within the urban area boundaries established for each alternative.

Alternatives 1b and 1c assume the same urban area boundaries as determined in their "a" counterpart. Alternatives 1b and 1c differ from 1a and 2a in that there is a change in the density and land use mix pattern within the urban area. This represents a further intervention into local land use planning beyond the setting of urban growth lines. The modifications represented in these two alternatives reflect policies dealing with infrastructure constraints, access to the coastline, competition between visitors and permanent residents for facilities, as well as other policy issues.

Each alternative described below will include a discussion of the applicable coastal policies and the criteria employed for determining pattern, mix, and the intensity of use. The three land use maps (Figures V-3, V-4, V-5) accompanying this section serve as a summary of this information.*

Alternative 1a: "Resource Protection Allowing Infill According to Existing Zoning"

This is a restrictive interpretation of area-wide policies on coastal resource protection and concentration of development. Here, resource protection policies have been given the greatest weight when considering permissible land uses. Urban area boundaries for

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*The maps are inserted in a pocket attached to the inside of the rear cover. These maps conceptually designate part of the Half Moon Bay Golf Links for residential use since this property is presently being developed. However, the following analyses are based on a recreational designation for the entire parcel.

Alternative 1a were designated so as to permit infill development of parcels under ten acres in areas that were already moderately to heavily urbanized. The remaining part of the subregion was zoned for agriculture or recreation.

This alternative sets a pattern of development based on the geographic resource protection policies in the Coastal Plan and Coastal Act with particular emphasis on the intent of policy 33* and Coastal Act §30241 and §30250. Two decision rules were used in establishing the boundaries for infill:

1. For partly or fully developed sections:

   In this area, infill boundary lines were drawn to include all continuously developed areas and where

   a. the major portion of the lots were already developed and/or the pattern was such that resource uses were economically infeasible (i.e., in most cases ≤ 10-acre parcels), or

   b. existing improvements (i.e., streets, curbs, utilities, etc.) preclude resource uses.

2. For undeveloped sections (i.e., parcels are generally 5 to 10 acres or are one acre or more but grouped in 5- to 10-acre blocks):

   In these areas, infill boundary lines were drawn around undeveloped areas that have characteristics that make them particularly suitable for development. The two primary characteristics considered were: areas where existing

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*"Designate Use of Remaining Agricultural Parcels Within Highly Developed Areas."

development would interfere with agricultural uses (particularly those areas surrounded on three or more sides by development), and areas where agricultural or other resource use of the parcel is not economically feasible.

Further guidance for decisions along the fringe of developed areas is provided by the following "Fringe-Fill Determination Rule":*

1. Zero to less than five-acre parcels: Parcels in this size range are appropriate for development if more than 50 percent of their boundaries are surrounded by development.
2. Five- to ten-acre parcels: Parcels in this size range are appropriate for development if more than 65 percent of their boundaries are surrounded by development.

The percentages given yield an initial determination which must be weighed against the two basic rules just described. A combination of these three rules allowed for the determination of the final boundaries for Alternative 1a. These three criteria are seen as refined interpretations of policy 33 of the Coastal Plan.†

The three decision rules enabled infill boundary lines to be drawn and all parcels and lots inside these boundaries to be designated as appropriate for future development. For Alternative 1a, the existing zoning was used in both the County areas and the Half Moon Bay area to calculate the number of new residential units and new

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*Coastal Plan policy 32 requires consideration of the subregional agricultural economy before a final land use designation for fringe area parcels is made. It is anticipated that future subregional studies in agricultural areas will focus on the question of economic feasibility.

†Coastal Plan policy 33 is considered to be a means of achieving Coastal Act §30241 and §30250.

commercial establishments to be allowed. A summary of the land use inventory as well as the projected number of new units and added population is presented in Table V-1. The additional 10,400 persons allowed under this alternative would yield an ultimate population of 24,000 persons.* Figure V-3 is a land use map of Alternative 1a showing the locations and densities of the proposed development in the subregion.

Although Table V-1 indicates a possibility of 254 new commercial establishments, it should be emphasized that this number was derived by assuming maximum buildout on minimum lot sizes of 5,000 and 7,500 square feet. What seems more likely is that a much smaller number of new establishments would actually be built. This assumption is based on actual utilization of larger amounts of land for new businesses as well as a fourfold reduction in the anticipated growth in population as compared to the existing plans. Assuming that resident-serving commercial establishments increase in proportion to population growth and that visitor-serving facilities double, Alternative 1a includes 100 new commercial units (see Table V-8).

Alternative 1b: "Resource Protection with Reallocation of Densities and Use Mix in Accordance with Coastal Policies on Water and Wastewater Constraints"

This alternative accepts the infill boundaries defined by the criteria used in Alternative 1a, but alters the existing internal zoning in terms of both density and land use mix. Densities of residential development have been generally lowered to bring the allowed residential development into greater accord with Coastal Policies (in

*This alternative thus requires some expansion of the subregion's water supply.

Table V-1

Alternative 1a: Resource Protection Allowing Infill According to Existing Zoning

District	Total Area Developed or to be developed (acres)	Existing Developed Lots		Existing Undeveloped Land				Potential Additional Units			Potential Additional Population
		Actual	Committed	Open and unsubdivided (acreage)	Res. Lots	Comm. Lots	Indust. Lots	Res.	Comm.	Indust.	
Montara	201	579	-	-	395	4	-	395	4	-	1,272
Moss Beach	176	425	-	9.0	515	14	-	578	14	-	1,860
Princeton	59	36	-	5.0	65	-	75	65	30	75	209
El Granada	394	795	-	1.1	1134	24	-	1333*	24	-	4,007
Miramar	29	72	-	-	119	-	-	119	-	-	383
HMB North	136	458	50	-	51	58	-	51	58	-	164
HMB Central	561	967	182	44.9	402	37	-	1029†	124	-	2,527
HMB South	55	197	-	-	-	-	-	-	-	-	-
TOTALS	1610	3529	232	60.0	2681	137	75	3570	254	75	10,422

*includes SF - 1043 units
2F - 170 units
M - 120 units

†includes SF - 329 units
2F - 223 units
M - 477 units

+Existing Population 13.600

Total Population 24,022

addition to policies used to formulate Alternative 1a). Policy 59, concerning infrastructure, was used to formulate Alternative 1b, with regard to:

1. priorities of coastal-dependent commercial and industrial uses over other commercial uses (Coastal Plan policy 62 and Coastal Act §30255);

2. access to the coastal zone by all people (Coastal Plan policy 121 and Coastal Act §30210, §30211, and §30212).

3. priority of recreation use and access over residential uses or other private development (Coastal Plan policies 131, 132, 133, 134, and 140 and Coastal Act §30220, §30221, §30222, and §30252).

The mix, amount, and location of commercial, industrial, and recreational activities have been evaluated to determine a scheme more compatible with the Coastal Policies. The intensity of residential development to the west of Route 1 has been lowered in previously multiple family areas to decrease highway congestion.

As Table V-2 shows, the number of new residential units and thus added population has been reduced in all of the coastal districts. The goal was to reduce the ultimate population to approximately 18,500 persons in order to stay within the initial estimates of water and wastewater capacities of the subregion.* This reduction has been accomplished for the most part through downzoning of the infill areas. Some purchase of lots is recommended in areas felt to be inappropriate for development because of insufficient infrastructure capacity, or infeasiblity of lot consolidation, and/or not economically viable for agriculture. These figures indicate a possible $1.5 to $2 million purchase cost depending on the accuracy of the assessed values of the parcels in question. These

*Subsequent estimates have shown that more people may be serviced (see Chapters II and III).

Table V-2

Alternative 1b: Resource Protection with Reallocation of Densities and Land Use Mix in Accordance with Coastal Policies on Water and Wastewater Constraints

District	Total Area Developed or to be Developed (acres)	Existing Developed Lots		Existing Undeveloped Land				Potential Additional Units‡			Potential Additional Population
		Actual	Committed	Open and unsubdivided (acres)	Res. Lots	Comm. Lots	Indust. Lots	Res.	Comm.	Indust.	
Montara	201	579	-	-	238	4	-	225	4	-	725
Moss Beach	170	425	-	2.1	385	14	-	145	14	-	467
Princeton	59	36	-	5	-	140	-	-	170	-	-
El Granada	394	795	-	1.1	647	24	-	750*	24	-	2,267
Miramar	29	72	-	-	93	-	-	33	-	-	105
HMB North	136	458	50	-	75	5	-	75	5	-	242
HMB Central	519	967	182	2.4	409	30	-	559†	44	-	1,572
HMB South	55	197	-	-	-	-	-	-	-	-	-
TOTALS	1563	3529	232	10.6	1847	217	-	1787	261	-	5,378

*includes SF - 556 units
2F - 194 units

†includes SF - 259 units
2F - 300 units

‡after lot purchase (see Table V-3)

+Existing Population 13,600

Total Population 18,978

costs can be compared to the cost of increasing water and wastewater capacities to meet the needs of a larger population, as well as with other municipal and special district costs (see Table V-3).

The land use map for Alternative 1b (see Figure V-4) shows the new land use mix and reflects downzoning and purchasing of parcels through a lowering of the average density figures. This alternative provides for an additional 5,738 persons or an ultimate population level of 19,000 persons for the subregion. Table V-2 indicates a possible 261 additional commercial establishments, a reduction from current zoning to reflect the lower density and population levels. The only increase is in the Princeton district which is seen as a prime area for recreational, commercial and other coastal-dependent activities. Again, the same qualification concerning lot size exists as it did for Alternative 1a, in that most commercial establishments will use more than the 5,000 or 7,500 square foot lot size. Using the same assumptions as those given for Alternative 1a above, Alternative 1b includes 69 new commercial units (see Table V-8).

Alternative 1c: "Resource Protection Allowing Concentrated Infill Constrained by Transportation Capacity"

This is the most restrictive alternative and is based upon strict interpretations of the geographically-specific coastal resource protection policies and the concentration of development policies. In addition, little growth in development is allowed based on an initial

Table V-3

Parcels to be Purchased in Developed Areas
to Implement the Development Goals
of Alternative 1b

Subdistrict	Number of lots	Assessed Value (dollars)	Remarks
A-1	3	$ 5,000	West of Route 1
A-2	10	15,000	West of Route 1
B-1	93	80,000	All vacant parcels
B-2	49	40,000	All vacant parcels
B-3	62	70,000	All vacant parcels
B-5	27	30,000	All vacant parcels
B-6	9	20,000	All vacant parcels
E-1	60	60,000	All vacant parcels
TOTALS	313	$ 320,000	

estimate of highway capacity for approximately 14,000 residents.* In all cases, infill is allowed only on land already subdivided into small lots which are presently served by water, streets, and utilities. Also, all infill is limited to Central Half Moon Bay to emphasize the concentration of development policies, with priority given to infill of lots to the east of Route 1. Finally, one large infill area (subdistrict G-4) to the west of Route 1 presently zoned at 29 units per net acre has been downzoned to 17 units per net acre (i.e., duplex density).

Table V-4 shows the amount and location of new growth allowed under this scenario. This alternative would result in a total subregional population of approximately 15,000. No map was prepared for Alternative 1c. The land use map for Alternative 1b would apply with the following modification. The only new development allowed would be infill as described above. Thus, all other residential areas presently containing undeveloped lots would realize a decrease in ultimate development density, in proportion to the number of unbuilt lots to be purchased. This alternative essentially puts a freeze on new development in all districts except Central Half Moon Bay.

No presently zoned commercial acreage is slated for either acquisition or conversion to residential use, leaving 149 acres designated for commercial use. This includes the area in Princeton which is seen as a prime location for commercial recreation activities as described in Alternative 1b. But using the same assumptions as above, Alternative 1c includes 45 new commercial units as likely (see Table V-8).

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*Based on assumptions of 2.6 residents per commuter, all commuters traveling at rush hour, 1.18 rush hour commuters per vehicle, 2 peak hours, one way road capacities of 1190 and 1057 (total = 2247) and no local competition (see Chapter IV for discussion of various possible assumptions).

Table V-4

Alternative 1c: Resource Protection Allowing Concentrated Infill Constrained by Transportation Capacity

District	Total Area Developed or to be Developed (acres)	Existing Developed Lots		Existing Undeveloped Land				Potential Additional Units*			Potential Additional Population
		Actual	Committed	Open and unsubdivided (acres)	Res. Lots	Commm. Lots	Indust.	Res.	Comm.	Indust.	
Montara	201	579	-	-	395	4	-	-	4	-	0
Moss Beach	168	425	-	-	515	14	-	-	14	-	0
Princeton	59	36	-	5.0	-	140	-	-	170	-	0
El Granada	393	795	-	-	1134	24	-	-	24	-	0
Miramar	29	72	-	-	119	-	-	-	-	-	0
HMB North	136	458	50	-	51	58	-	-	58	-	0
HMB Central	518	967	182	2.4	402	37	-	514†	51	-	1,427
HMB South	55	197	-	-	-	-	-	-	-	-	0
TOTALS	1559	3529	232	7.4	2616	277	-	514	321	-	1,427

*after lot purchase (see Table V-5)

†includes SF - 214 units
2F - 300 units

+Existing Population 13,600

Total Population 15,027

Given the existence of over 2,000 remaining small vacant lots which are located within already developed areas serviced by water, streets, and other utilities, this scheme may require the purchase of many, if not all, of the remaining undeveloped lots. Table V-5 shows the location and number of these lots in the subregion. Tables V-6a through V-6g give the approximate cost by subdistrict for the purchase of these lots. The values are those of unimproved parcels on those assessor's book-pages which most closely correspond to the zones enumerated in Table V-5. The costs for acquisition of the restricted parcels contained within already urbanized areas would range from $8 to $10 million or more depending on how close the assessed cash value is to actual market value (i.e., assessed value x 4).

Alternative 2a: "Limited Growth - Concentrated Development Utilizing Existing Zoning"

This alternative places all growth beyond the levels allowed in Alternative 1a for the City of Half Moon Bay. The infill pattern is extended to include larger parcels of presently vacant lands within the city limits in an attempt to form a unified and contiguous area for limited growth and expansion within the existing urban core. This scheme allots equal weight to the resource protection policies and the concentration of development policies in the Central Half Moon Bay area, but still emphasizes the resource policies in all other sections of the subregion. In Alternative 2a, some resource lands are allowed to urbanize in order to achieve development contiguity. The major policy consideration in Alternative 2a is to concentrate development and thereby achieve advantages of concentrated over sprawled or strip development (e.g., better internal transit, lower public service costs,

Table V-5

Location and Number of Unbuilt Lots and Large Parcels Requiring Purchase for Alternative 1c

Location*	Lots	Large Parcels (Acres)
A-1	30	-
A-2	365	-
B-1	93	-
B-2	49	6.9
B-3	62	-
B-5	27	-
B-6	9	-
B-8	55	2.1
B-10	199	-
B-11	21	-
D-2	1037	-
D-3	9	-
D-4	85	-
D-6	3	-
D-8	-	1.1
E-1	60	-
E-2	40	-
E-3	19	-
Total county	2163	10.1

Location	Lots	Large Parcels (Acres)
F-4	5	-
F-6	4	-
F-7	39	-
F-9	3	-
G-6A	18	-
G-6B	20	-
G-37	-	1.1
G-45	16	-
G-62	28	-
Total city	133	1.1
Total subregion	2296	11.2

*A - Montara B - Moss Beach D - El Granada
E - Miramar F - HMB North G - HMB Central

Table V-6

Location and Value of Unimproved Parcels to be Purchased for Alternative 1c

Table V-6a Montara

Book-Page	Assessed Value
3601	$ 38,263
3602	35,312
3603	24,573
3604	20,700
3605	50,072
3606	41,442
3607	27,031
3609	29,625
3610	45,153
3612	27,225
3701	28,067
TOTAL	$ 367,463

Table V-6b HMB North

Book-Page	Assessed Value
4821	$ 13,900
4829	47,725
4811	32,750
4812	31,375
TOTAL	$ 125,750

Table V-6c HMB Central

Book-Page	Assessed Value
5605	$ 21,950

Table V-6 (continued)

Table V-6d Moss Beach

Book-Page	Assessed Value
3706	$ 51,278
3707	21,711
3708	57,563
3709	73,091
3710	13,323
3711	35,652
3712	66,000
3713	34,240
3714	36,294
3715	43,947
3717	26,054
3718	39,078
3719	27,305
3720	0
3721	14,205
3725	40,686
3733	0
3734	0
3735	0
TOTAL	$ 580,427

Table V-6e El Granada

Book-Page	Assessed Value
4705	$ 20,838
4706	16,200
4707	68,342
4709	35,259
4710	63,968
4711	52,078
4712	55,605
4713	42,533
4717	56,000
4718	64,750
4719	36,256
4720	62,481
4721	79,430
4722	44,628
4723	36,088
4724	48,619
4727	44,686
4728	23,800
4729	29,403
TOTAL	$ 880,964

Table V-6f Miramar

Book-Page	Assessed Value
4803	$ 30,635
4804	33,256
4805	12,225
4806	29,727
TOTAL	$ 105,843

Table V-6g TOTALS

Total county	- $ 1,934,697
Total city	- $ 147,700
Total Subregion	- $ 2,082,397
Approximate market value (x4)	- $ 8,329,588

and less land consumption). This alternative uses Alternative 1a as a starting point and employs its infill and fringe criteria in all areas, except in the Central Half Moon Bay area where added lands are allowed to develop so as to provide for a continuous urban core. After the urban lines have been redrawn, the existing zoning is again used to define the ultimate density and mix of development.

Table V-7 shows that Alternative 2a provides for an additional population of 13,300 persons, which yields an ultimate population level of 26,900 persons. It also provides for an additional 395 commercial units. This alternative is mapped in Figure V-5.

SUMMARY OF THE FOUR ALTERNATIVES

For each of the alternatives just described, the Central section of Half Moon Bay was chosen for application of the concentration of development policies when a choice was necessary. Since the majority of urban and commercial services are located in Central Half Moon Bay, concentration of development follows the existing pattern. For those alternatives which allow significant growth, it is most appropriate to channel the major portion of that growth into this section of the subregion.

Tables V-8 through V-10 summarize the similarities and differences among the four alternatives. Table V-8 shows the likely number of industrial and commercial parcels to be developed. Industrial development is proportional to population increases, while commercial development is proportional to population plus tourist increases. Tables V-9 and V-10 allow comparison of residential characteristics and land use among the alternatives. Although both tables show little variation in residential acreages among alternatives, it can be seen

Table V-7

Alternative 2a: Limited Growth-Concentrated Development Utilizing Existing Zoning

District	Total Area Developed or to be Developed (Acres)	Existing Developed Lots		Existing Undeveloped Land				Potential Additional Units			Potential Additional Population
		Actual	Committed	Open and unsubdivided (Acres)	Res. Lots	Comm. Lots	Indust. Lots	Res.	Comm.	Indust. Lots	
Montara	201	579	-	-	395	4	-	395	4	-	1,272
Moss Beach	176	425	-	9.0	515	14	-	578	14	-	1,860
Princeton	59	36	-	5.0	65	-	75	65	30	75	209
El Granada	394	795	-	1.1	1134	24	-	1333*	24	-	4,007
Miramar	29	72	-	-	119	-	-	119	-	-	383
HMB North	136	458	50	-	51	58	-	51	58	-	164
HMB Central	819	983	182	261.3	615	37	-	2291†	265	64	5,418
HMB South	55	197	-	-	-	-	-	-	-	-	-
TOTALS	1868	3545	232	276.4	2894	137	75	4832	395	139	13,313

*includes SF - 1043 units
2F - 170 units
M-120 units

†includes SF - 594 units
2F - 443 units
M - 1254 units

+Existing Population 13,600

Total Population 26,913

Table V-8

Summary of Commercial and Industrial Units

Alternatives	Commercial Parcels: Current Number of Parcels* Local	Current Number of Parcels* Tourist	Additional Parcels Local†	Additional Parcels Tourist‡	Total	Total Acres Zoned
1a	83	36	54	36	219	136
1b	83	36	33	36	188	129
1c	83	36	9	36	164	149
2a	83	36	81	36	236	157
4a	83	36	291	36	446	301
4b	83	36	247	36	402	307

Distribution of Additional Parcels
Based on Land Use Allocations
(Shown in Table V-9)

Alternative / District	Commercial 1a	1b	1c	2a	4a	4b	Industrial 1a	1b	1c	2a	4a	4b
A	1	2	-	1	9	7	-	-	-	-	-	-
B	5	6	3	4	24	21	-	-	-	-	9	17
C	25	30§	30§	21	32	27	13	1	6	11	20	38
D	8	10	0	7	53	45	-	-	-	-	-	-
E	0	0	0	0	9	7	-	-	-	-	-	-
F	19	2	1	16	34	29	-	-	-	-	20	-
G	41	19	11	68	166	141	2	1	1	8	18	-
H	0	0	0	0	0	0	-	-	-	-	-	-

*: split is based on attributing the difference in the per capita sales volume between San Mateo Co overall and Half Moon Bay to tourists; and applying that percentage (30%) to the total number of existing commercial units.

†: based on increase proportional to population reflects (1) 1 commercial unit for each additional 164 people; (2) 1 industrial unit for each 715 additional people.

‡: based on expected doubling of recreational use.

§: proposed concentration of tourist-related commercial activities.

Table V-9

Summary of Residential Characteristics of the Four Alternatives

District	Type of Unit	ALTERNATIVES											
		1a			1b			1c			2a		
		Acres*	New Units	Added Pop.†	Acres	New Units	Added Pop.	Acres	New Units	Added Pop.	Acres	New Units	Added Pop.
Montara	SF	193	395	1272	193	225	725	193	0	0	193	395	1272
Moss Beach	SF	161	578	1860	161	145	467	161	0	0	161	578	1860
Princeton	SF	18	65	209	0	0	0	0	0	0	18	65	209
El Granada	SF	331	1043	3358	331	556	1790	331	0	0	331	1043	3358
	2F	39	170	418	42	194	477	42	0	0	39	170	418
	Multiple	3	120	231	0	-	-	0	0	0	3	120	231
Miramar	SF	29	119	383	29	33	105	29	0	0	29	119	383
H.M.B. North	SF	115	51	164	134	75	242	134	0	0	115	51	164
H.M.B. Central	SF	326	329	1059	305	259	834	305	214	589	484	594	1912
	2F	50	223	548	57	300	738	57	300	738	66	443	1089
	Multiple	24	477	916	0	-	-	0	0	0	61	1254	2408
H.M.B. South	SF	5	-	-	5	-	-	5	-	0	5	-	-
	Mobile Home	50	-	-	50	-	-	50		0	50	-	-
TOTALS		1344	3570	10422	1307	1787	5378	1307	514	1427	1788	4832	13304
+Existing Population				13600			13600			13600			13600
Total Population				24022			18978			15027			26904

*Acres - total residential acres with areas designated for continued urban development; in each plan.

†Population Multipliers: 3.22 for SF; 2.46 for Two Family; 1.92 for Multiple and trailer; in each plan.

Table V-10

Summary of Land Use Types by Acreage for the Four Alternative and Two Existing Commitment Plans

Subarea	Land Use Type	Number of Acres for Each Alternative					
		1a	1b	1c	2a	4a	4b
Montara	Residential	193	193	193	193	652	652
	Commercial	8	8	8	8	8	8
	Industrial	0	0	0	0	0	0
	Institutional	0	0	0	0	0	0
	Agricultural	81	81	81	81	0	0
	Recreational	34	34	34	34	19	19
	Hazard	0	0	0	0	0	0
	Open Space Res.	363	363	363	363	0	0
Moss Beach	Residential	161	154	152	161	365	365
	Commercial	12	12	12	12	23	23
	Industrial	0	0	0	0	16	16
	Institutional	4	4	4	4	9	9
	Agricultural	16	16	16	16	0	0
	Recreational	53	53	53	53	30	30
	Hazard	22	22	22	22	0	0
	Open Space Res.	175	182	184	175	0	0
Princeton	Residential	18	0	0	18	47	47
	Commercial	5	31	31	5	30	30
	Industrial	36	28	28	36	35	35
	Institutional	0	0	0	0	0	0
	Agricultural	2	2	2	2	0	0
	Recreational	24	24	24	24	0	0
	Hazard	27	27	27	27	0	0
	Open Space Res.	0	0	0	0	0	0
El Granada	Residential	372	372	371	372	464	464
	Commercial	10	10	10	10	50	50
	Industrial	0	0	0	0	0	0
	Institutional	12	12	12	12	12	12
	Agricultural	17	17	17	17	0	0
	Recreational	56	56	56	56	0	0
	Hazard	19	19	19	19	0	0
	Open Space Res.	40	40	41	40	0	0
Miramar	Residential	29	29	29	29	107	107
	Commercial	0	0	0	0	8	8
	Industrial	0	0	0	0	0	0
	Institutional	0	0	0	0	0	0
	Agricultural	74	74	74	74	0	0
	Recreational	12	12	12	12	0	0
	Hazard	0	0	0	0	0	0
	Open Space Res.	0	0	0	0	0	0
Half Moon Bay North	Residential	115	133	115	115	952	602
	Commercial	20	2	20	20	50	32
	Industrial	0	0	0	0	36	0
	Institutional	0	0	0	0	40	61
	Agricultural	474	474	474	474	140	549
	Recreational	132	132	132	132	144	122
	Hazard	54	54	54	54	41	36
	Open Space Res.	607	607	607	607	0	0
Half Moon Bay Central	Residential	400	371	368	611	846	688
	Commercial	81	66	68	102	124	156
	Industrial	4	4	4	25	32	0
	Institutional	78	78	78	78	46	92
	Agricultural	373	427	427	240	0	69
	Recreational	110	110	110	110	157	189
	Hazard	83	83	83	83	55	61
	Open Space Res.	121	121	122	11	0	5
Half Moon Bay South	Residential	55	55	55	55	794	661
	Commercial	0	0	0	0	8	1
	Industrial	0	0	0	0	0	0
	Institutional	0	0	0	0	23	33
	Agricultural	525	525	525	525	0	132
	Recreational	420	420	420	420	175	123
	Hazard	35	35	35	35	35	35
	Open Space Res.	0	0	0	0	0	110
TOTAL		5572	5572	5572	5572	5573	5572

from Table V-9 that there is considerable variation in the number of residential units, and thus in residential density. Only two of the alternatives envision purchase of parcels in developed areas as part of the implementation program. The full acquisition costs for Alternative 1b would be approximately $1,500,000, while the costs for Alternative 1c would be approximately $9,000,000.

Appropriateness of the Alternatives

These alternatives have been developed for the purpose of combining impact assessment with a consideration of land use and recreational use alternatives.* However, in terms of revised service capacity estimates and planned expansions it appears that Alternatives 1a and 2a are more consistent with service capacity. Chapters II and III show that proposed wastewater and water capacity increases will serve 23,800 and 25,500 residents respectively. Furthermore, if acquisition were the only technique available to keep certain parcels from being developed, Alternatives 1b and 1c would lose their feasibility. In fact, due to continued growth in the subregion, Alternative 1c now represents the baseline condition. For this reason Alternative 1c serves more as a comparison than as a viable alternative, unless a no-growth policy is proposed for the subregion. Alternative 2a may be viewed as a future addition to 1a, if the proposed service expansions do become operational. Based on permit criteria used for subdivision permits, development in the new areas of Alternative 2a should be delayed until all infilling that would be allowed under Alternative 1a is at least 80 percent completed. This 80 percent rule would provide better

*See Chapter VI.

utilization of the existing infrastructure as well as allowing additional time to better plan for further increases in population.

Limitations and Constraints of the Preceding Analysis

The preceding analysis is subject to three qualifications. First, the buildout of residential units calculated for the four alternatives did not account for possible additional units in the ninth district which is defined as all county lands not included in the first eight districts ("Other County" on maps). There are two reasons for this exclusion. To begin with, parcels in this district are quite large in terms of acreage, and only five of them have a use classification of "vacant." Half of the parcels are in active agricultural use and a large part of the second half already have residential units on them. Secondly, San Mateo County's resource management program suggests that the areas near and to the east of the eight coastal districts remain in agricultural use and that only limited development should occur on these lands. Any other development that might occur farther east in the hills will be at a very low density in conformance with resource management zoning, and therefore will have little impact on the environment and the highway system. For these reasons, a parcel by parcel determination was not made in these areas. The ninth district areas are generally shown in white on land use maps.

The second qualification is that the unit and population projections are calculated in terms of ultimate holding capacity. The assumption is that every lot will be built to the maximum allowed by the zoning. For the infill-only alternatives and on lands zoned for single family units, this is probably a reasonable assumption. But for expansion areas or areas zoned at multiple units per lot, the actual buildout will undoubtedly be somewhat less than the maximum. Given the

restricted levels of the four alternatives, the variation in most cases would be on the order of 500 to 1,000 units at most. This possibility should be considered when evaluating the alternatives against infrastructure constraints.

Finally, growth rates have not been projected over time. The San Mateo Coast Corridor Evaluation done by ABAG/MTC indicates a projected 1990 population level of 18,000 - 19,000 for the recommended "compact growth scenario" for the subregion. This is in contrast to 24,000 proposed by the City of Half Moon Bay (AMBAG/MTC, p. 37). The ABAG/MTC scenario provides for a maximum potential population of 34,400 persons. This figure is approximately 7,400 more than the population allowed under Alternative 2a of this study. One could assume then, if the ABAG/MTC figures are accepted, that the projected 1990 population level for all the coastal alternatives of this study except 1c would be approximately 15,000 to 18,000 persons.

FURTHER EXPANSION AND REFINEMENT OF THE ALTERNATIVES

To provide additional information for impact assessment it may be necessary to expand the initial land use and population level components of the development alternatives. Also, some aspects originally omitted might be judged relevant and in need of further work, such as planning for the non-urbanized part of the subregion or including a program for phasing development over time. As the local coastal plans undergo review and assessment, they may require further revisions or it may be necessary to develop additional alternatives. For example, the following information could be included as part of each plan alternative: housing cost, housing size, agricultural acres by agricultural/floriculture use, schools (number, size, location, cost), roads (location, cost), transit,

mobile home component of predicted residential mix, bikeways and trails, and non-urbanized acres by ownership (public/private). Collectively, these elements should be consistent with the initial local coastal plan components. For example, housing size and cost must be stated in a manner that does not invalidate the population multipliers.

In certain subregions special development characteristics, such as fluctuations in resource and service use, may exist which may require that alternatives be developed to reflect specific assumptions related to these uses. For example, subregions with office/commercial centers will receive substantial numbers of commuters during business hours, areas which contain a university will show an influx of students during the school year, and coastal subregions will experience greater use during vacation and summer months.

Given the shoreline components of all coastal subregions together with the Coastal Commission's mandate that high priority is to be given to recreational uses, all subregional studies will include some recreational analysis. The following section outlines the manner in which the recreational component can be included with the four Land Use Alternatives.

RECREATION COMPONENT FOR THE HALF MOON BAY SUBREGION

CCZCC policies contained in the Coastal Plan and Coastal Act with respect to recreation are:

- Basic Policy: Increase coastal recreation compatible with resource protection. (131)* {30210}†

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*Coastal Plan policy number in parentheses.

†Comparable Coastal Act sections in brackets.

- Consider recreational potential before allowing other uses of oceanfront land. (132) {30220, 30221}
- Give priority to commercial recreation over other private development. (133) {30222}
- Reserve shoreline areas for recreation activities that need access to water. (134) {30220, 30221}
- Restrict substantial alterations along the coast for recreation. (135) {30251}
- Reserve upland areas for recreational support. (136) {30223}
- Provide a variety of recreational facilities near metropolitan areas (137) {30212.5}
- Balance development with open space and recreation facilities. (140) {30252}
- Establish long-range program to protect recreational resources. (144) {30210, 30212, 30212.5}

Data Base and Methodology Overview

The attempt has been made to consider recreational data with all phases of the subregional analysis. It was found, however, that existing recreational data for the Half Moon Bay subregion was incomplete and future projections of use were unreliable. Since recreational use is directly dependent upon transportation into and out of the area, the transportation model described in Chapter IV was used to develop projections for the estimated number and distribution of visitors. Data collected for this analysis included descriptions of existing and proposed facilities (see Appendix B-4).

Local plans for the Half Moon Bay area commit the entire shoreline to park use. The four Land Use Alternatives basically follow this designation. In other subregions, an analysis of land use potential for recreation and present and projected recreation demand may be necessary before designating recreation uses on alternative land use plans.

When the alternatives were developed for the subregion, their land use and population levels were used in the transportation model to determine recreational use for each alternative and the impacts of that use-type and level on the highway system.* The number of recreationists could then be combined with the local population figure in order to measure other non-recreational impacts for each alternative. Despite the uncertain nature of recreation forecasting, it is possible to designate a range of low, middle and high recreational use for each of the alternatives.

Recreational Facilities and Use

Existing facilities. The four major shoreline recreation areas of the Half Moon Bay subregion have been described in Chapter IV and are summarized in Table V-11. It should be noted that although the actual park area is 218 acres, more of the beach has been publicly acquired.† In addition to the beaches there are the Half Moon Bay Golf Links and Pillar Point Harbor (with boat moorings, launching ramp, and fishing pier). Other public lands lie inland and outside of the eight districts of the focus of this analysis. Information on existing recreational areas concerning land ownership, location and size was obtained during the analysis of the present commitment to growth (see Chapter I). Estimates of recreation use were provided by the Department of Parks and Recreation, and local rangers and managers of the facilities‡ (see Table V-12).

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*See Chapter VI.

†As beach acquisition has been and is a continuing activity, different data sources vary in their area figures due to different publication dates.

‡Estimates for recreation use are based on sample counts, usually of cars, therefore they may not represent absolute numbers of visitors.

Table V-11

Existing Beach Facilities

Beach	Capacity *	Park † Acres	Ocean Front. (in ft.)	Sandy Beach (in ft.)	Parking Spaces	Parking Acres	Drinking Water	Picnic Tables	Rest-rooms	Camp Sites
Gray Whale Cove	-	3	300	300	410	2.8	-	-	-	-
Montara	90	13	4,000	1,100	30	0.2	-	-	2	-
Fitzgerald ‡	181	32	5,000	-	46	-	x	x	x	-
Half Moon Bay	4,116	170	11,025	11,025	510	3.5				
Miramar					-		-	-	-	-
Roosevelt					70		-	-	x	-
Venice					50		-	-	x	-
Dunes					150		x	-	x	-
Francis					240		x	x	3	50
Sweetwood					8		-	-	x	50

*Maximum people at one time according to county or state park standards.
†As noted in the text, acreage figures are increasing due to continuing acquisitions.
‡Also has horse trails.

Sources: State of California Department of Parks and Recreation "State Beaches of San Mateo County" pamphlet and "San Mateo Coastal Area, Area Operations Plan." San Mateo County. Fitzgerald Marine Reserve Concept Plan, 1974.

Table V-12

Beach Use Data

Beach	Memorial Day (3-day wknd) 1973	July 4 1973	Labor Day, (3-day wknd) 1973	June 1973	June-Aug. 1973	July '72 June '73	June 1972	July '71- June '72
Gray Whale Cove	-	400	310	-	-	not open	not open	not open
Montara	860	720	500	9,786	25,231	83,204	7,699	81,008
Fitzgerald	2,130	520	1,590	N.A.	41,860*	77,807	N.A.	84,865
Half Moon Bay	9,400	8,300	5,800	103,925	268,623	823,829	60,093	574,900
TOTALS	12,390	9,940	10,200	-	335,714	984,840	-	740,773

*includes May and September

Beach	July '74 June '75	July '73 June '74	Peak Month '74 - '75	Peak Month '73 - '74
Gray Whale Cove	19,559	19,495	3,382 (July)	3,701 (May)
Montara	119,663	80,349	13,386 (Aug)	12,758 (June)
Half Moon Bay	1,302,920	883,885	149,610 (Aug)	141,703 (June)

Since beach-goers are often either unaware or not respectful of private property boundaries, use is often not limited to the park areas. Table V-13 shows the total area of available sandy beach in the subregion and the number of people that could be accommodated. This figure varies depending on the density of beach use and the turnover rate.

According the State Parks and Recreation standards, Half Moon Bay State Beach had its design capacity exceeded 20 out of a total of 92 summer days, while Montara was over capacity 90 of the 92 days. Concerning boating related uses, the EIR for Pillar Point Harbor states that there is a waiting list of 230 berths for facilities not yet constructed, and a similar excess demand at Santa Cruz Yacht Harbor (EIS, Pillar Point, 1972).

Commercial recreation facilities for beach-goers are currently limited to 20 establishments with a combined capacity of 943 restaurant/lounge seats and 56 overnight rooms (see Table V-14). No use data has been collected for hotel-motel facilities, but since most rooms are rented out by the week or month, it can be assumed that overnight accommodations are extremely limited.

Current proposals for expanded facilities. Both the County and Coastal Commission's Plans recommend expansion of public ownership of land in the Montara-Gray Whale Cove Beach area. The Commission proposes acquisition of 60 acres of shoreline between the two beaches.* The county recommends a 38 acre extension of Montara Beach and further public ownership around the Cove.†

*California Coastal Zone Conservation Commission. Recommended Public Properties for Public Acquisition. March 1976.

†California, San Mateo County. "Parks and Open Space." San Mateo County General Plan. San Mateo, June 1968.

Table V-13

Design Peak Beach Use

Beach	Sandy Beach frontage (in ft.)	Sandy Beach estimated area (sq.ft.)	Use Standard (sq.ft./person)	Persons at Beach at any one time	Total Daily Persons 1.5 -turnover- 3.0	
Gray Whale Cove	3,200	320,000	600	533	800	1,599
Montara	9,600	960,000	600	1,600	2,400	4,800
So. Pillar Point	5,600	560,000	100	5,600	8,400	16,800
Half Moon Bay	10,400	1,040,000	100	10,410	15,615	31,230
Miramontes	10,400	1,040,000	600	1,735	2,063	5,205
TOTAL	39,200	3,920,000 = 90 acres		19,878	29,817	59,634
Annual Visitors					1,192,680	2,385,360

Notes:
Fitzgerald Marine Reserve not included because of its reserve status; it is not planned to be developed to peak capacity.
Estimated area is 100 sq. ft. for each foot of frontage; actual park area (including non-sandy ocean frontage and extending farther inland) is likely much greater; this back-up area can also support people for activities such as picnicking and sports.
Use standard varies for beaches based on current experience.
Total daily persons based on turnover rates of 1.5 and 3.0.
Annual visitors based on California Department of Parks and Recreation standard that peak usage is 2.5% of annual total.
A similar analysis using - 600 $ft.^2$/person for all beaches yields 370,520 - 784,080 annual visitors.
- 100 $ft.^2$/person for all beaches yields 2,353,200 - 4,706,400 annual visitors.

Table V-14

Private Recreational Service Facilities

Name of Facility	Approximate Occupancy Cocktail Lounge/Restaurant	Hotel
Half Moon Bay		
1. Half Moon Bay Inn	65	
2. Cypress House	33	
3. Enterprise Saloon and Eatery	45	
4. Blanda's Italian Delicatessen	25	
5. Carter's Cafe	40	
6. La Dolce Pizza	45	
7. Sno White Drive-In	15	
8. Red Baron Coffee Shop	9	
9. Original Johnny's	48	
10. Pete's Coffee Shop	15	
11. Domenics	70	20
12. Moby Taco	33	
Princeton by the Sea		
13. The Shore Bird	55	
14. Hazel's Place	25	
15. The Crab Cottage	40	
16. Ida's Seafood Grotto	35	
Moss Beach		
17. Dan's Place	110	16
18. The Moss Beach Distillery	80	
Montara		
19. Frank Torres Beach Hotel	125	16
20. The Ace of Cups	30	

*Motel/Hotel rooms rented generally by week and month.

Source: Jim Hemmann, "Recreation Alternative Future for the Half Moon Bay Area" University of California, Berkeley, Department of Landscape Architecture, 1975.

The County proposes that its Fitzgerald Marine Reserve be expanded to 184 acres and developed as a low-intensity use area (Fitzgerald Marine Plan, 1974). One hundred parking spaces are planned at its northern entrance and 200 spaces at the south, with only foot-trails traversing the reserve. Some walk-in picnic sites are also provided Eight hundred thousand dollars for the purchase of 40 acres is available from a special tax approved by the voters in 1972. This project is also on the Coastal Commission's proposed acquisitions list.

A development plan for Pillar Point Harbor proposed by the San Mateo County Harbor District has been revised to be presented for Coastal Commission approval (San Mateo Harbor District, 1972). It includes docking for about 1,100 recreation boats, a launch ramp, a smaller commercial docking area with back-up facilities, a service station-motel-restaurant complex, and ancillary boat services.

At Half Moon Bay State Beach, plans have been approved to convert a day-use parking lot and de facto camping area into a full service campground, primarily for recreational vehicles (California Department of Parks and Recreation, 1975-1976).

South of the Half Moon Bay State Beaches, the Coastal Commission recommends the acquisition of 220 acres encompassing 5 miles of ocean frontage for general recreation use. A similar proposal is contained in San Mateo County's general plan which proposes complete public ownership between El Granada and Purisima Creek.

In addition to beaches, there are other recreation-open space possibilities in the subregion. As mentioned, the golf course is already constructed. However, Alternatives 1a, 1b, 1c, and 2a

designate the entire golf course parcel for recreation use rather than for residential development as proposed by the owners.* The undeveloped portion of the golf course and ocean frontage could be used for park purposes.

The "Parks and Open Space" element of the San Mateo County General Plan proposes the acquisition of several upland areas in the Half Moon Bay subregion including:

Green Valley - proposed park
Montara Gulch - cultural-recreation center
San Vicente Creek - golf course or park
Denniston Creek - golf course or park
Corinda Canyon - proposed park
Diggs Canyon - camping and day use park
Pilarcitos Creek - camping and day use park
Mills Creek - proposed park

Also, the northern portion of the subregion is under easement as San Francisco Watershed land and may eventually be opened to the public.

Commercial recreation centers and visitor-serving commercial facilities. While major public recreation areas will be of primary concern in subregional plans, provision for private facilities should also be considered. Because Coastal Act §30222 gives priority to commercial recreation uses, a portion of the commercial acreage allocated under under each alternative has been assumed to serve recreational users.

Alternatives 1a and 2a devote 25 acres to commercial recreation in Princeton and the Miramar Beach area of Half Moon Bay while Alternatives 1b and 1c allocate approximately 17 acres to coastal-dependent commercial usages in Princeton. In addition there is the proposed commercial development at Pillar Point. No conceptual designs have been proposed for these areas other than for Pillar Point (San Mateo Harbor District, 1972). There are two types of possible facilities: primarily

*Some of this land is already being developed.

tourist-commercial stores with heavier emphasis on gift shops and restaurants in a special setting (e.g., fish wharf recreated old village) or major commercial recreation facility such as an amusement park, stadium, or aquarium.

While it is difficult to categorize commercial facilities as either visitor or local serving, it is possible to identify two groups of visitor-serving businesses.* The first group includes hotels, motels, and some specialty shops that are developed on the basis of expected use of the area's recreational facilities, and which cater almost exclusively to outsiders. Yet it is difficult to predict how many of these facilities will actually develop under each alternative because the decision to open such a business may be quite subjective. Rather than basing such decisions on multipliers (e.g., one motel room for each 200 beach users), entrepreneurs usually increase their facilities as existing ones become crowded. The fact that beach use is so variable and irregular complicates this decision.

The other group of visitor-serving businesses includes those that also cater to local clientele, such as restaurants, gas stations, hardware stores, and the like. While certain firms in each of these categories may be more oriented to one type of clientele, it is possible to develop approximate customer splits by category through the use of surveys (e.g., 50 percent split for restaurants between local and outside customers; 25-75 percent split for gas stations). Then, a projected number of future facilities can be determined for each alternative by using the respective population and visitor multipliers.

*Appendix A presents a land use classification system based on the Coastal Plan policies.

Future Recreational Demand

Estimation of future recreational use is dependent upon the definition of assumptions concerning future leisure time, relative attractiveness of comparable recreational sites, and competing attractions. Any estimates of future recreational use will be constrained by the accuracy of the estimates for each of these factors. Projections of future recreational use are utilized in two steps of the collaborative planning process:

1. to estimate the demand and related level of facility development for each alternative plan; and
2. to estimate the number of recreationists and the associated service requirements (i.e., water supply, wastewater, etc.) for use in the assessment of impacts of each alternative land use plan.

To provide a justifiable and disaggregated picture of beach use, the model described in Chapter IV was employed to estimate recreational use for each of the alternative scenarios. In summary, the model uses assumptions and data for local weekend trips which compete for highway capacity with visitor beach trips. The model also applies assumptions concerning: the rate of increase in vehicles passing through the subregion, recreational demand (which reflects increased leisure time and Bay Area population), the varying attractiveness of the beaches, beach arrival patterns depending on time of day, and beach capacity

Table V-15

Projected Peak Instantaneous Beach Use*

Beach Alternative	1c	1b	1a	2a	4b	4a
Gray Whale Cove						
Peak users	1014	1215	1449	1548	2244	2562
sq. ft./person	316	263	221	207	143	125
Montara						
Peak users	1638	2004	2424	2754	6336	6777
sq. ft./person	586	479	396	349	152	142
Half Moon Bay						
Peak users	3741	4224	4770	4985	5175	5175
sq. ft./person	278	246	218	209	201	201
Miramontes						
Peak users	3450	3843	4295	4617	6216	8556
sq. ft./person	301	271	242	225	167	122

*Based on beach use standard not to exceed 100 sq. ft./person; turnover rate of 1.5

†Unusual overflow condition

Table V-16

Total Daily Beach Use on a Peak Day*

Beach Alternative	1c	1b	1a	2a	4b	4a
Gray Whale Cove	1545	1857	2214	2367	3444	3936
Montara	2502	3072	3720	4161	8862	10272
Half Moon Bay	5661	6405	7241	7641	8329	8490
Miramontes	5211	5820	6513	7008	9594	12615
Pillar Point	3243	3792	4392	4776	7116	8379
Daily Users (arriving by car)	18162	20946	24080	25953	37345	43692
Total Annual Users†	726480	837840	963200	1038120	1493800	1747680

*Based on beach use standard not to exceed 100 sq. ft./person; turnover rate of 1.5; 3 people per car

†Based on parks and recreation rule of thumb that peak-day visitors are 2.5 percent of annual visitors

(set at a 100 square foot per person minimum).* The beach areas of Table V-13 have been used with the following exception: South Pillar Point and 250,000 square feet of Half Moon Bay State Beach are excluded as beach areas due to expansion and development of Pillar Point Harbor. Similarly, Fitzgerald Marine Reserve is not included due to its status as a reserve. The model is based on peak traffic counts of July 1974, and assumes three people per car and a turnover rate of 1.5 at the beach. The model has been used to generate peak beach use for the year 2000 and also traffic and parking volumes.

Table V-15 shows the peak beach use of the peak-use day and the resulting area available per person.

Table V-16 shows the projected total daily users at each beach and at Pillar Point and the total daily users for the year 2000. Further estimates of yearly users were obtained from the California Department of Parks and Recreation. It has been assumed that peak day visitors represent 2.5 percent of the yearly total.

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*The Department of Parks and Recreation also makes computer projections of future facility use through PARIS (see California Department of Parks and Recreation, Park and Recreation Information System, Planning Monograph No. 2, 1966. See also, James E. Burke, Peak Recreation Day Simulation Model, University of California, Berkeley, (forthcoming).

CHAPTER VI

IMPACT ASSESSMENT

This chapter presents a process for evaluating the environmental, economic, social, public service, and access impacts of subregional and local coastal plans (see Figure VI-1).

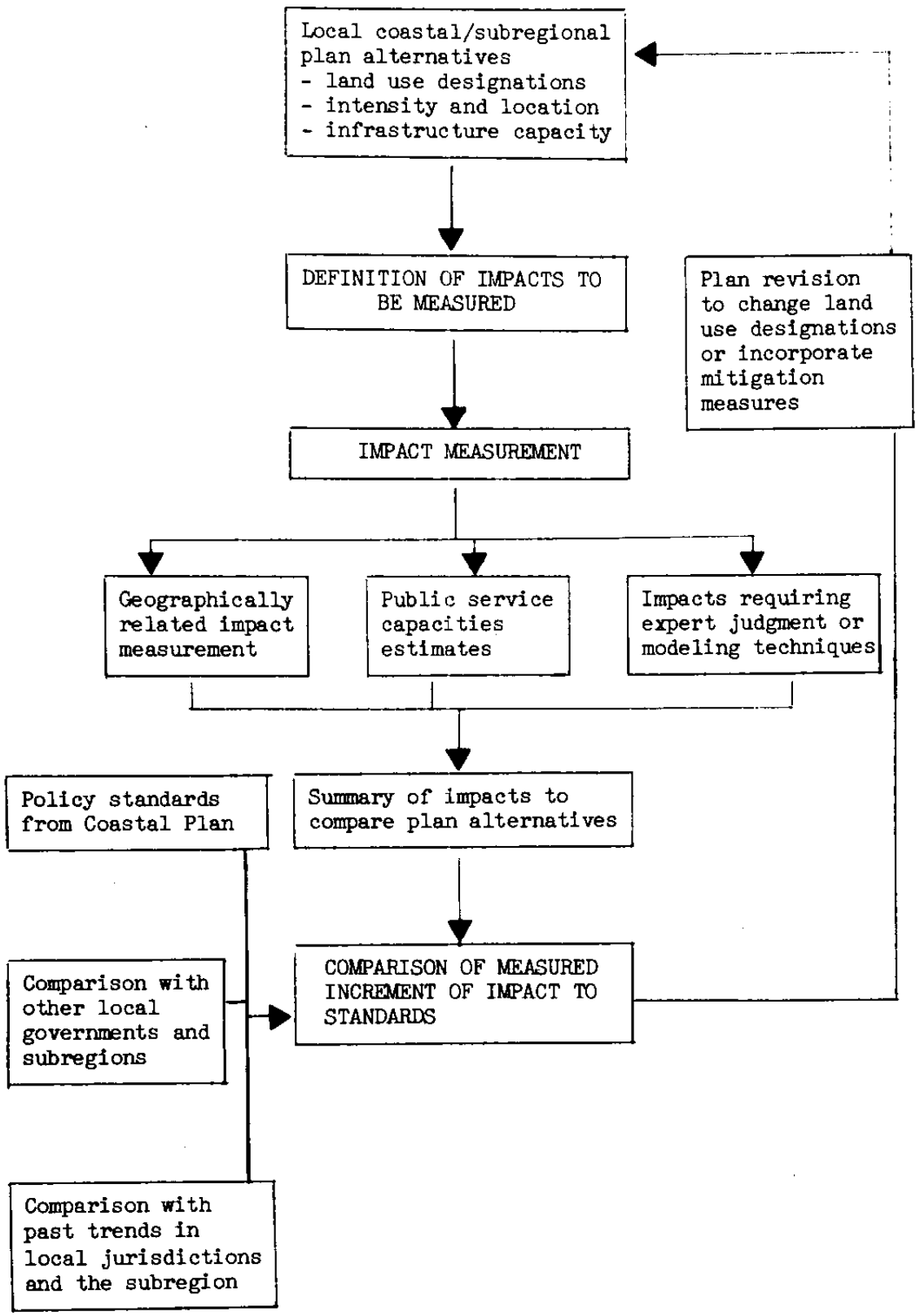
Impact assessment is relevant to three steps in the development of subregional and local coastal plans. First, impact assessment is used to define the extent of conflicts between the existing commitment and coastal policies (see Chapter I). Second, impact assessment can be used as a means to summarize and compare alternative land use plans, especially the extent to which each alternative impinges upon the geographically specific Coastal Policies. Impact summaries will be particularly useful to focus public debate in the review of land use alternatives. Third, impact assessment can be used to determine appropriate implementing actions (e.g., grading ordinances) to be incorporated as part of the local coastal program for a sensitive coastal resource area.* In many instances more than one implementing action may be considered in mitigating the effect of specific impacts.

A primary purpose of impact assessment of land use plans and zoning ordinances is to evaluate the cumulative effects of development, effects that cannot be determined on a project-by-project basis. Thus, impact assessment of local coastal programs concerns the impacts which will result from a specified land use pattern, population level, and level of facility development. Specifically, it is a means of measuring:

*Coastal Act §30108.4

Figure VI-1

Impact Assessment Process



1. The extent to which land use designations are in conflict with Coastal Policies in resource areas--soils, hazards, open space, recreational lands, protection (i.e., how much prime soil is preempted for urbanization in a local coastal plan).

2. The extent to which public services capacities are exceeded by the increased levels of population (i.e., will the service requirements of full buildout of residential subdivisions exceed facility capabilities).

3. The extent to which the "carrying capacities" of any natural systems--viewshed, airshed, watershed--are exceeded by the amount (density) of development allowed (i.e., too much recreational beach use, too much impervious surface coverage, too many houses in a scenic viewshed).

4. The extent to which planned development is allowed adjacent to a resource area--viewshed, habitats, watershed, so as to present an adverse impact, threat, or use conflict (i.e., development along a coastal stream, adjacent to agricultural land).

DEFINITION OF IMPACTS TO BE MEASURED

Table VI-1 lists 28 impact assessment criteria which are relevant in the analysis of subregional and local coastal plans. Impact assessment criteria are defined as broad categories of changes in environmental, social, and economic conditions. The criteria represent an attempt to group the related Coastal Policies into a set of generic categories based upon common policy language or intent. These categories to some extent reduce the problem of overlap or conflict contained in the policy language. For example, policies concerning access to the shoreline are stated or implied in more than fifteen separate statements (see Table VI-2).

Table VI-1

Impact Assessment Criteria

Environmental Impacts

1. Change in the extent of open space lands
2. Change in condition of habitat areas
3. Change in the type and extent of forest lands
4. Intrusion upon hazard areas and unstable landforms
5. Change in extent of prime soils
6. Change in the acreage of non-prime agricultural lands with productive soils
7. Change in condition of viewshed and blockage of view
8. Change in condition of watershed and coastal waters and their buffer areas and change in sand supply
9. Change in the extent and type of mineral resource areas
10. Change in condition of airshed

Access Impacts

11. Change in the type and extent of public access to the shoreline and other coastal recreation areas
12. Change in the type and location of public and commercial recreation facilities
13. Change in convenience of traveling to the coastal zone
14. Change in the availability of transportation options
15. Change in the cost and availability of coastal housing and related social mix of coastal communities

Social/Economic Impacts

16. Change in amount of business
17. Change in amount of employment available
18. Change in yearly average income of coastal residents
19. Change in local jurisdictions' fiscal status and change in tax obligation of citizens
20. Change in the amount of state and federal funding for projects and activities in the coastal zone
21. Change in community character and disruption of community way of life
22. Change in the condition of man-made resource areas
23. Change in quality of public health and safety

Public Service Impacts

24. Change in extent of water usage
25. Change in extent of use of electricity and natural gas
26. Change in extent of transportation facility usage
27. Change in extent of wastewater facility usage
28. Change in extent of solid waste facility usage

Table VI-2

Impact Assessment Criteria, Measures, and Standards

ENVIRONMENTAL

Impact	Policy Support	Affected Area	Measures	Standards
Change in extent of open space lands	"concentrate development in already developed areas" (59)* [30250]† "the amount of new development in the near-coast area shall be correlated with precise open space acquisition and recreational use plans" (140) [30252] "construction or expansion of coastal roads shall be allowed only where the proposed project would not open coastal rural areas for development..." (102) [30254 (Route 1), 30210, 30241(d)] "open space...shall be provided in new developments large enough to accommodate [it]." (141) [30252(6)]	Open space lands	Total acres plan allocates to open space by: . public/private . shoreline/inland	Comparison of amount of open space with similar coastal jurisdictions National Recreational and Parks Association standards (cited in policy 140a) Policy 60 has criteria for division of rural land
Change in condition of habitat areas (see also change in condition of coastal waters)	"preserve significant natural areas and rare species" (26) [30240, 30230] "protect fragile habitat areas" (27) [30240, 30230] "maintain natural vegetation" (28c) [30240(6)] "minimize habitat damage wherever development is permitted" (29) [30240(b), 30250] "limit access and recreational use where necessary" (142) [30210] "establish a coastal reserve system" (150) "development should complement natural and scenic resource areas...with particular regard to cumulative impact" (57) [30251, 30250]	Habitat areas	Total acres and density plan allocates to development: . within habitat areas . adjacent to habitat areas . within watershed of habitat areas Total acres and density plan allocates to development, recreation, and logging in areas adjacent to habitat areas Habitat areas should be subdivided based upon biological life cycle function (eg., breeding, feeding, etc.)	Absolute protection of significant habitats (policy 26) Policy 28a lists priorities for complementary uses Comparison of acres pre-empted for urban uses with other communities

*Coastal Plan Policy numbers are in parentheses.

†Coastal Act sections containing comparable policies are in brackets.

(Table VI-2 continued)

Impact	Policy Support	Affected Area	Measures	Standards
Change in the type and extent of forest lands	"restrict conversion of productive timberlands" (38a) [30243] "development should complement natural and scenic resource areas...with particular regard to cumulative impact" (57) [30251, 30250]	Forests	Total acres plan allocates to urban uses presently in forest	Comparison of acres preempted for urban uses with other juridictions
Intrusion upon hazard areas and unstable landforms	"restrict development in flood hazard areas" (64) [30253(1)]* "review and regulate new developments for geologic safety" (67) [30253(1) + (2)] "establish safety measures for possible tsunami occurance" (69) [30253(1)]* "regulate bluff and cliff developments for geologic safety" (70) [30253(2)] "nuclear plants must be in seismically safe areas" (79) [30413(b), 30253]* "restrict substantial alterations along the coast for recreation" (135) [30251, 30210, 30240] "prevent subsidence" (83g) [30253]	Hazard areas and unstable landforms	Total acres plan allocates to urban use in hazard areas or fragile landforms unsuitable for development: . flood plains (100 yr) . subsidence areas . tsunami run-up . cliffs and bluffs . geologic hazard areas . fault zones . landslide areas . dunes . beaches	Cobey-Alquist Flood-Plain Management Act Policy 67 has criteria for development in hazard areas HUD standards on flood plain development and zoning to be eligible for federal flood insurance
Change in extent of prime soils	"preserve prime agricultural lands" (policies 32, 33, 36 further imply protection) (30a) [30241]* "protect coastal soil resources" (40) [30243] "development should complement natural and scenic resource areas...with particular regard to cumulative impact" (57) [30251, 30250] "regulate development and land division near agricultural areas" (37) [30250, 30241]	Prime soils (U.S.D.A. Classes I, II, and III)	Total acres plan allocates for urban use on prime soils	Interim guidelines for conversion from policies 32d, 33, 34 Absolute standard: preserve as much as possible Policy 37 gives standards for development near agricultural lands Comparison of the amount of agricultural land preempted for urban uses with other agricultural areas

*Subsequent asterisk indicates Coastal Plan policy liberally interpreted as a means of achieving the specific objectives of the Coastal Act.

(Table VI-2 continued)

Impact	Policy Support	Affected Area	Measures	Standards
Change in acreage of non-prime agricultural land with productive soils	"preserve other agricultural land in suitable locations" (policy 34 further implies protection) (30b) [30242]*	Non-prime soils presently in cultivation or suitable for crops or grazing	Total acres plan allocates to urban use on non-prime soils suitable for crops or grazing	(same for prime soils)
Change in condition of viewshed and blockage of view	"design guideline: protection coastal viewsheds" (50) [30251] "design development to protect coastal viewsheds" (44) [30251] "protect the visual quality of highly scenic areas" (45) [30251] "development should complement natural and scenic resource areas...with particular regard to cumulative impact" (57) [30251, 30250] "restore visually degraded coastal areas" (152b) [30251] "petroleum facilities shall be permitted where (1) accidental spills will not have a significant adverse impact on...highly scenic areas. (11a) [30263(4)]	Viewshed	Total acres and distribution of uses plan allocates to development in viewsheds Total acres (units) plan allocates to urban uses located within or adjacent to viewing areas Total mileage of Highway 1 with blockage of coastal view	Absolute standard of non-degradation for special viewsheds Policies 49-57 have specific design standards Comparison of acres of viewshed pre-empted for urban uses with other coastal jurisdictions
Change in condition of watershed and coastal waters and their buffer areas, and change in sand supply	"control runoff that degrades coastal waters" (14) [30231] "development that could directly or cumulatively aggravate runoff problems or create significant adverse impact on coastal waters shall be permitted only if adequate measures are taken to prevent degradation of water quality or unnatural changes in the rate of water flow into coastal waters" (14a) [30231, 30240(b)] "special protection to estuaries and wetlands" (15) [30231, 30240(b)] "prepare and implement comprehensive water management plans to prevent significant adverse impacts...with particular attention to: . loss of natural riparian vegetation . loss of reduction of coastal sand supply . adverse alteration of saltwater-freshwater balance	Watersheds by sub-basins) Waterways, estuaries, wetlands Beaches	Total acres plan allocates to urban uses in ground water aquifer recharge areas (salt water intrusion withdrawal rate) Amount of pollutants: (Including point and non-point sources) . dissolved oxygen . BOD . coliforms (fecal + total) . nitrogen (NH_3, NO_3, total dissolved) . phosphorous (ortho + total) . chlorophyll A . algae . pesticides . other toxics	"Water Quality Criteria" Fed. Water Pollution Control Act, 1968 "Water Quality Criteria" California Water Quality Control Board Policy 15 contains criteria for intrusion into wetlands Policy 7 sets EPA or Water Resources Control Board standards as a minimum Policies 19 and 135 have standards for allowing shoreline structures and activities

(Table VI-2 continued)

Impact	Policy Support	Affected Area	Measure	Standards
	. sedimentation impacts on coastal streams . degradation of groundwater resources . reduction of needed surface recharge areas . saltwater intrusion . land subsidence (22) [30231, 30240(b)] "development should not adversely affect local water resources" (23b) [30231] "protect water quality from adverse effects of logging" (38c) [30231] "development should complement natural and scenic resource areas...with particular regard to cumulative impact" (57) [30251, 30250] "...to eliminate or mitigate adverse impacts on shoreline sand systems" (19) [30235] "structures and major activities...in or near coastal streams shall be regulated to avoid or mitigate significant adverse impacts as listed in Policy 22" (24) [30231, 30240(b)] "the sand supply of the particular watershed is sufficient or alternative sand supply is provided to allow (sand) mining without significant adverse impact" (41) [30236]		. suspended solids . temperature Amount of impervious surface coverage in acres (by land use type - sub-watershed) Amount of logging/urban use in areas buffering coastal streams and wetlands Percentage of new construction on septic tanks/sewers Amount of erosion from construction activity Total acres plan allocates to development in or surrounding wetlands	
Change in the extent and type of mineral resource areas	"prepare and implement comprehensive water management plans to prevent significant adverse impacts...with particular attention to: irreversible commitment of recoverable mineral deposits" (22) "near-city mines and reserves shall be protected from urban encroachment" (42) [30250]*	Areas with mineral deposits and energy resources . oil and gas . geothermal	Total acres plan allocates to urban uses mineral or energy resources areas (by resource types)	Comparison of acres containing mineral resource preempted for use with other coastal jurisdictions
Change in condition of airshed	"new...fossil fuel facilities shall not be built in...air quality maintenance areas or in areas where such coastal resources... would be adversely affected" (78h) [30253(3), 30250] "new coastal developments shall...protect and restore coastal zone air quality" (43) [30253]*	Airshed	Constituent Pollutants: . CO (Carbon Monoxide) . hydrocarbons . NO_x (Nitrogen Oxide) . particulates . SO_x (Sulfur Oxide) . photochemical oxident	Policy 43a suggests developing air quality carrying capacity standards Environmental Protection Agency, and Air Control Board published standards

(Table VI-2 continued)

Impact	Policy Support	Affected Areas	Measures	Standards
	"no degradation of air quality (on refineries)" (88c) [30253, 30263]*		- Number of major new polluting facilities plan allocates in critical airsheds	Policy 41 proposes noise standards for mining areas be developed; policy 112 for airports
	"encourage...non-air-polluting transportation forms" (99b) [30252, 30253]		- Vehicle miles traveled (local/inter-regional trips)	DOT, HUD, EPA noise standards
	"to reduce air pollution along coastal roads" (103)		- Buffer areas surrounding airports and Highways 1 and 92	Maximum ambient noise level: 75DB(A)
	(public transit) "in order to reduce air pollution levels" (109)		- Amount of traffic: auto, truck, and air (by location and time of day)	Chapter 18.070 of Half Moon Bay zoning ordinance gives maximum levels of noise in residential or commercial districts generated by industrial districts
	"restrict significant developments in areas removed from employment and commercial centers" (59c) [30250]		- Noise scales . weighted decibels . perceived noise level . traffic noise index . noise pollution level . composite noise rating	
	"noise and dust (from mining) shall be controlled" (41c)			
	"addressing the possible adverse impacts airports can have...(e.g.,...noise)" (112) [30240(b)]*			
ACCESS				
Change in the type or extent of public access to the shoreline and other coastal recreation areas and in amount of conflict between different land uses	"Basic policy: increases recreational use compatable with resource protection" (131) [30210]	Coastal Recreationists (by type)	Acres of recreational land and level of facility development (by type and ownership - public/private) within: . shoreline zone remainder of coastal zone	Comparison of availability of recreational land (by type) with other coastal jurisdictions
	"provide a variety of recreation near metropolitan areas" (137)			NPRA standards by recreational use type (stated in policy 140A)
	"establish a coastal reserve system...to promote recreational...use"		Percentage of total shoreline mileage open to public ("effective feet" of recreational area)	Stratton Commission: 15 percent of marine shores reserved for public use
	"limit access and recreational use where necessary" (142) [30210, 30245]			
	(on shoreline works) "...be compatible with maximum possible shoreline access and use" (19b) [30211, 30251]			
	"reserve shoreline for recreation activities that need access to water to achieve a wide range of recreational opportunities" (134) [30220, 30221]			

(Table VI-2 continued)

Impact	Policy Support	Affected Areas	Measures	Standards
	"restrict off-road recreational vehicles along the coastline" (143)			
	"provide public access in some airport buffer land" (114) [30210]*			
	"public recreation areas are adequately managed and maintained to achieve this end (of desired recreational use levels...)" (144) [30210, 30212(1), 30212.5, 30330]			
	"substantial area will be established for permanent public use and enjoyment of the coast" (79j) [30210]			
	"provide public access ways to the coastline" (123) [30212, 30210, 30211]			
	"a wide variety and numerous facilities should be provided to accommodate heavy recreational use and intensive activities along the coast in areas convenient to population centers" (137)			
	"provide access to marinas" (148) [30210, 30212]			
	"the public shall be afforded access to commercial fishing harbors" (5c) [30210, 30212]*			
	"rights of public use of the coast...shall be effectively guaranteed" (122) [30210, 30211]			
	"provision of maximum amounts of ocean front area available for public use and enjoyment" (121) [30210, 30213]			
	"protect potential acquisition areas" (157)			
Change in the type and location of public or commercial recreational facilities	"provide lower-cost tourist facilities" (125) [30213]	Coastal recreationists (by type)	Acres (units) of commercial recreation.	Comparison of available public and commercial recreation facilities with other coastal jurisdictions
	"reserve shoreline areas for recreation activities that need access to water" (134) [30220, 30221]		Total visitor days (by type and overnight/day use)	
	"restrict off-road recreational vehicles along the coastline" (143)		Cost and number of overnight visitor facilities	
	"establish long-range program to protect recreational resources" and (144)		Acres of parking	
	"provide campgrounds and other facilities (along trails)" (145d)			

(Table VI-2 continued)

Impact	Policy Support	Affected Publics	Measures	Standards
	"accommodate new recreational boating facilities without degrading coastal resources" (146) [30224]			
	"provide roadside recreational amenities" (104d)			
Change in convenience of travelling to coastal zone	"maximize recreational and scenic value of Highway 1..." (104) [30254, 30251]	Coastal recreationists (by mode of access)	Accessibility and availability of transit facilities (frequency)	Comparison of average travel time (inter-urban) to shoreline with other jurisdictions
	"establish a coastal trails systems" (145)		Average peak day congestion level on coastal access roads	Comparison of average peak congestion level with other coastal jurisdictions
	"public recreational and scenic uses of the coastal road system will not be limited by new private...development" (101) [30254, 30250]		Total days (over one year period) service level E is exceeded on coastal access roads	
	"...to reserve Highway 1 primarily for recreational use" (103)		Average travel time from nearby urban areas to beach on weekends (by auto/transit)	
	"provide new funding for coastal zone transit" (107)			
	"improve and expand bus service" (109a)			
	"design bus service for recreational uses" (109b)			
	"maximize access to the coast for people of all income ranges" (1) [30210, 30213]			
	"travel conflicts between residents and coastal visitors are minimized..." (59c) [30250, 30252]			
	"encourage expanded rail service" (110)			
	(on road expansion) "the project is necessary to provide increased public access to the coast" (102b)			
Change in the availability of transportation options	"protect...special coastal communities... with small-scale and limited automobile traffic providing opportunities for pedestrian and bicycle access for visitors to the coast" (58) [30253(5)]	Coastal community residents and recreationists especially . hikers . bicyclists . transit-dependent citizens:	Total miles plan allocates to bikeways and trails (linkage of bikeways and trails to adjacent areas)	Comparison of amount of trails and bikeways with other coastal jurisdictions
	"encourage energy-conserving and non-air-polluting transportation forms" (99b) [30253(4)]		Percentage and spatial distribution of street miles served by transit and frequency of service	Comparison of transit service with other coastal jurisdictions

(Table VI-2 continued)

Impact	Policy Support	Affected Publics	Measures	Standards
	"new development shall be planned to (1) facilitate provision or extension of transit service and (2) provide non-automobile circulation within the development (e.g., shuttles, bikepaths, and walkways)" (59f) [30252] "major new developments...in locations removed from employment and commercial service areas shall be permitted only if the project will be adequately served by public transportation" (59e) [30250, 30253(4)]* "to provide transit alternatives, replacing the need for the private car...at coastal airports" (115) [30252(4)] "pedestrian walkways, bicycle paths...shall be provided in new developments large enough to accommodate them" (141) [30212]* [30252(6)] "hiking, bicycle, and equestrian trails systems shall be established along or near coast" (145)	. elderly . youth . handicapped . non-auto owners	Walking distance from residential/recreational usage (in miles) to major service facilities (e.g., shopping, health care, etc.)	
Change in the cost and availability of coastal housing (rental or purchase) and related social mix of coastal communities	"housing for persons of low and moderate income shall be adequately provided to increase access..." (126) [30213] "do not decrease low and moderate income housing...new replacement housing shall be required as a condition of approval of the demolition of any such existing housing..." (126a) [30213]* "a significant percentage of new housing within the nearshore area shall serve low--and moderate--income persons" (126b) [30213]* "development out of...social character shall not be allowed in designated special communities and neighborhoods" (58c) [30253(5)] "regulate condominium conversion in areas which provide significant rental opportunities for low- and moderate-income persons" (126c) [30213]	Coastal community residents and potential residents Coastal workers (especially low income workers) . present . anticipated as needed for constructing and operating new projects	Amount of new housing plan allocates within the subregion Median assessed value of single family units (related to income distribution of local residents) Median rents Vacancy rates	Comparison of rents and new housing costs with other coastal communities Comparison of the new amount of new housing costs with other jurisdictions Comparison of coastal housing costs and availability with adjacent inland areas

(Table VI-2 continued)

SOCIAL/ECONOMIC

Impact	Policy Support	Affected Publics	Measures	Standards
Change in business	Shipping: "filling and dredging for major port development or expansion may be required to maintain the high economic values of California ports" (118) [30233(1)(2)] Timber: "timber harvesting is a vital and necessary industry that should be encouraged..." (38) [30243] Agriculture: "basic policy: protect agriculture and its economic viability" (30) [30241] "to protect agricultural lands, trails shall not interfere with agriculture..." (145b) [30212(3)] (Policies 32, 33, 36 further imply protection) Fishing aquaculture: "new...aquaculture operations...shall be encouraged" (4) [30255] "upgrade commercial fishing facilities" (5) [30234, 30233(a)(1), 30233(3)] "provide special protection for anadromous fish streams" (25) [30236, 30231] General: "concentrate development in already developed areas to be consistent with the goals... above (namely,) existing downtown areas that have declined as a result of suburban sprawl will be revitalized" (59) [30250(a)] "because in extreme situations local taxpayers can inadvertently be penalized when a local municipality is responsible for maintaining coastal recreational facilities used heavily by inland residents, county, State, or Federal governments shall assume greater responsibility for paying some of these costs" (139)	Business by sector	Amount of business volume in dollars Total acres plan allocates to commercial uses Business profit margins and amount of capital investment	Comparison of business volume with other coastal jurisdictions Comparison of mean profit by business sector in coastal zone with other jurisdictions

(Table VI-2 continued)

Impact	Policy Support	Affected Publics	Measures	Standards
Change in amount of employment available		Coastal residents desiring to work in the coastal zone	Total number employed (by sector)	Comparison of unemployment rates with other coastal jurisdictions
Change in yearly average income of coastal residents		Coastal residents	Median income of coastal residents (employed within coastal zone/commuters)	Comparison of average incomes with other coastal jurisdictions Congressional goal: maximum unemployment rate of 4 percent
Change in local jurisdictions' fiscal status and change in tax obligation of citizens	"because local taxpayers can be inadvertently penalized when a local municipality is reponsible for maintaining coastal recreational facilities used heavily by inland residents, county, State, or Federal governments shall assume greater responsibility for paying some of these costs" (139) "prevent public subsidy for hazardous developments" (68) [30253(1), 30253(2)]* "concentrate development in already developed areas" to be consistent with the goals above: (namely) duplication and costs of public services will be reduced by utilizing services already in place (59) [30250(a), 30252] "water management shall stress conservation" (23d) [30236(1)]* "in those instances where public investment in roads and other facilities to serve existing lots would be more costly than public purchase of the land, public acquisition shall be considered as a means of reducing the number of lots" (154)	Local jurisdictions and special districts (cities, counties, school districts, fire districts, water and sanitary districts) Property taxpayers	Difference between local revenues and expenditures (per capita and by agency) Educational costs and revenues per pupil (local share) Local expenditures including operating and capital costs Ratio of charges for recreational use to expenditures by the jurisdiction for public service costs and maintenance Per capita distribution of taxes (by social group)	Comparison of ratio of expenditures to revenues with other coastal cities and non-coastal cities (California and elsewhere) Comparison of per capita tax rates with other areas

(Table VI-2 continued)

Impact	Policy Support	Affected Publics	Measures	Standards
Change in the amount of state and federal funding for projects and activities in the coastal zone	"county, state, or federal governments shall assume greater responsibility for paying some of these costs (beach maintenance)" (139) "prevent public subsidy for hazardous developments" (68) [30253(1), 30253(2)] "...(road capacity)...to reduce the costs to the public of extensive road construction" (101) [30254] "mitigate adverse impacts on shoreline sand systems because (finding) beach sand losses are a costly problem" (19) [30211, 30251]	State and federal taxpayers State and federal agencies	Cost of acquisition (full or partial) Cost of new facilities User charges for projects Local share required for matching direct and indirect funding	Comparison of public expenditures in the coastal zone with expenditures in other areas or for other projects
Change in community character and disruption of community way of life	"protect, enhance, and restore the man-made resources of the coast -- the special communities and neighborhoods that have unique cultural, historic, and aesthetic qualities" (1) [30253(5)] "protect and enhance special coastal communities and neighborhoods" (58) [30253(5)] "where travel conflicts between local shopping trips and coastal visitors are minimized" (59c) [30252(2)]	Residents of coastal communities (small coastal towns and special neighborhoods in coastal cities)	Amount of new construction in historical districts Change in density of neighborhoods Average distance of residences from commercial center Resident to tourist ratio (see also housing and income measures)	
Change in the quality or extent of manmade resource areas	"protect, enhance, and restore the manmade resources of the coast" (1) [30244, 30253(5)] "road construction shall eliminate or minimize adverse impacts on historic or archeological sites and other significant manmade resources" (102c) [30244, 30253(5)] "protect historical and prehistorical resources" (151) [30244]	Historical and archeological areas	Amount of urbanization plan allocates to historical and archeological areas	

(Table VI-2 continued)

Impact	Policy Support	Measures	Standards
Change in the quality of public health and safety	"limit number of (LNG) terminals until safety is assured" (95a) [30261(b)] "human health and safety paramount consideration [in siting of LNG terminals]" (95b) [30261(b)] "require safety measures during marine operations" (96) [30261b] "require safety measures at onshore (LNG) facilities" (97) [30261(b)] "transportation plans shall include consideration of emerging transportation needs" (99c) "the project is determined to be necessary for unquestionably needed traffic safety improvements where no other safety measures are possible" (102b) "...consistent with necessary security and public safety requirements" (148) [30210, 30212]		
PUBLIC SERVICE			
Extent of water usage	"agencies that provide water service shall develop water supply plans" (23a) [30504] "...and the following potential water sources should be considered in evaluating the impact of providing cooling water [for power plants] at inland sites...(4) other freshwater supplies ...so as not to deprive inland or coastal areas of fresh water needed for agricultural production or groundwater maintenance..." (79b)	Water supply currently available and potentially available (groundwater, surface water) Water demand based on gallon use per capita per day (by sector group, e.g., commercial, recreation, residential)	Comparison of usage with capacity of water supply systems including all alternative sources allowed under coastal jurisdictions
Extent of use of electricity and natural gas	"...to encourage conservation" (71) "non-essential consumption of energy shall be reduced statewide" (72) [30253(4)]	Average demand for electricity for uses proposed in plan	Energy Commission to establish statewide energy conservation standards by July 1, 1977 (policy 72) Comparison of energy use with other coastal jurisdictions

(Table VI-2 continued)

Impact	Policy Support	Measures	Standards
Extent of transportation facility usage	"consider coastal concerns in transportation plans: (a) weekend, holiday, special events, travel;(b) encourage energy-conserving and non-air-polluting transportation forms" (99) [30253(4)] "where the road system capacity is or should be limited based on coastal policies, a system of budgeting the remaining or planned capacity should be developed" (101) [30254, 30250] "develop alternatives to prevent excessive use of coastal routes" (103)	Number of commuter and other trips during peak hours (Number of commuter trips is based on commuter to population ratio and average number of commuters per vehicle) Number of peak day recreationists' cars parking facility capacity Road capacity by service level (from Highway Capacity Manual)	Comparison of highway use at peak commute hours to road capacity at service level E Policy 99 proposes to allocate any excess capacity according to the following priority scheme: First, coastal-dependent land uses, essential public services, and basic industries; second, public recreation, commercial recreation, and visitor-serving land uses Comparison of number of recreationists' autos during peak period to parking capacity Policy 106 proposes parking standards to be determined in subregional planning process
Extent of wastewater facility usage		Capacity of existing facilities Wastewater demand based on gallon use per capita per day (by sector)	Comparison of demand with capacity of facilities providing secondary treatment and meeting water quality standards
Extent of solid waste facility usage		Tons of waste facility can process Waste generated per capita (by sector) Tons/unit by waste type	Comparison of facility usage rates with capacity of existing and potential facilities

The major impact assessment criteria reflect the level of generality present in most Coastal Plan and Coastal Act policies. Where more specific definition or criteria are present in the policies, these were incorporated in the related list of impact measures. The list of impact assessment criteria from the Act is augmented with the addition of some social and economic impacts for which there are no direct Coastal Plan or Coastal Act policies. This augmentation was in part based upon the impact assessment literature.*

There are three considerations in choosing which impact assessment criteria and measures will be used in the analysis of a particular local coastal or subregional plan.

The Degree of Conflict Between the Local Coastal Plan Alternatives and the Coastal Act Policies

Table VI-2 specifies the policy basis, geographic or population group affected, measures and standards for each of the impact assessment criteria. The second column of Table VI-2 lists the policy basis for each impact criterion. The CCZCC will be most concerned with those impact categories which are supported by Coastal Act policies. Localities may develop further policies applicable to other categories. Similarly, other interest groups may wish to see impacts measured which reflect their concerns, such as specific social or economic effects. The importance of respective impact criteria and measures will vary among local coastal jurisdictions.

The impacts selected for detailed assessment should be those which most clearly depict the difference between land use alternatives, especially

*See Thomas G. Dickert (ed.), Environmental Impact Assessment: Guidelines and Commentary, University of California Extension, 1974; Kurt Finsterbusch and C.P. Wolf (eds.), The Methodology of Social Impact Assessment, Stroudsburg, Pa.: Dowden, Hutchingson and Ross, 1976.

where tradeoffs have been necessary between priority of use policies and resource policies (e.g., recreational support facilities within agricultural areas.

Plan Specificity

The appropriateness of a particular impact measure is dependent upon the detail which has been incorporated in the land use plan alternative to be assessed. It may be impossible, for example, to determine how a particular policy (such as protection of wetlands) will be applied within a particular jurisdiction. Land use maps, prepared as part of the local coastal program, and the zoning ordinance will provide more detail concerning the type, location, and intensity of land uses adjacent to wetlands than the plan policies, and thus the geographically related impact measures (e.g., acres preempted) could be utilized. At a more specific level, impact measures (e.g., acres preempted) could be utilized. At a more specific level, impact assessment of a grading ordinance could include prediction of values for change in affected water quality parameters (e.g., total dissolved solids, nitrogen, tec.).

Hierarchy of Plan Specificity

(low) ↑ degree of specificity (high) ↓

1. Policy plan (e.g., Coastal Plan)
2. Land use maps and zoning ordinance
3. Special ordinances and implementation program

Appropriate Level of Analysis and Difficulty of Measurement

The difficulty of measurement varies among impact criteria and among the respective impact measures for each criterion. In general, at least qualitative statements can be made summarizing effects for most categories. However, some measures will require the use of predictive

models and related data bases in order to obtain a quantitative comparison of impacts for alterantives. Decisions concerning the allocation of limited staff and financial resources for quantitative analysis to those impacts that are most important within a particular local coastal jurisdiction must be carefully reviewed. In most cases, impact assessment which focuses on a limited number of impact criteria for detailed analysis will be preferable to more generalized analysis for all criteria. The definition of the most relevant impact criteria in a particular jurisdiction will require early collaboration between the CCZCC and local units of government.

IMPACT MEASUREMENT

Following the selection of impact assessment criteria and measures for a particular local coastal or subregional plan, a value is computed for each impact measure related to the respective alternative. Impact assessment measures can be grouped into three general types for computation purposes and are described in Table VI-2: geographically related impact measures, public service capacity measures, and measures requiring expert judgment or modeling techniques.

Geographically Based Impact Measures

Acreage displacement is the impact measure used for most of the geographically specific resource policies (see Table I-4). Acreage displacement is computed by directly overlaying alternative plans on resource maps and measuring the area designated for urban use within resource areas. Thus, for example, the impact measure will define acres of agricultural land or wildlife habitat preempted for urban use. It should be noted that this measure represents an aggregate indicator of

total resource areas. For example, the degradation of a wetland located in one jurisdiction caused by increased sediment production in an adjacent jurisdiction will not be accounted for by the acreage displacement measures.

Other geographically based impact measures may relate the impact of a particular type of land use (e.g., industrial development) to a larger geographic area. In the case of development adjacent to a specific resource area (e.g., wetland, riparian habitat, etc.), the total amount of development within the adjacent watershed can be determined as well as the encroachment or acreage displacement by urban use.

An impact summary of geographically based impact measures for Half Moon Bay is illustrated in Table VI-3. Impact measures are expressed both in terms of the absolute change in acres for a particular resource (e.g., agricultural lands) and as a percentage change related to the total extent of the particular resource within the jursdiction.

Public Service Capacities and Fiscal Costs

Estimation of impacts related to public service capacities is based upon the results of the analysis contained in Chapters II, III, and IV. Population and land use multipliers are used to relate the service requirements of land uses shown on the local plan to the existing and projected capacities of public service systems. Existing or some assumed consumption rate is specified for each land use category and multiplied by the number of units designated for that use in the plan. The resultant impact is defined in terms of the difference between the capacity of the particular service system and the capacity required in an alternative plan.

Comparison of the existing and projected service capacities with alternative population levels is shown in Figure VI-2. The required increase in service capacities for each land use alternative is shown

Table VI-3

Impact Summary--Geographically Based Impact Measures

Impact Assessment Criteria	Baseline Condition (1975) 13,589 existing population	Measure	Measured Increment of Change for Alternatives					
			1c	1b	1a	2a	4b	4a
		additional population	1,427	5,378	10,422	13,304	40,499	47,657
		total population	15,016	18,967	23,911	26,893	54,088	61,246
1. Change in the extent of open lands	4150 acres of rural open space	Rural open space converted (acres)	136	140	191	444	2644	3358
		Percentage of existing rural open space converted	3.3	3.4	4.6	10.7	63.7	80.9
4. Intrusion upon hazard areas	240 acres of floodplains	Floodplains preempted (acres)	0	0	0	0	68	68
		Percentage of undeveloped plains preempted	0	0	0	0	28.3	28.3
5. Change in extent of prime soils	380 acres of Class I soil	Class I soils converted (acres)	0	0	39	47	139	129
		Percentage of existing Class I soils converted	0	0	10.3	12.4	36.6	33.9
	1340 acres of Class II soil	Class II soils converted (acres)	13	19	38	76	641	564
		Percentage of existing Class II soils converted	1.0	1.4	2.8	5.7	47.8	42.1
	770 acres of Class III soil	Class III soils converted (acres)	0	0	0	41	429	746
		Percentage of existing Class III soils converted	0	0	0	5.3	55.7	96.9

(Table VI-3 continued)

Impact Assessment Criteria	Baseline Condition (1975)	Measure	Measured Increment of Change for Alternatives 1c	1b	1a	2a	4b	4a
	4490 acres of total prime soil	Prime soils converted (acres)	13	19	77	164	1209	1169
		Percentage of existing prime soils converted	.3	.4	1.7	3.7	26.9	26.0
7. Change in blockage of view	.6 miles of unblocked view northbound	Unblocked view preempted (miles)	0	0	0	0	.6	.6
		Percentage of unblocked view preempted	0	0	0	0	100	100
	2.4 miles of unblocked view southbound	Unblocked view southbound preempted (miles)	0	0	0	0	2.1	2.1
		Percentage of unblocked view southbound preempted	0	0	0	0	87.5	87.5
11. Change in the extent of public access to the shoreline recreation areas	218 acres of recreation land west of Highway 1	Additional recreation land (acres)	623	623	623	623	266	307
		Ratio increase of additional recreation land to existing recreation land	2.9	2.9	2.9	2.9	1.2	1.4
	5 miles of shoreline in public ownership	Additional shoreline in public ownership (miles)	11.1	11.1	11.1	11.1	10.6	10.6
		Ratio increase of additional shoreline in public ownership to existing shoreline in public ownership	2.2	2.2	2.2	2.2	2.1	2.1

(Table VI-3 continued)

Impact Assessment Criteria	Baseline Condition (1975)	Measure	Measured Increment of Change for Alternatives 1c	1b	1a	2a	4b	4a
15. Change in the availability of coastal housing	4504 existing housing units	Additional housing (units)	514	1787	3570	4832	12860	16535
		Ratio increase of additional housing units to existing units	.1	.4	.8	1.1	2.9	3.7
16. Change in amount of commercial activity	119 existing commercial units	Additional commercial (units)	45	69	100	117	283	327
		Ratio increase of additional commercial units to existing units	.4	.6	.8	1.0	2.4	2.7

in Table VI-4. Fiscal costs of services are drawn from a study conducted by the University of California Agricultural Extension (see Figure VI-3).*

Measurement of Impacts Requiring Expert Judgment or Models

Statement of quantitative level of impact for some of the measures contained in Table VI-2 can only be reliably determined through the use of expert judgment or modeling techniques. This is particularly true for impacts related to the water and air quality, habitat productivity, scenic quality, and coastal access.† A major decision in the impact assessment of local coastal programs will be the determination of the extent to which complex analysis methods or models should be employed. One approach which may be considered in deciding whether rigorous analysis methods should be utilized is the comparison between the costs of conducting the analysis and the costs associated with the potential impacts. This comparison may reveal that in some instances rigorous analysis will provide only limited additional certainty of impact outcomes with considerable increase in the analysis costs.

Lack of available baseline data or fundamental understanding of cause-effect relationships may be a pervasive limitation in structuring such analysis. Cost and availability of qualified staff may also limit the use of modeling approaches. For some impact criteria, expert judgments concerning the impact magnitude or spatial extent may be the only method available for assessment. Experts may be drawn from local researchers as well as state and local agency staffs. Local governments may wish to

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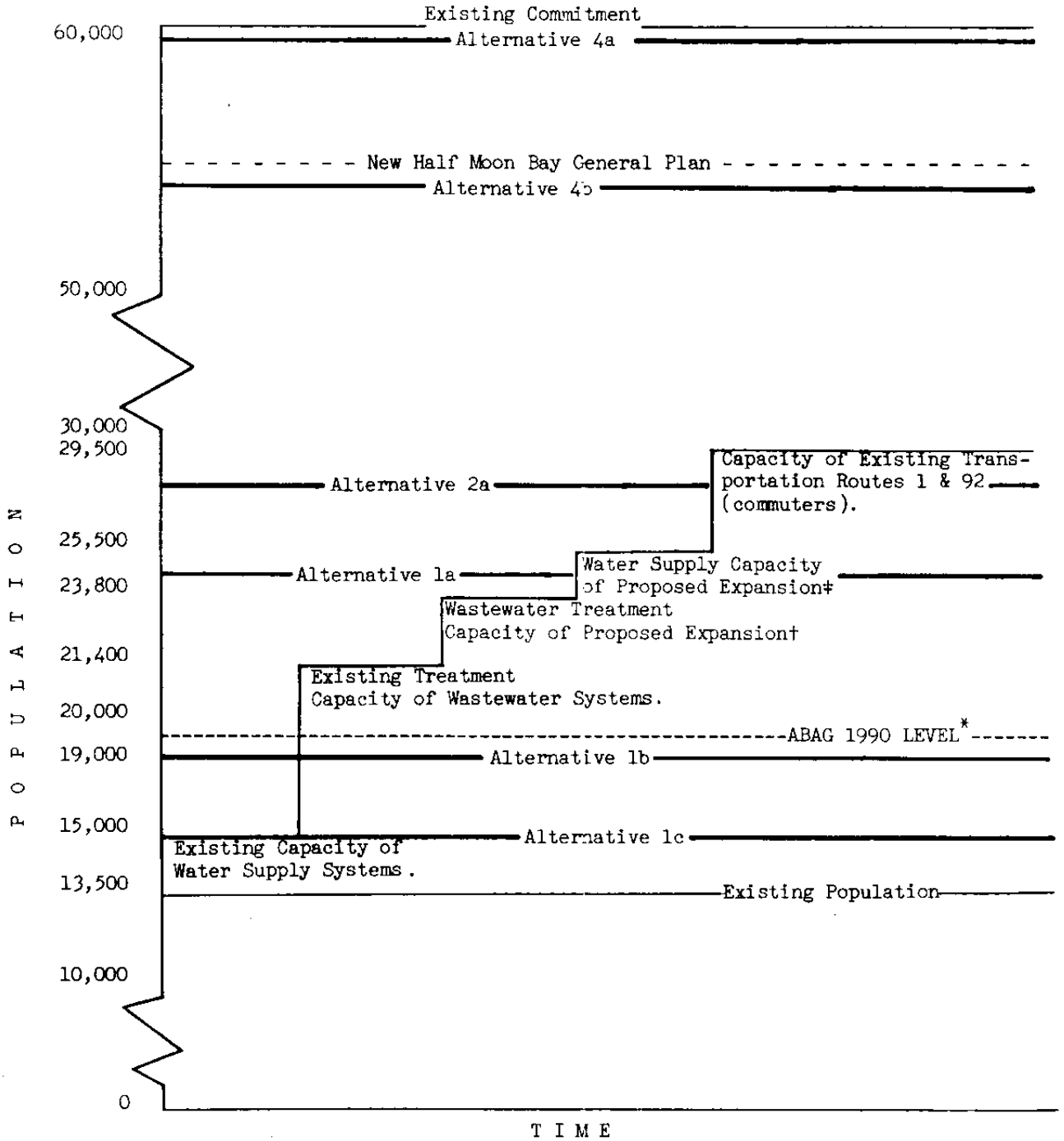
*George Goldman and David Strong, Governmental Costs and Revenues Associated with Implementing Coastal Plan Policies in the Half Moon Bay Subregion, Special Publication 3208, Division of Agricultural Sciences, University of California, Berkeley, October 1976.

†Forthcoming Sea Grant discussion papers will review impact assessment methods appropriate for each of these environmental factors.

Figure VI-2

Existing and Modified Levels of Public Service
Capacity Comparison with Alternatives



*ABAG will recommend approval of water or wastewater increases commensurate with this 1990 population level (ABAG/MTC, 1975)

†Midpoint of high and low projections in "Wastewater Treatment Allocation and Development"

‡Midpoint of high and low projections in "Water Supply Allocation and Development"

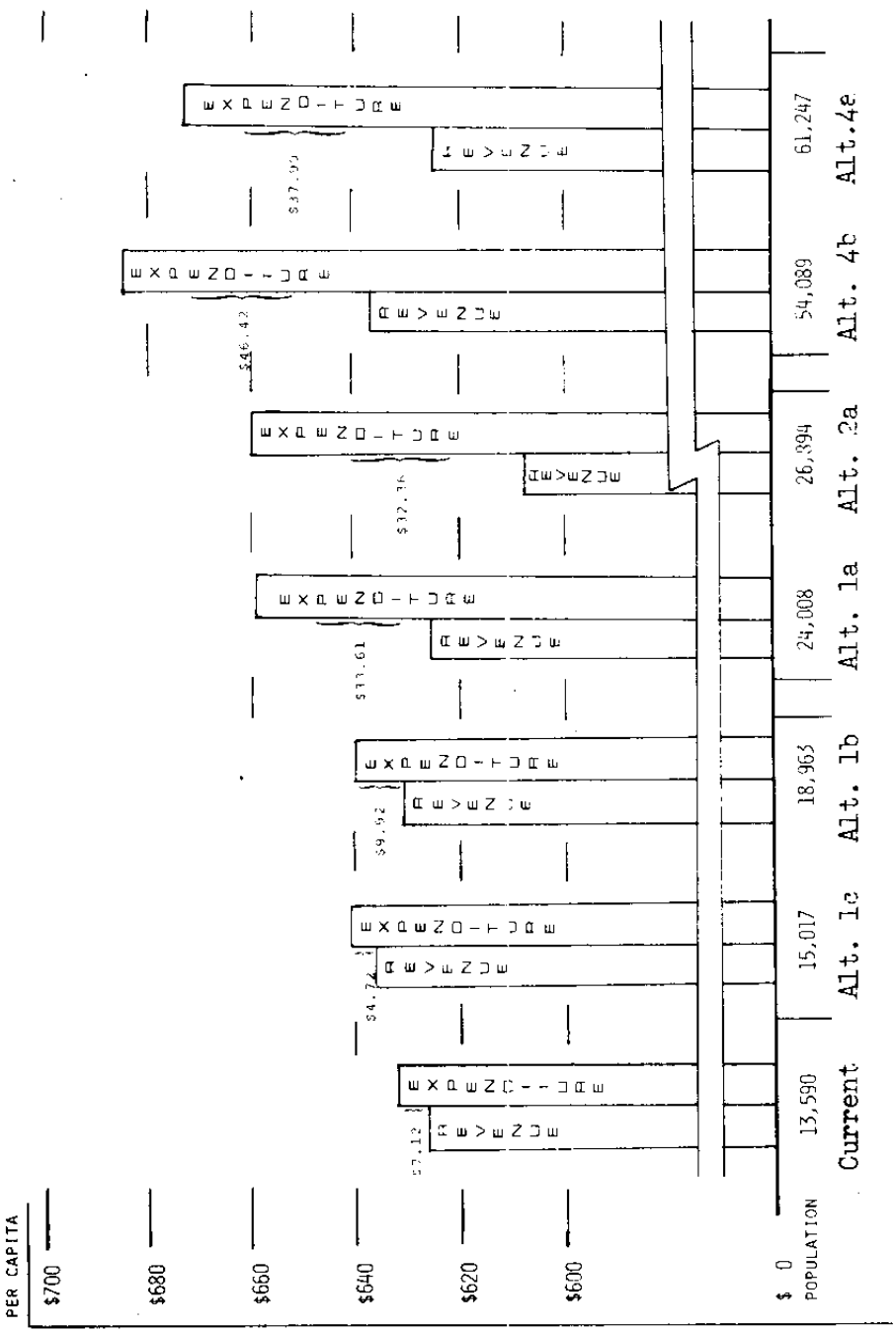
Table VI-4

Impact Summary--Public Service Capacities

Impact Assessment Criteria	Baseline Condition (1975)	Measure	Measured Increment of Change for Alternatives 1c	1b	1a	2a	4b	4b
24. Change in extent of water usage	2.59 MGD water used	Additional water to be used (MGD)	.43	1.30	2.41	3.01	8.84	10.40
		Ratio increase of additional water needed to current usage	.2	.5	.9	1.2	3.4	4.0
27. Change in extent of waste-water facility usage	.2 MGD wastewater generated in Montara	Additional wastewater in Montara (MGD)	.01	.10-.14	.27-.36	.23-.32	.54-.70	.49-.67
		Ratio increase of additional wastewater generation to current generation	.1	.5-.7	1.4-1.8	1.2-1.6	2.7-3.5	2.5-3.4
	2. MGD wastewater generated in El Granada	Additional wastewater in El Granada (MGD)	.08	.23-.31	.46-.61	.45-.51	.98-1.25	1.06-1.36
		Ratio increase of additional wastewater generation to current generation	.4	1.2-1.6	2.3-3.1	2.3-2.6	4.9-6.3	5.3-6.8
	.3 MGD wastewater generated in Half Moon Bay	Additional wastewater in Half Moon Bay (MGD)	.21-.25	.24-.29	.34-.42	.61-.77	1.63-2.19	2.27-3.03
		Ratio increase of additional wastewater generation to current generation	.7-.8	.8-.10	1.1-1.4	2.0-2.6	5.4-7.3	7.6-10.1

Figure VI-3

Public Agency Revenues and Expenditures
for Current Condition and Future Scenarios



Source: George Goldman and David Strong. Government Cost and Revenues Associated with Implementing Coastal Plan Policies in the Half Moon Bay Subregion. University of California, Berkeley: Cooperative Extension Service, 1976, p. 1.

establish formal expert review panels or task forces to assist in the analysis for particular impact assessment criteria.

COMPARISON OF MEASURED INCREMENT OF IMPACT TO STANDARDS

The measured increment for each impact category can be compared for each alternative to a policy standard derived for that impact criterion. A preliminary list of standards for each impact assessment criterion area is suggested in the last column of Table VI-2. The standard serves to define the significance of the measured impact for a specific plan alternative and its relative importance in relation to other impacts.* There are several methods available to define standards which may be appropriate in plan preparation.

Comparison to an Absolute Standard

For many of the impact assessment criteria, for example air and water quality, an absolute standard has been defined in state and federal regulations. Similarly, the Coastal Plan contains standards and criteria for policies in several areas. An absolute standard has the advantage in plan review that it is very clear when it is being exceeded by the level of development proposed. In general, besides the standards in the environmental areas (air, noise, water quality), few scientifically based standards with high degrees of reliability are currently available.

Comparison with Past Trends

Using this method, the base condition is defined using historical land use trends. For example, a local government could determine the original extent of prime agricultural soils, how much has been preempted for urban uses to date, and fluctuations in utilization of agricultural

*See California Environmental Quality Act, Public Resources Code, §21100, and Guidelines.

lands and related impacts. The historical trend and yearly rates of change could be used to estimate significance of measured impacts for each land use alternative.

Comparison with the Existing Commitment

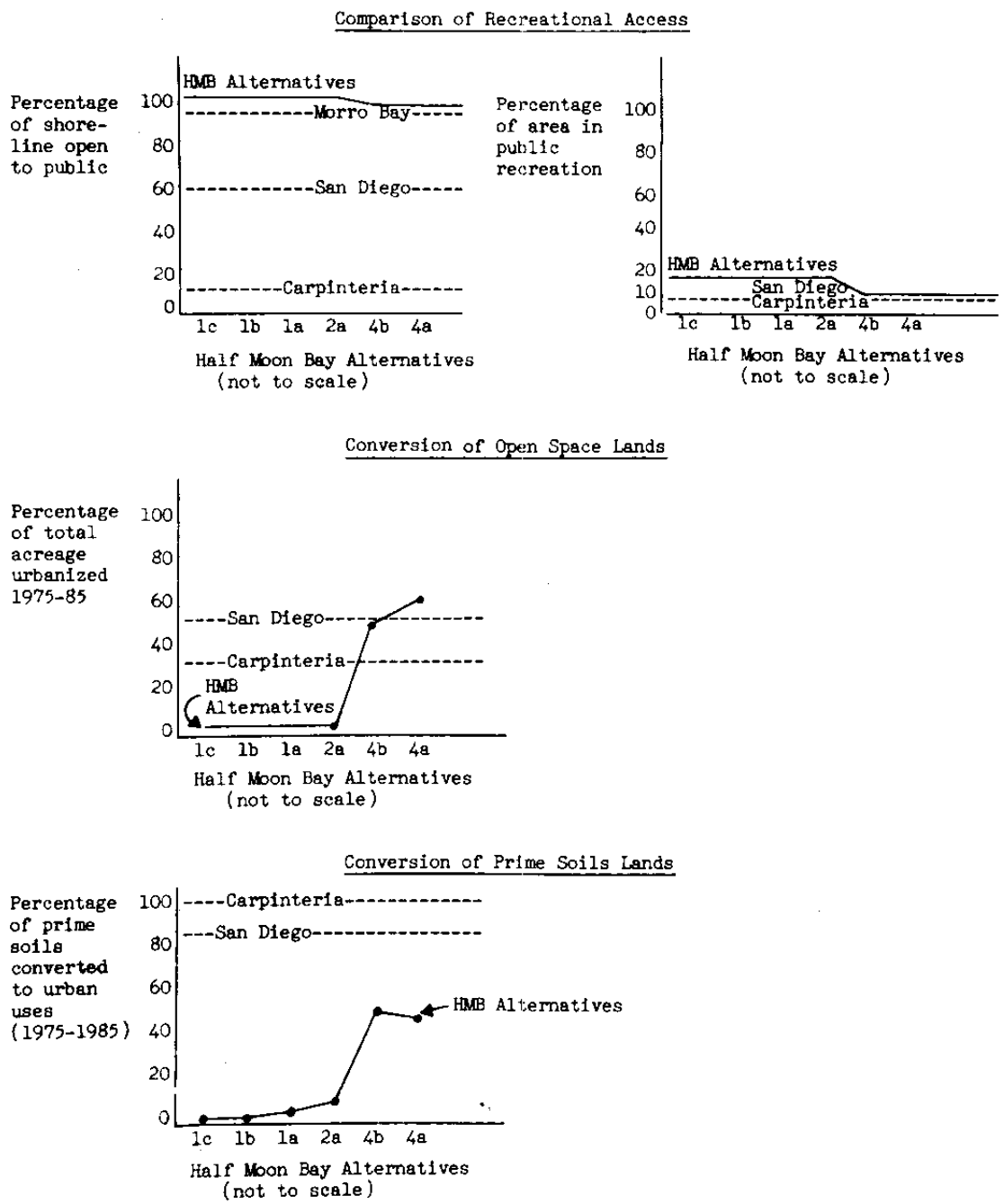
Using this method an estimate is made of the full buildout of residential and other land uses based upon existing zoning, general plans, and ownership (see Chapter I). The existing commitment was determined for Half Moon Bay and can be used as a baseline against which to compare plan alternatives (see Figure VI-2). One problem with this approach, as illustrated in Half Moon Bay, is that the existing commitment may represent an unrealistic statement of possible development within a jurisdiction. Thus modifying assumptions may need to be made from other population estimates, in order to use the existing commitment as a standard for comparison.

Comparison with an Absolute or Conditional Threshold

Absolute or conditional threshold points can be defined for most of the public service system impacts. A threshold point exists when a major public investment must be made to enlarge the capacity of a water supply, wastewater, highway system, or other public service system. Obviously, any estimate of capacity would require that a series of assumptions be made concerning the acceptable level of service and consumption rate. The threshold standard may also be used in relation to natural resources (e.g., agricultural lands, wildlife habitats); however, available knowledge on cause-effect relationships will limit the ability to set an absolute limit. Thus in the case of certain environmental criteria it may be possible to define only a conditional threshold based upon assumptions concerning any number of future conditions.

Figure VI-4

Comparison of Half Moon Bay with Other Subregions



Comparison with Analogous Areas

The values derived for specific impact categories in other coastal subregions or local jurisdictions can serve as a basis of comparison in the absence of more scientifically defined standards. This necessitates choosing comparable areas, and collecting data related to the impact category. The definition of comparable areas should be based upon similarity of population levels, resource characteristics, and past urbanization trends. For geographically based standards, map sources include the COAP Land Use and Ownership Inventories, the Department of Water Resources prime agricultural lands map (including projected urbanization) and their periodically updated land use maps, and U.S. Soil Conservation Service soil surveys (see Appendix C-1). For socioeconomic standards, U.S. Census and California Department of Finance data is the most accessible, although highly aggregated. Using maps and data from different time periods, it is possible to relate the change in the value for a specific impact measure over time. Because it is necessary to use several sources to derive the comparative measures, there may be a problem in data compatibility because of different methods of collection or categorization rleated to each data set. As local coastal plans are certified by the CCZCC, threshold values for specific standards (e.g., required amount of recreational commercial use) could be defined which will allow a more meaningful comparison of geographic areas and definition of comparative standards.

An initial attempt was made to compare impact levels determined in Half Moon Bay with two other coastal subregions. Using available data, comparisons could be made for three impact assessment criteria: public access to the shoreline and public recreation, conversion of open space lands, and conversion of lands with prime soils. Results for

these criteria are shown in Figure VI-4. Available data was the most important factor in limiting the analysis to these three critiera. Even for the criteria evaluated here, the available data did not allow comparison on the same yearly frequency for all subregions.

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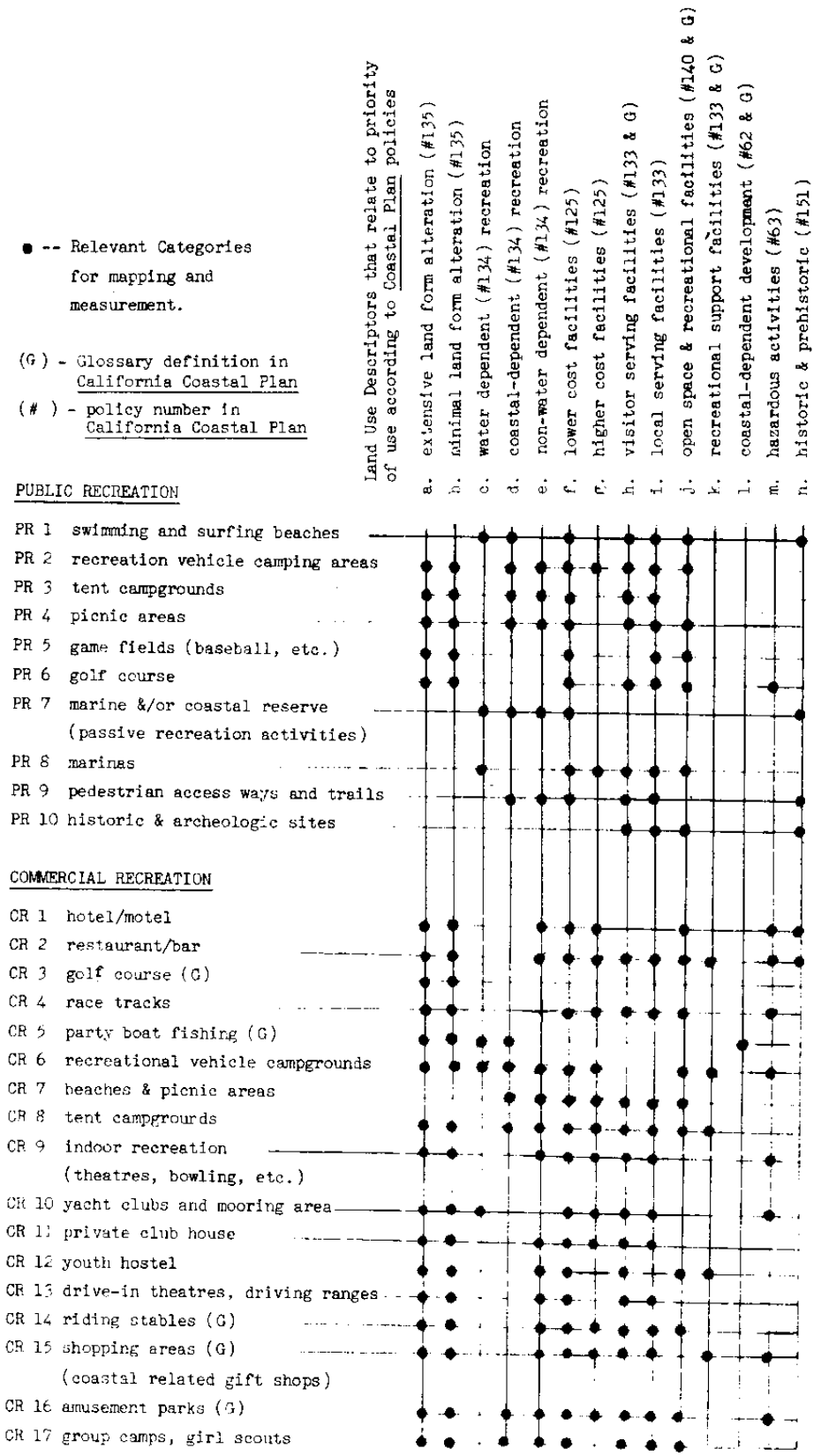
APPENDIX A

LAND USE CLASSIFICATION FOR CCZCC POLICY APPLICATION

● -- Relevant Categories for mapping and measurement.

(G) - Glossary definition in California Coastal Plan

(#) - policy number in California Coastal Plan



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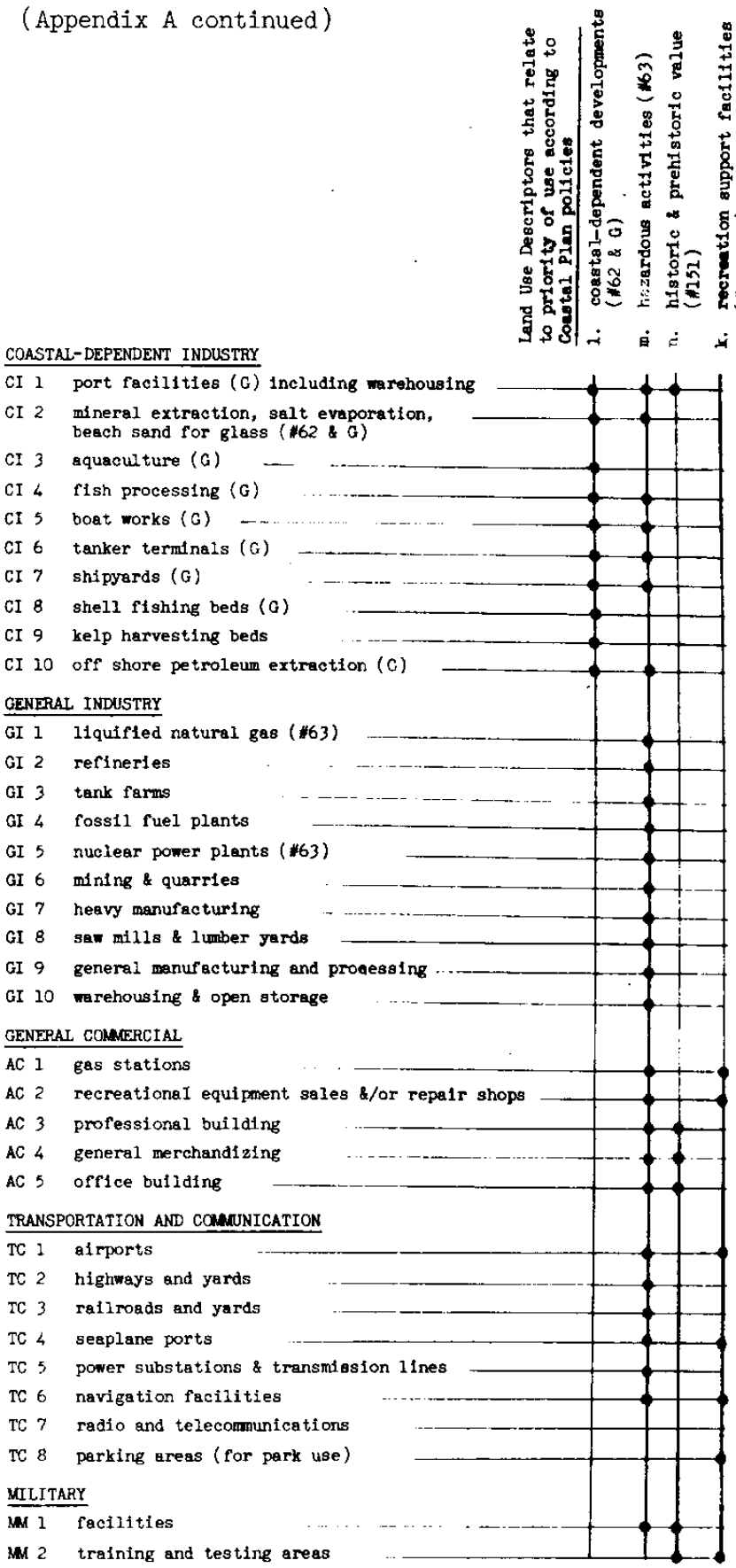

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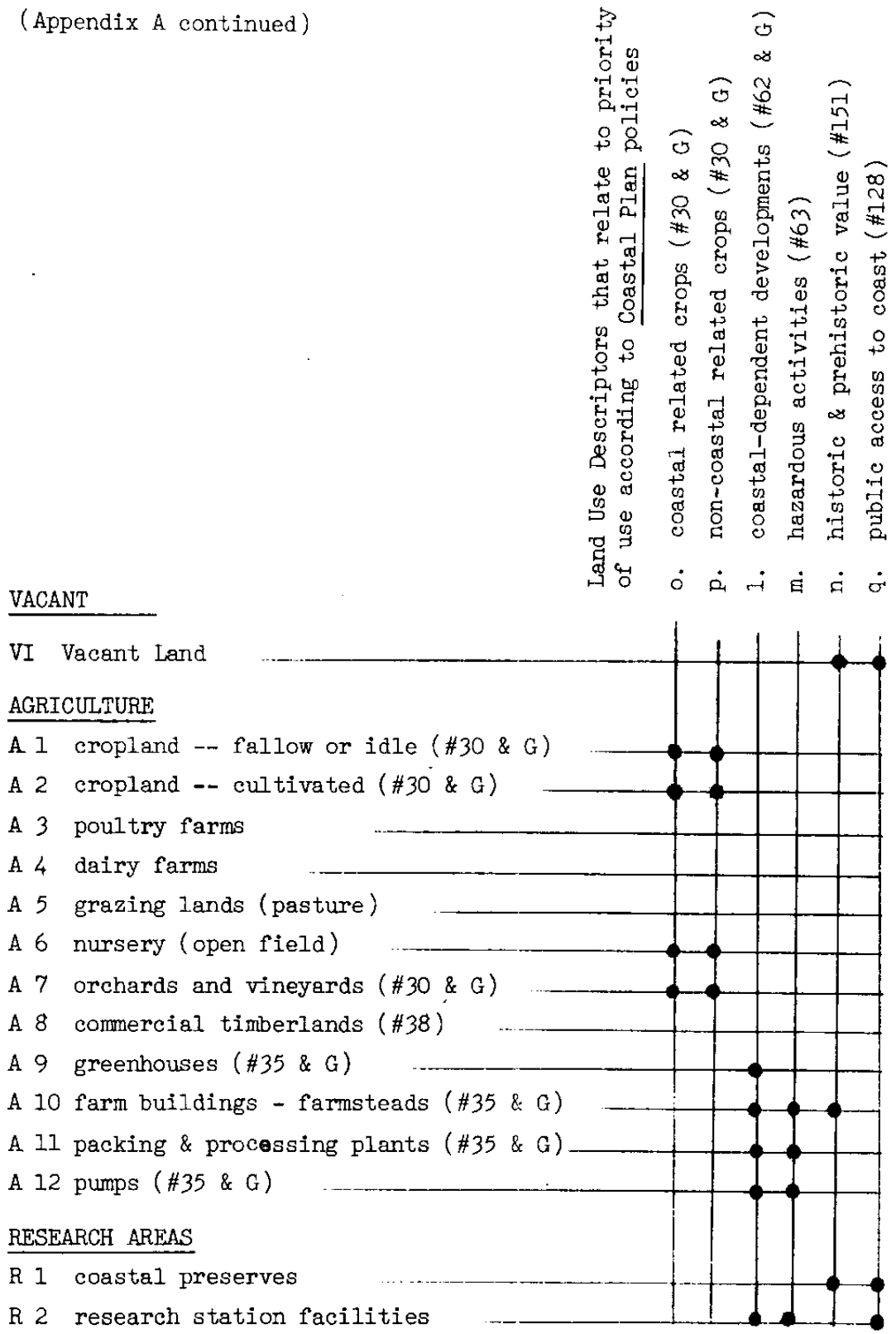

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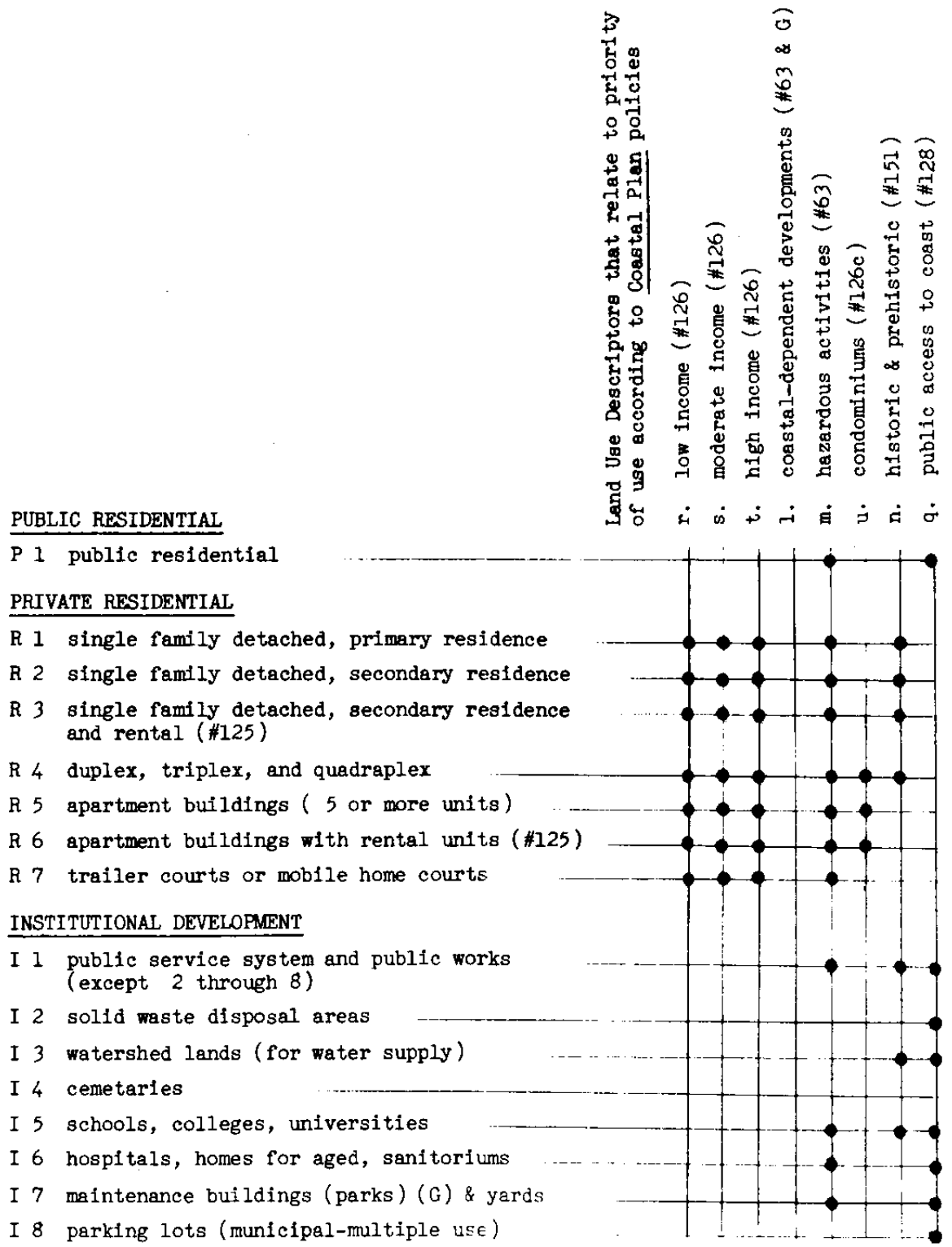

APPENDIX B

DATA REQUIREMENTS

Appendix

B-1 Applying Coastal Plan Policies

B-2 Water Supply Analysis

B-3 Wastewater Analysis

B-4 Recreation and Transportation Simulation

APPENDIX B-1

APPLYING COASTAL PLAN POLICIES

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Existing Commitment	a. Land use map* and number of each type. b. Parcel map and ownership map (assessor's records). c. Population multipliers - residential - commercial - recreational	a. General plans. b. Zoning. c. Projected change in population multipliers. d. Proposed and potential uses not in conformity with general plans or zoning.
Agriculture	a. Existing agricultural land uses (crop types). b. Soil survey. c. Williamson Act lands.	a. Economic feasibility of continued agriculture for each crop type.
Coastal Hazards	a. 100-year floodplains. b. Areas subject to shore erosion. c. Landslide-prone areas. d. Tsunami run-up areas. e. Fault zones and seismic hazard areas.	
Viewshed	a. Viewshed from coastal highways and public recreation areas.	
Flora and Fauna	a. Habitat maps. b. Vegetation and forest maps. c. Rare and/or endangered species maps.	

*See Appendix A, "Land Use Classification for CCMCC Policy Application."

APPENDIX B-2

WATER SUPPLY ANALYSIS

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Supply	a. Total available supply from existing facilities (in MGD) - by service area - by season or month, if variable.	a. Potential changes in supply from existing facilities (in MGD) b. Potential additional sources of supply from new facilities (diversions, wells, inpoundments, reclamation, in MGD).
Use	a. Number of connections by sectors: - agriculture - public recreation - commercial recreation - residential - coastal-dependent commerce - coastal-dependent industry - commercial (non coastal-dependent) - industrial (non coastal-dependent) - government - other. b. Rate of use per sector: - annual use (cubic feet) - average daily use (mgd) - peak month use (cubic feet) - peak day (mgd) c. Annual use for all sectors (combined). d. Peak daily use for all sectors (combined).	a. Potential connections committed or forecasted by sector: - agriculture - public recreation - commercial recreation - residential - coastal-dependent commerce - coastal-dependent industry - commercial (non-coastal-dependent) - industrial (non-coastal-dependent) - government - other. b. Potential change in use per sector in years ahead: - annual use - average daily use - % each sector will use of total water demand. c. Potential annual change in use for all sectors (combined).

(Appendix B-2 continued)

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Use (continued)	e. Per capita per day use for public recreation, commercial recreation, residential and commercial uses (when appropriate).	d. Unit standards used to project water demands for each sector (when relevant) (e.g., gpd per residential connection, gpd per day use recreationist). e. Potential changes in unit standards used to project water demands for each sector (potential changes in consumption patterns).
Socio-Economic and Institutional Factors	a. Population served by each utility district - residential - visitor b. Service area boundaries c. Water charges per unit (gals, cubic feet). d. Average water service connection costs (per sector). e. Charges required to pay for reclaiming wastewater per unit (gals, cubic feet). f. Property taxes per unit of assessed valuation related to capital costs of water supply development.	a. Projected increases in population (residential and visitor) in service area. b. Potential changes in service area boundaries. c. Projected increases in water costs per unit (gals, cubic feet). d. Feasibility of wastewater reclamation and projected charges per unit.

APPENDIX B-3

WASTEWATER ANALYSIS

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Treatment	a. Design capacity - average dry weather flow (in MGD) - peak dry weather flow (in MGD) - peak wet weather flow b. Level of treatment (primary, secondary, tertiary).	a. Proposal to expand design capacity. b. Proposals to upgrade level of treatment.
Discharge	a. Quality of discharge in relation to state and federal standards. b. Location, design, and capacity of outfall (in MGD).	a. Proposals to improve quality of discharge. b. Proposals for new outfall locations or design.
Use	a. Number of units on septic tanks (by watershed, by aquifer) by sector: - residential - commercial - recreational b. Number of units with septic tanks if an inadequate design or in an improper location. c. Number of connections to wastewater treatment systems by sector: - agriculture - public recreation - commercial recreation - residential - coastal-dependent industry - commercial (non-coastal-dependent) - industrial (non-coastal-dependent) - government - other.	a. Proposals to connect units with inadequate septic tanks to wastewater treatment systems. b. Potential connections committed or forecasted by sector: - agriculture - public recreation - commercial recreation - residential - coastal-dependent industry - commercial (non-coastal-dependent) - industrial (non-coastal-dependent) - government - other.

(Appendix B-3 continued)

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Use (continued)	d. Rate of wastewater generation by sector during: - annual generation - average daily dry weather - peak daily dry weather - peak daily wet weather e. Total wastewater flow - annual generation - average daily dry weather - peak daily dry weather - peak daily wet weather (including percent infiltration). f. Per capita per day use for public recreation, commercial recreation, residential, and commercial uses (when appropriate).	c. Unit standard used to project wastewater generation for each sector (when relevant) (e.g., gpd per residential connection, gpd per day use recreationist). d. Potential changes in unit standards used to project wastewater generation for each sector (potential changes in wastewater generation patterns).
Socio-Economic and Institutional Factors	a. Population served by each utility district. - residential - visitor b. Service area boundaries. c. Wastewater charges per unit generated. d. Average sewerage service connection costs (per sector). e. Charges required to pay for reclaiming wastewater per unit.	a. Projected increases in population (residential and visitor) in service area. b. Potential changes in service area boundaries. c. Projected increases in wastewater charges per unit generated. d. Feasibility of wastewater reclamation and projected charges per unit.

(Appendix B-3 continued)

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Socio-Economic and Institutional Factors (continued)	f. Property taxes per unit assessed valuation related to capital costs of wastewater development.	
	g. Areas with bans or limitations on sewerage service connections	

APPENDIX B-4

RECREATION AND TRANSPORTATION SIMULATION

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Highway Network	a. Simple subregional network indicating major arterials and secondary roads used for commute, recreational and local trips. b. Present capacity vs. LOS (Level of Service) for each link. c. Designation of all beaches, CBDs, residential districts, and unusual attractions (e.g., amusement parks, marinas, etc.) as nodes.	a. Potential changes network due to either public or private development. b. Plans that will affect capacities (e.g., road-widening, traffic signals, etc.) c. Possible increase in nodes.
Housing	a. Number of single and multi-unit dwellings in each district* (corresponding to node).	a. Potential increases in dwelling units in each node.
Beaches and Other Attractions	a. Areas of beaches (in square feet). b. Estimated standards of beach use† (e.g., 100-600 square feet per person). c. Turnover rate† (e.g., 1.0-3.0). d. Usage data for each facility* (e.g., daily, monthly, yearly, etc., and day use vs. overnight). e. Parking at each facility (streets and lots). f. Access road capacity.	a. Increases in area of existing or future nodes. b. Potential and/or planned parking at each facility. c. Potential and/or planned increase in access capacity.

*Census data (tract and/or block).

†California Dept. of Parks and Recreation; County; city data sources.

DATA CATEGORIES	PRESENT CONDITIONS	FUTURE PLANS
Traffic	a. Hourly traffic counts* for as many points in the network as possible: -during commute periods -on weekends -during special peak periods (e.g., July 4th) b. License plate (origin-destination) surveys.*	
Population	a. Population of the surrounding region which uses the subregion as a recreation area.	a. Population projection of surrounding region.†
Transit	a. Network (stops and service frequency). b. Patronage	a. Proposed network expansions.
Safety	a. Number of accidents.	a. Safety improvement plans.

*Local CALTRANS District office.

†Regional Planning Agency, State Department of Finance

APPENDIX C

HALF MOON BAY DATA SOURCES

Appendix

APPENDIX C-1

HALF MOON BAY DATA SOURCES BY TYPE OF IMPACT

IMPACT	INFORMATION REQUIRED	SOURCE	DOCUMENT OR DATA
AGRICULTURE	Soil characteristics and qualities	US Department of Agriculture Soil Conservation Service	Report and General Soil Map San Mateo County (1974)
	Soil characteristics and qualities plus genesis of classification	US Department of Agriculture and California Agricultural Experimental Station	Soil Survey, San Mateo Area (May 1961)
	Soil characteristics and qualities plus soil limitations and suitabilities	US Department of Agriculture and San Mateo Conservation District	A supplement to Soil Survey, San Mateo Area (January 1969)
	Logging, taxation, land use data	San Mateo County Planning Department	Report of "Forest Resources of San Mateo County" (March 1971)
	Crop, livestock data	San Mateo County Department of Agriculture	Agricultural Crop Report (1973)
COASTAL HAZARDS	Map of Tsunamis hazards (for a 20-foot wave at the Golden Gate)	USGS/HUD. SF Bay Region Environment and Resources Planning Study	Map showing areas of potential inundation by tsunamis in the SF Bay Region (MF-480), Basic Data Contribution #52 (1972)
	Landslide maps	USGS/HUD. SF Bay Region Environment and Resources Planning Study	Map showing distribution and cost by counties of structurally damaging landslides in the SF Bay Region, CW. 1968-69. (MF 327) (1972)
	Landslide maps	USGS/HUD. SF Bay Region Environment and Resources Planning Study	Landslide Susceptibility in San Mateo County (MF 360) (1972)
	Landslide maps	USGS/HUD. SF Bay Region Environment and Resources Planning Study	Preliminary map of landslide deposits in San Mateo County (MF 344) (1972)

(Appendix C-1 continued)

IMPACT	INFORMATION REQUIRED	SOURCE	DOCUMENT OR DATA
(COASTAL HAZARDS continued)	Soil consolidation map: danger areas	USGS/HUD. SF Bay Region Environment and Resources Planning Study	Geologic map of unconsolidated and moderately consolidated deposits in San Mateo County (MF 575) (1974)
	Geologic map	USGS/HUD. SF Bay Region Environment and Resources Planning Study	Preliminary geologic map of San Mateo County (MF 328) (1972)
	Coastal Erosion	USGS/HUD Study. California Division of Mines and Geology	
HYDROLOGY--WATER QUALITY AND FLOODING	Daily, peak discharge; sediment size; physical, chemical, and biological water quality	USGS/HUD. SF Bay Region Environment and Resources Planning Study. Interpretative Report #5 (MFS 526)	Availability of data on surface water quantity and quality in the SF Bay Region with a summary of beneficial uses (1974)
	Background information on flooding	State of California Department of Water Resources	Coastal San Mateo County, Investigation Bulletin #138 (March 1966)
	Water quality limits for effluents	State of California Water Quality Control Board	Water Quality Control Plan for Ocean Waters of California
	Background	Regional Water Quality Control Board	Basin Plan.
	Background--waste facilities	CCZCC	Plan Element, Public Utility Study, Chapter 4 "Wastewater Facilities"
	Background--maps, many issues for Santa Cruz	Landscape Architecture Department, UC Berkeley	"Early Warning System" by Patri, et al.
	Water quality--sewage capacity for various sewage districts	Jenks and Adamson for the City of Half Moon Bay and the Coastside Sewer Service Agency	San Mateo County: Mid-Coastside Supplemental Project Report, Phase I

(Appendix C-1 continued)

IMPACT	INFORMATION REQUIRED	SOURCE	DOCUMENT OR DATA
(HYDROLOGY continued)		Don Juneata (Attorney General's Office)	Coastside Water District Suit
			Impact Statement for Half Moon Bay Sewage Treatment Plant
			File for exemption from EIR procedure from D & D for golf course
	Historical sale of water rights	Water District	
	Precipitation	US Weather Service	
SOCIAL EQUITY--RECREATION	Recreation areas	State of California Department of Parks and Recreation, Sacramento	California Outdoor Recreation Resources Plan (February 1974)
	Usage data (daily, monthly) for San Mateo beaches	State of California Department of Parks and Recreation, local office, Half Moon Bay	Handwritten sheets from R.W. Werts
	System description, background	State of California Department of Parks and Recreation	PARIS, Planning, Monograph #2 (November 1966)
	Recreation areas	Central Coast Regional CCZCC	Recreation (August 23, 1974)
	State beach map	State of California Department of Parks and Recreation	State Beaches of San Mateo County
	Information on Fitzgerald Marine Reserve	County of San Mateo Department of Parks and Recreation	Concept Plan
	Recreation and open space	San Mateo Planning Department	Parks and Open Space Element (March 1969)
		San Mateo Planning Department	Conservation and Open Space Element of the San Mateo County General Plan (December 1973)
	Proposed Plan	San Mateo County Planning Department, K. Siegel	Mid-Coast Community Plan (draft) (August 1974)

(Appendix C-1 continued)

IMPACT	INFORMATION REQUIRED	SOURCE	DOCUMENT OR DATA
(SOCIAL EQUITY--RECREATION continued)	Existing Plan	San Mateo County Planning Department, K. Siegel	Master Plan (last amended January 1964)
	Background and land use development criteria	San Mateo County Planning Department, K. Siegel	Resource Management Zoning District, a portion of San Mateo County Zoning Ordinance, open space standards review (December 1973)
	Population, employment, industry and land use projections	ABAG for Regional Water Quality Control Board	Population, Employment and Land Use Projections for the SF Bay Region (February 1973)
	Development thresholds, standards, maps	San Mateo County Planning Department	Description of "Land Use Factors to Density Matrix" and related memos
	Extensive aerial photography of land use	Army Corps of Engineers, San Francisco	
	Background on population characteristics	San Mateo County Planning Department, K. Siegel	Mid-Coast Plan, Background (draft)
	Housing stock, background	San Mateo County Planning Department, K. Siegel	Mid-Coast Plan, Background (draft)
	Holding capacity: general impact of changing minimum lot size from 5,000 to 10,000	San Mateo County Planning Department, K. Siegel	Mid-Coast Plan, Background (draft)
	Background information on special districts	LAFCO	Special Districts in San Mateo County (1972)
	Ownership map	San Mateo County Assessor	Tract and Parcel Map
	Income/age, etc., of residents	Survey Research Center	US Census
	Assessments over the last 20 years	County Assessor	

(Appendix C-1 continued)

IMPACT	INFORMATION REQUIRED	SOURCE	DOCUMENT OR DATA
(SOCIAL EQUITY--RECREATION continued)	Number of developable/ undevelopable parcels	Old subdivisions, minimum lot size 5000 square feet, improved parcels	
	City General Plan	City of Half Moon Bay	
TRANSPORTATION	Recreational trips	CALTRANS, District 4	Special Study, Postcard Survey 8/20-8/22/74
	Trip Ends Generative	CALTRANS, District 4	Progress Reports on Trip Ends: Sixth Progress Report (December 1970); Seventh Progress Report (December 1971); Eighth Progress Report (July 1973)
	Background information	CALTRANS, District 4	Draft EIS (Report #380)
	CALTRANS future projects	CALTRANS, District 4	California State Highway Map, CALTRANS (1974)
	Counts--every 6 minutes for duration of study	CALTRANS, District 4, P. Lee	Special Study (6/27-7/7/74) for eight locations in Half Moon Bay area--copy of computer output
	Coastal network description	CALTRANS, District 4, R. Jones	Personal communication
	Coastal zone policy	CALTRANS, B. Borup	Appendix 2 of 1972 Annual Highway Planning Report
	Coastal zone highway network	CALTRANS, B. Borup	Appendix 2 of 1972 Annual Highway Planning Report
	Location and cost of proposed CALTRANS projects in coastal zone	CALTRANS, B. Borup	Excerpts from the 1974 program guide
	Population projections resulting from changes in highway network, San Mateo Coast	M. Barchas, San Mateo County Planning Agency	Mid-Coast Population Implications Resulting from Improvements to Major Routes Connecting San Francisco and the Bayside. Working paper #8-A (December 1971)

(Appendix C-1 continued)

IMPACT	INFORMATION REQUIRED	SOURCE	DOCUMENT OR DATA
(TRANSPORTATION continued)	Present/proposed transit	San Mateo County by PB-TB-Webber Smith-Kirker, Chapman	San Mateo County Local Bus Transit Study
VISUAL DEGRADATION	View from the road	Sea Grant, UC Berkeley	Inventory, analysis, and evaluation of coastal lands possessing significant visual quality based on view from highways
	Visual analysis	Central Coast CCZCC	Appearance and design element
	Viewshed boundary	PROS (County Open Space Plan) County visual quality study	
	Physical resources	San Mateo County Planning Department	The Physical Setting of San Mateo County (May 1968)

APPENDIX C-2

MASTER LIST OF COASTSIDE MAPS

as of May 16, 1973*

1. Locator Map
2. Density Control Map
2. Density Control Map

21. 100-Year Flood Plains
22. Susceptibility of Slopes to Failure by Landsliding, San Mateo County
23. Generalized Slope
24. Active Faults, Probable Active Faults, and Associated Fracture Zones
25. Composite Hazards

31. Public Interest Lands
32. Agricultural Preserves - December 1972
33. High Quality Agricultural Soils
34. Remote Coastside Land
35. Lands Theoretically Capable of Urban Development

41. Unincorporated Area Zoning - 1972
42. Coastside Road Network - 1972
43. Generalized Coastside Land Values
44. Coastside Land Area Within Special Service Districts
45. Coastside Land Ownership Turnover 1962-1971
46. Coastside Lands Generally in Agricultural Use from 1968-1972
47. Generalized Land Parcel Size

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*Source: Marc Barchas, San Mateo County Planning Department

APPENDIX D

DATA AVAILABLE FROM ASSESSOR'S TAPES ON THE COMPUTERIZED DATA MANAGEMENT SYSTEM

1. Assessor's Map Book Number
2. Assessor's Page Number
3. Assessor's Block Number
4. Assessor's Parcel Number
5. Tax Area Code
6. Name of Owner(s)
7. Care of Name
8. Mailing Address
9. Assessed Value of Land
10. Assessed Value of Improvements
11. Value of Exemptions
12. Unconfirmed Sale Amount
13. City or County Code
14. Street Number
15. Street Name
16. Zoning
17. Use Code

The following pages list the various use code numbers and their definitions. The uses are numbered 0-98 and cover a wide range of uses within the subregion. This list is useful in understanding the master assessor's data book compiled for parts of the subregion from the Data Management System (INGRES).

USE CODES CONTAINED ON ASSESSOR'S RECORDS

00. Vacant Land

01. Single Residences. Includes single trailer on residential lot.

02. Duplexes

03. Three Units - Triplexes

04. Four Units (For Combination Units see Nos. 91 - 92 - 93 - 94 - 95 - 96).

05. Apartments: Multiple Unit (Five Units or more, up to three stories.

06. Hotels - Motels (one to three stories)

07. Hotels and High-Rise Apartments (Four stories or more)

08. Boarding Houses, Rooming House

09. Trailer Parks

10. Commercial

11. Stores - One story

12. Store and Office - Combination

13. Store or Office and Residence - Combination

14. Super Markets

15. Department Stores

16. Shopping Centers - All

17. Office Buildings -- One Story

18. Office Buildings -- Multi-Story

19. Professional Buildings, Pet Hospitals, Medical and Medical/Dental Buildings

20. Commercial

21. Restaurants and Drive-In Restaurants, Cocktail Lounges - Bars, Drive-In Coffee Shops, Etc., Night Clubs

(Appendix D continued)

22. Recreation (enclosed), Dance and Music Schools, Health Studios, Pool Halls, Driving Range (Golf), Theaters (enclosed), Bowling Alley, Skating Rink, Archery and Rifle Range

23. Financial Institutions, Banks, Savings and Loan Companies, Mortgage Companies, Insurance Companies, Title Companies (if the building is built for such purpose)

24. Service Shops, Radio and Television Repair, Refrigeration Service, Paint Shops, Electric Repair, Dry Cleaners

25. Service Stations, Petroleum Bulk Plants

26. Auto Sales, Repair and Storage; Auto Service Shops; Body and Fender Shops, Garages (Commercial); Farm Machinery Sales and Service

27. Parking Lots, Commercial Lots

28. Wholesale Outlets, Produce Houses, Manufacturers Outlets

29. Nursery Schools, Private Schools (Commercial), Trade Schools

30. Industrial

31. Light Manufacturing, Small Equipment Manufacturing Plants, Small Machine Shops, Instrument Manufacturing, Printing Plants

32. Heavy Industrial, Heavy Equipment Manufacturing Plants, Heavy Machine Shops, Foundries, Steel Fabricating Plants, Aircraft Plants, Wharves and Dock

33. Lumber Yards, Sawmills, Planing Mills

34. Packing Plants, Vegetable Packing Plants, Meat Packing Plants

35. Canneries, Fruit and Vegetable

36. Other Food Processing, Candy Plants, Potato Chip Factories, Bakeries, Wineries

37. Mineral Processing, Cement Plants, Refineries, Clay Plants, Rock and Gravel Plants, Paving Mix Plants

38. Warehousing, Distribution Terminals, Trucking Terminals, Van and Storage Warehousing, Bus Depot

39. Open Storage

40. Horticulture (Row crops, outdoor flowers, etc.)

41. Horticulture and Dry Farm

(Appendix D continued)

42. Horticulture and Grazing

43. Horticulture and Barren or Brush

44. Irrigated Pasture

45. Irrigated Pasture and Barren or Brush

46. Dry Farm or Pasture

47. Grazing

48. Wooded or Timber

49. Barren or Brush

50. Unimproved Site(s) (U/40 Ac., except Horticulture)

51. Single Family Res. (U/5 Ac.)

52. Single Family Res. (5-40 Ac.)

53. Single Family Res. (O/40 Ac.)

54. Multi-Use Imps. (U/5 Ac.)

55. Multi-Use Imps. (5-40 Ac.) } Include Single Family Residence(s)

56. Multi-Use Imps. (O/40 Ac.) }

57. Auxiliary Farm Imps.

58. Miscellaneous Imps. (Non-exempt organizations, resorts, recreation).

59. Nurseries and Greenhouses

60. Recreational Open

61. Drive-In Theatres

62. Airport (Not Exempt)

63. Marinas, Boat Harbors

64. Clubs, Lodge Halls, Dance Halls

65. Auditoriums, Stadiums, Amusement Piers

66. Golf Courses

(Appendix D continued)

67. Race Tracks

68. Camps

69. Parks

70. Institutional

71. Churches

72. Schools; Parochial, Private

73. Colleges; Private

74. Hospitals

75. Homes for the Aged and Others, Orphanages, Nursing Homes, Convalescent Homes

76. Post Offices

77. Mortuaries, Mausoleums

78. Community Centers, Y.M.C.A., B.S.A.-G.S.A., etc.

79. Multi-Use

80. Miscellaneous

81. Utility, Gas and Electricity, Telephone and Telegraph, Water Service

82. Mining; Gold, Silver, etc.; Lime, Clay

83. Petroleum and Gas Wells

84. Pipe Lines, Canals

85. Rights of Way

86. Water Rights

87. Rivers and Lakes

88. Highways and Streets; City, County, State, Federal, and District Owned Property, Taxable or Non-Taxable

89. General Miscellaneous

(Appendix D continued)

90. New Primary Use Code Numbers for Multiple Residential Properties That Do Not Fit Into the Normal Use Codes

91. More than one single family detached res. or detached cottages (court) on one parcel.

92. Single family res. (01) on one parcel plus

1. One basement apt. or,
2. One 2nd floor apt. or,
3. One living unit over garage or,
4. One rental unit at rear (detached).

93. One single family res. on one parcel plus

1. One duplex or
2. One triplex.

94. Two duplexes on one parcel.

95. Any other combination of units with less than four units in one building that is not covered in the above codes.

96. One fourplex plus any other combination of units, such as residence, duplex, or triplex.

97. Condominiums.

APPENDIX E

PUBLIC SERVICES MANAGEMENT IMPACTS

E-1 Water Supply

E-2 Wastewater Disposal

E-3 Transportation

E-4 Provision of Energy

E-5 Disposal of Solid Waste

Key to Coastal Plan Documentation and Policy Guidance Columns

*No subsequent footnote indicates Coastal Plan finding

†Numbers in parentheses indicate Coastal Plan policy numbers

‡No direct Coastal Plan citation

APPENDIX E-1

WATER SUPPLY

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
ALLOW DEMAND TO EXCEED CAPACITY	Environmental		
	Degradation of habitat areas	Overuse of groundwater can...often have a damaging effect on native habitats*	"High priority for funding shall be given to project necessary to offset the continued depletion of coastal area water supplies [both surface and groundwater]" (8)
	Increase in hazard areas	If an aquifer is overdrafted, [it] may lose its structural capacity through subsidence	"Water management shall stress conservation" (23d) [30254]
	Loss of prime soils	As a result of continued overdraft of groundwater supplies and the reduction of freshwater recharge, salt water has intruded into underground freshwater reserves and can harm soil quality for agricultural use	
	Degradation of watershed and coastal waters	Overdrafts also threaten water quality	
		Overexploitation of surface water will prevent adequate recharge of aquifers	
		Overuse of groundwater can affect surface supplies by drying up streams and springs	
	Social/Economic		
	Loss of business	Groundwater deterioration harms agriculture, or deterioration and smaller supply requires more money for new water sources*	

(Appendix E-1 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(ALLOW DEMAND TO EXCEED CAPACITY continued)	Improvement in local jurisdictions' fiscal status	Facility services per capita cost decreases‡	
	Public Service		
	Decrease in extent of water usage	Lowers per capita water consumption and/or periodic shorages‡	
CONSTRUCT NEW FACILITIES - DAMS - RESERVOIRS - PIPELINES	Environmental		
	Loss of environmentally sensitive lands (open space, forest, soils, habitats, etc.)	New facilities require space; new reservoirs may innundate environmentally sensitive land*	"Public service facilities shall be provided or expanded only to the extent that...[it] is consistent with other Coastal Plan policies" (61) [30254]
		Extending urban services into coastal recreational, agricultural, and wildlife areas would make possible development that might not otherwise occur	"Projects that would alter natural streams...shall be permitted"... "Only for (1) necessary water supply projects, or (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible" (24b) [30231, 30236]
	Degradation of viewshed quality	"Water storage tanks, pumping stations can be major visual intrusions"	
	Loss of sand supply	Dams reduce the natural flood flows of coastal streams and so eliminate or impair the continued generation and delivery of beach sands	
	Loss of coastal waters and habitats	Coastal estuaries and wetlands have been deprived of freshwater inflow by water diversions	
		The upstream habitat has been damaged by many activities: dams, water diversions	

(Appendix E-1 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSTRUCT NEW FACILITIES continued)	Access		
	Change in opportunities for public access to coastal recreation areas	"[Dams]: loss of water-oriented recreational opportunities on coastal streams" (22b)	
		Excessive expansion of services in already developed areas can result in additional development to the extent of impeding public access to the coastline	
	Social/Economic		
	Change in local jurisdictions' fiscal status	High cost of new facility construction‡	
	Increase in state and federal funding for projects in the coastal zone	State and federal share of cost of new facilities‡	
	Public Services		
	Increase in use of wastewater facility usage		
SHIFT IN ALLOCATIONS AMONG USER GROUPS	Social/Economic		
	Change in amount of business	Loss of water for agriculture‡	
CONSERVATION	Social/Economic		
	Change in local jurisdictions' fiscal	The adverse economic effects of overuse of water supplies can all be reduced by lowering the rate of growth in demand for water use	"Water management shall stress conservation" (23d)

(Appendix E-1 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSERVATION continued)	Public Services		
	Decrease in use of water (avoids impacts associated with "excess capacity" or "construct new facilities" shown above)	The adverse environmental effects of overuse of water supplies can all be reduced by lowering the rate of growth in demand for water use	
RECLAMATION	Social/Economic		
	Change in local jurisdictions' fiscal status and tax obligation of citizens	Reduce California's dependency on costly interbasin water transfers	"Stress reclamation of wastewater" (8) [30231, Section 15]
	Public Services		
	Increase in use of water (but avoids impacts associated with "exceeds capacity" or "construct new facilities" shown above)	Reclamation of wastewater can help conserve limited water supplies, thus avoiding the potential adverse effects of overdrafts	
	Decrease in use of wastewater facility	Reclamation of wastewater can also eliminate the adverse effects of partially treated waters into coastal waters	
INTERBASIN TRANSFERS	Social/Economic		
	Change in local jurisdictions' fiscal status and tax obligation of citizens	Costly...interbasin water transfers	"High priority for funding shall be given to projects necessary...to decrease the need for water importation programs" (8) [30231, Section 15]

(Appendix E-1 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(INTERBASIN TRANSFERS continued)	Public Services		
	Increase in use of energy	Water importation may entail high energy costs	"Avoid need for future water importation" (23c)[30504, 30254] "The watershed management plans shall...consider statewide interbasin interests" (22b)[30251]

APPENDIX E-2

WASTEWATER DISPOSAL

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
ALLOW DEMAND TO EXCEED CAPACITY OR USE SUBSTANDARD FACILITIES	Environmental		
	Degrades habitat areas	"Discharges that adversely affect biologically sensitive sites" (7a)	"Restrict expansion of substandard sewage systems" (7e) [Section 15]
	Degradation of watershed and coastal waters	Waste discharges impair essential water quality	"Upgrade existing municipal and industrial discharges" (7a)[Section 15]
		"Discharges that adversely affect wetlands, estuaries" (7a)	"Phase out discharge to enclosed bays and estuaries" (7b)[Section 15]
	Access		
	Loss of recreation access	"Discharges that adversely affect areas important for water contact sports" (7a)	
	Economic		
	Loss of business	"Discharges that adversely affect areas that produce shellfish for human consumption" (7a)	
ALLOW UNSEWERED DISCHARGES	Environmental		
	Degradation of watershed and coastal waters	Failing septic tanks [can cause] degradation of water quality or unnatural changes in the rate of waterflow into coastal waters	"New or expanded coastal developments that are not connected to sewers and sewage treatment systems shall meet strict waste discharge requirements to prevent adverse impacts" (7d) [Section 15]

(Appendix E-2 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
CONSTRUCT NEW FACILITIES OR EXPAND EXISTING ONES - TREATMENT PLANTS - PIPELINES	Environmental		
	Loss of environmentally sensitive lands (open space, habitats, etc.)	New facilities require land‡ Extending urban services into coastal recreational, agricultural, and wildlife areas would make possible development that might not otherwise occur	"New or enlarged sewage systems and treatment plants discharging to other coastal waters shall meet present federal requirements" (7c) [Section 15]
	Degradation of viewshed	Sewage treatment facilities that can be major visual intrusions	
	Access		
	Loss of public access to coastal recreational areas	Excessive expansion of services in already-developed areas can result in additional development to the extent of impeding public access to coastline	
	Social/Economic		
	Change in local jurisdictions' fiscal status and change in tax obligation of citizens	Cost of new facilities‡	"Sewer...systems shall be provided or expanded only to the extent that the location and amount of development and population that the systems will potentially serve is consistent with other Coastal Plan policies" (61) [30254]
	Increase in state and federal funding for projects in the coastal zone	State and federal share of cost of new facilities‡	

APPENDIX E-3

TRANSPORTATION

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
ALLOW DEMAND TO EXCEED CAPACITY - ROADS - PARKING	Environmental		
	Loss of viewshed and blockage of view	"Increased visual pollution caused by slow-moving traffic"	
	Degradation of airshed	"Increased air pollution caused by slow-moving traffic"	
		Noise‡	
	Access		
	Loss of convenience of traveling to coastal zone		"Coordinated bus service...car pooling and segregation of heavy vehicles from regular coastal traffic shall also be encouraged to reduce excessive traffic loads as well as to reduce air pollution" (103) [30252, 30253(3)]
	Decrease in access to shoreline	Where parking is inadequate, cars spill over...impeding public access to the shoreline	"Minimize impact of parking facilities...while allowing for increased public access" (105) [30252]
	Social/Economic		
	Change in quality of public safety	Decreased safety resulting from conflicts between different types of traffic	"Consider emergency transportation needs" (99c)
	Public Service		
	Increase in use of energy		

(Appendix E-3 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
CONSTRUCT NEW FACILITIES	Environmental		
	Loss of environmentally sensitive lands (open space, habitats, etc.)	Extending urban services into coastal recreational, agricultural, and wildlife areas would make possible development that might not otherwise occur	"New...scenic routes...shall be designed...with the highest regard for aesthetic considerations" (104e) [30254, 30251]
		Valuable coastal land can be taken for road construction‡	"Construction or expansion of coastal roads shall be allowed only where the project shall not open coastal rural areas for development" (102) [30254] ..."or shall eliminate or minimize adverse environmental impacts" (102c) [30254]
		Additional parking facilities would consume scarce coastal land	"Minimize impact of parking facilities" (105) [30252]
	Increase in hazard areas	Poor road construction methods can cause soil erosion resulting in mud- and landslides	
	Loss of viewshed	Transportation and parking facilities that can result in cutting and filling of the natural landscape and the well-known "sea of asphalt"	"Transportation facilities shall be provided or expanded only to the extent that [it] is consistent with other Coastal Plan policies" (61) [30254]
	Degradation of watersheds and coastal waters	Poor [road] construction methods can cause soil erosion, water pollution, flooding; can reduce tidal flushing in coastal wetlands and lagoons	
	Degradation of airshed	Auto-generated air pollution can be a significant problem in coastal valley areas. High noise levels create an unpleasant experience when freeways encourage a net increase in vehicular mileage; they also add to total air basin pollution	

(Appendix E-3 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSTRUCT NEW FACILITIES continued)	Access		
	Increase in convenience of traveling to coastal zone and access to shoreline		"Construction or expansion of coastal coastal roads shall be allowed only where the project shall not open coastal rural areas for development" (102) [30254]
	Social/Economic		
	Increase in the amount of state and federal funding		
	Loss of man-made resources	"...adverse impacts on historic or archaelogical sites" (102c)	"Road construction shall eliminate or minimize adverse impacts on historic or archaelogical sites" (102c) [30254, 30244]
	Change in quality of public health and safety	Poor [road] construction can cause soil erosion resulting in flooding and fire hazard New roads may lessen accidents or allow increased usage, thereby increasing accidents‡	
	Public Services		
	Increase in transportation facility usage	Increased road capacity can initially work...to improve the level of service, however expanded road capacity is absorbed...so the overall level of service is often not greatly improved and in some cases diminished	

(Appendix E-3 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
PROVISION OF MASS TRANSIT	Environmental		
	Improvement in condition of airshed	Coastal transit systems could help reduce...pollution	"Encourage energy-conserving and non-air polluting transportation forms" (97b) [30261(b)]
			"Expand transit in urban and air quality maintenance areas" (109)
	Access		
	Increase in availability of transportation options	Coastal transit systems could help provide coastal access to those without cars	"Establish priority of transit over new roads for cars" (108) [30252]
	Social/Economic		
	Increase in the amount of state and federal funding	Transit's major financial need is for operating costs; state and federal subsidies provide primarily for planning and capital expenditures	
	Increase in quality of public safety	Bus systems are an important means of evacuation [in emergencies]	
	Public Service		
	Decrease in use of energy	Energy consumption in transportation can be cut [e.g., rate and service improvements on public transit]	
	Increase in use of transportation facilities	A variety of transportation modes [cars, buses]...that all use the same road facilities...greatly increases traffic congestion	

(Appendix E-3 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
PROVISION OF NON-MOTORIZED TRANSPORTATION OPPORTUNITIES: - BIKEWAYS - TRAILS	Access		
	Increase in access to the coast	A system of coastal...trails would make more of the coast accessible to more people	"Establish a coastal trails system" (145)
	Increase in availability of transportation options		"Encourage energy-conserving and non-air polluting transportation forms" (99b) [30253(4), 30252]
	Social/Economic		
	Increase in quality of public safety	Although bicycles can be used on existing roadways, mixed bicycle-auto traffic is often dangerous to riders	

APPENDIX E-4

PROVISION OF ENERGY

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
ALLOW CONTINUED AND INCREASED CONSUMPTION OF ENERGY SUPPLIED BY CONVENTIONAL SOURCES: - PRODUCTION OF NON-RENEWABLE ENERGY RESOURCES (OIL, GAS) - UTILITY LINES - NEW POWER PLANTS (FOSSIL FUEL AND NUCLEAR)	Environmental		
	Loss of environmentally sensitive lands (open space, soils, etc.)	Offshore production will encourage onshore development Facilities require land area ±	"Criteria for siting and design of coastal power plants: - Energy conservation and peak load reduction efforts - [Evaluate] reasonable alternative inland sites - Plant expansions favored over new coastal sites - [Not] conflict with coastal-dependent uses - Nuclear plants must be in seismically safe areas - Meets [radiation hazard] criteria - Use least environmentally damaging technologies - Not be built in...Air Quality Maintenance Areas or in areas where such coastal resources...would be adversely affected - Minimize environmental and scenic impacts - Public access area necessary" (79) [30264, 30413]
	Loss of viewshed	Offshore oil structures are visually prominent Power plants can be major visual intrusions Utility facilities that can cause visual blight	
	Increase in hazard areas	"Liquid and gas extraction that could cause or contribute to subsidence hazard" (83g)	
	Degradation of coastal waters and marine habitats	Oil drilling: major spills associated with OCS development are statistically inevitable Power plants discharge huge volumes of (warmed) water...Some species that cannot tolerate the warmer water will leave or die off, others may be enhanced	"Criteria for siting and design of petroleum facilities: - Use best well sites - Assure geologic safety - Consolidate drilling, production, and processing sites - Minimize impacts of petroleum facilities onshore - Prevent subsidence" (83) [30262]

(Appendix E-4 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(ALLOW CONTINUED AND INCREASED CONSUMPTION OF ENERGY continued)	Degradation of airshed	The consequences implied in conventional supply mix forecasts are serious: increased problems of air pollution The proponents of nuclear power point out that its use reduces air pollution The radiation hazard potential of nuclear power plants	"Avoiding adverse impacts of federal OCS petroleum development" (86)
	Access		
	Decrease in access to the coast	Facilities may use recreation land or block beach access‡	
	Social/Economic		
	Increase in employment		
	Decrease in quality of public health and safety	Fire hazard from oil and gas extraction‡ The consequences implied in conventional supply mix forecasts are are serious: problems of nuclear fuel transport security, radioactive waste handling and disposal and potential nuclear reactor hazards	

Appendix E-4 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(ALLOW CONTINUED AND INCREASED CONSUMPTION OF ENERGY continued)	Public Service		
	Increase in water usage	The consequences implied in conventional supply mix forecasts are serious: problems of cooling water supply	"Public service...facilities...shall be provided or expanded only to the extent that the location and amount of development and population that the systems will potentially serve is consistent with other Coastal Plan policies" (61) [30254]
SHIFT TO ALTERNATIVE ENERGY SOURCES: - SOLAR - WIND - TIDAL - GEOTHERMAL - SOLID WASTE - METHANOL	Environmental		
	Loss of environmentally sensitive lands	Development of alternative energy sources will also require sites for power generation facilities	"Encourage development of alternative energy sources" (74)
		Solar: there is also concern over the large land areas...that could be required	"Require that local governmental agencies adopt 'sun rights' ordinances" 75d(3)
	Degradation of habitat areas and coastal waters	The damming of an entire bay or estuary for a tidal hydroelectric generating plant has severe environmental and ecological effects	
		Geothermal problems of disruption of wildlife habitat	
	Increase in hazard areas	Geothermal: problems of soil erosion, land subsidence	
	Loss of viewshed	Wind: the principal environmental concern is with the appearance of... wind generation equipment	

(Appendix E-4 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(SHIFT TO ALTERNATIVE ENERGY SOURCES continued)	Change in condition of airshed	Wind: the principal environmental concern is with...noise of...wind generation equipment There is also some concern that large-scale solar collecting systems may upset local thermal balances Incineration...of refuse can produce recoverable heat [but] can present air pollution problems Methanol-gasoline mixture results in...lower emissions	
	Public Service		
	Increase in water usage	Solar: there is also concern over the large amount of...fresh water for cooling that could be required	
	Decrease in use of natural gas	Implementation of solar energy systems can be directly correlated with potential savings in natural gas	
	Decrease in use of solid waste facilities	Methanol...can be made from practically any other fuel... offering a means of reducing the nation's waste disposal problems	
CONSTRUCT/EXPAND TANKER TERMINALS, LNG FACILITIES, AND REFINERIES	Environmental		
	Loss of environmentally sensitive lands (open space, soils, etc.)	LNG land facilities require sufficient acreage Refineries typically require as much as 500-1,500 acres of land Tanker terminals encourage related development	

(Appendix E-4 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSTRUCT/EXPAND TANKER TERMINALS, LNG FACILITIES AND REFINERIES continued)	Access		
	Decrease in access to the coast	Facilities may be located on potential recreational sites Oil spills are aesthetically displeasing; they cover beaches	"Criteria for siting and design of LNG facilities: - Limit number of terminals until safety is assured - Sites remote from human population concentrations - Restrict dredging and filling - Minimize adverse environmental effects" (95) [30261(b)]
	Social/Economic		
	Change in local fiscal status	In the short term, refineries enlarge the tax base of the host community; in the longer term, they very substantially increase municipal services requirements	
	Disruption of community character and loss of business	Oil spills may have significant economic and psychological impact on human communities within the coastal zone LNG: location near a residential area could present social and economic impacts on the community	
	Threat of decrease in quality of public health and safety	LNG is a hazardous substance	

(Appendix E-4 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSTRUCT/EXPAND TANKER TERMINALS, LNG FACILITIES AND REFINERIES continued)	Degradation of habitat and of coastal waters	Oil spills are more hazardous to the marine environment in nearshore areas than in deep water Cooled water discharges [from LNG facilities] can be fatal to marine life A wide range of water pollutants which are emitted by oil refineries LNG spill harms plants and animals: use of seawater in LNG vaporization adversely affects marine life Tanker facilities may require dredging and filling...with potential for significant adverse environmental effects on marine life	"Criteria for siting and design of coastal refineries: - Best location for facilities - Minimize adverse impact - No degradation of air quality - Minimize use of once-through cooling" (88) [30263] "Maximize use of existing tanker facilities" (91) [30261(2)] "Criteria for new or enlarged tanker terminals: - Need for new capacity - Minimize total volume of oil spilled - Minimize risks of other adverse effects to environment - Have ready access to...equipment for oil spills - Onshore deballasting facilities" (92) [30261(a)]
	Degradation of airshed	Oil spills create odors Refineries emit air pollutants; may occasionally emit noise and odors LNG: gas-fired vaporizers pose air pollution problems	

(Appendix E-4 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSTRUCT/EXPAND TANKER TERMINALS, LNG FACILITIES AND REFINERIES continued)		LNG spill on water presents fuel or explosion hazards	"Require safety measures during marine operations [for LNG carriers]" (96)[30261(b)]
		Refineries have a large potential for fire and explosion	"Require safety measures at onshore [LNG] facilities" (97) [30261(b)]
ENCOURAGE ENERGY CONSERVATION	General		
		Impact of energy facilities on coast can be reduced by energy conservation measures	"Restructure utility rates to encourage conservation" (71)
	Social/Economic		
	Change in local fiscal status and in amount of business	Substantial savings can be achieved by curtailing wasteful consumption of energy	"Non-essential consumption of energy shall be reduced statewide" (72)

APPENDIX E-5

DISPOSAL OF SOLID WASTES

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
ALLOW DEMAND TO EXCEED CAPACITY (OVERUSED FACILITIES OR DISPOSAL IN OTHER LOCATIONS)	Environmental		
	Degradation of coastal waters	Coastal estuaries and wetlands have been used as sumps for industrial waste	
RECYCLE WASTE OR USE AS ENERGY SOURCE	Environmental		
	Decrease in loss of mineral areas		
	Public Service		
	Decrease in use of gas and oil	That refuse could furnish 10 percent of the fuel oil needed by utilities ...or could furnish gas for direct use by...customers	
CONSTRUCT NEW FACILITIES	Environmental		
	Degradation of viewshed	Solid waste disposal facilities can be major visual intrusions	
	Degradation of watershed	Water pollution‡	
	Degradation of airshed	Odors‡	
		Blowing debris‡	

(Appendix E-5 continued)

MANAGEMENT ALTERNATIVE	MAJOR IMPACTS	COASTAL PLAN DOCUMENTATION	POLICY GUIDANCE FOR MITIGATION
(CONSTRUCT NEW FACILITIES continued)	Social/Economic		
	Decrease in quality of public safety	Burning would create fire hazard‡	
	Public Service		
	Increase in transportation facility usage	Trucks transporting wastes to site‡	

APPENDIX F

SELECTED COASTAL PLAN POLICIES APPLICABLE TO SUBREGIONAL TRANSPORTATION PLANNING

Coastal Plan Policies: Road Use & Expansion	Measures	Standards
101. Budget capacity of existing road system [30250]* so that private development will not [30254] limit public uses...		
a. Present and projected weekday and recreational traffic demands shall be determined	Existing and projected service volumes	Tolerable level of service and mix of uses
b. Determine remaining capacity	Maximum design capacity	Tolerable level of service
c. Allocate remaining capacity according to the following priorities: first, coastal-dependent land uses, essential public services, and basic industries determined by the coastal agency to be vital for the economic health of the region, State, or nation; second, public recreation, commercial recreation, and visitor-serving land uses; and third, other private and non-coastal-dependent uses	Remaining capacity	Tolerable level of service and mix of uses
103. To reserve Highway 1 for recreational [30252] use, inland and lateral routes should be improved to attract through traffic from coastal areas	Existing traffic patterns and capacities of inland and lateral routes	Total network capacity
104a. Highway 1 in rural areas of the [30254] coastline shall be kept a scenic [30251] two-way road		

*Coastal Act policies that correspond to Coastal Plan policies are in brackets.

(Appendix F continued)

Coastal Plan Policies	Measures for Half Moon Bay				Standards
102. The construction of coastal [30254] roads shall be allowed when the following criteria are met:	Weekday		Weekend		
	Resident/commuter	Recreation	Resident/commuter	Recreation	
(a) Shall not open coastal rural areas for (resident) development, except in accord with Coastal Plan policies	Maximum population highways can serve	Max. recreation highways can serve	Maximum population highways can serve	Max. recreation highways can serve	Max. population within CCZCC policies, local zoning, etc.
b(1) Existing roads are carrying traffic volumes in excess of their assigned service volumes and no alternatives are available	Existing traffic volume	Existing traffic volume	Existing trafffic volume	Existing traffic volume	Assigned service volume (see Policy 101c)
b(2) Needed to provide access to a (recreational) resource and transit cannot do it	NA	Recreational demand	NA	Recreational demand	Capacity of local recreational resources
b(3) Needed for safety	Accident frequency	Accident frequency	Accident frequency	Accident frequency	Statewide accident frequency for similar highway
C Eliminate or minimize adverse environmental impacts	Environmental Impact Assessment	Environmental Impact Assessment	Environmental Impact Assessment	Environmental Impact Assessment	Relevant CCZCC policies
61. Public service and transportation [30254] facilities, especially sewer and water systems, and roads, shall be provided or expanded only to the extent that the location and amount of development and population that the systems will potentially serve is consistent with other Coastal Plan policies. . .					

(Appendix F continued)

Coastal Plan Policies: Parking	Measures for Half Moon Bay Subregion	Standards
106. New, intensified or expanded coastal development shall be required to have either: [30252(4)]		
(1) Adequate parking facilities to meet the demand generated by the development	Projected recreation demand for the sub-region and parking required to meet this demand	California Parks and Recreation standards for parking facilities and design criteria in Appearance Design Plan Element
(2) Reasonably assured access by public transportation to replace the need for private vehicles and parking spaces to accommodate them	Amount of public transit provided for recreation trips	Percent cars replaced by transit

(Appendix F continued)

Coastal Plan Policies: Transit	Measures for Half Moon Bay Sub-region	Standards
108. Public transit should be given [30252] priority over new or expanded roads, particularly:		
(1) where transit is most economically feasible	(a) Concentration of population and recreational uses (b) Ability of existing transit to expand	(a) Population levels and recreation demand level needed to support transit (b) Capacity of existing system
(2) where present highway or parking facilities are congested	Existing use and capacity of facilities	Highway capacity and Calif. Parks and Recreation standards for parking
(3) to limit access to fragile areas	Fragile resources in area	Capacity of resource
(4) to link coastal communities	Existing connections	Sufficient traffic volumes to support transit
(5) where rail service could provide access	Existing right-of-way or service	
(6) where critical air pollution levels exist or are projected	Existing levels	Air Resources Board & Air Pollution Control District
109. expand transit in urban and air quality maintenance areas		

APPENDIX G

Transportation Model

This appendix outlines the steps employed in developing and operating the transportation model referred to in Chapters IV and V. Included are:

APPENDIX G-7

TRANSPORTATION: OUTLINE OF THE METHOD

1. Define Network

   a. present network; present development

   b. future network; development of raw plans (several scenarios are possible)

   c. consider only those links where recreationists and locals compete

   d. construct "symbolic" network for the present; future scenarios of nodes and links

2. Estimate Trip Generation from Nodes

   a. consider only those trips that get on the network

   b. estimate future trips from outside nodes using future, etc. projections

   c. identify local vs. outside trips (outside trips are trips originating or ending at an outside node)

   d. identify recreation vs. non-recreation trips

   e. disaggregate trips by hour

3. Estimate Probabilities of Internodal Trips

   a. use all empirical evidence available

   b. consider other methods for establishing probabilities

   c. develop rule for establishing destination probabilities for normal departure from beaches

4. Establish Trip Matrix (multiply trip generation vector by probability matrix)

5. Devise Rules for Overflow from Beaches and Commercial Facilities

   a. beach overflow traffic to beach with greatest percentage of unused area--a measure of perceived absence of crowding

   b. some percent of commercial establishments to nearest similar shopping center

(Appendix G-1 continued)

6. Add Overflow Trips and Return Trips to the Trip Matrix

7. Assign Trips to Network-Load Limits

   a. use single or multiple path methods

   b. use unconstrained loadings to indicate potential impact on the ciruclation network

   c. use constrained locadings to indicate effect of highway construction limitations

8. Identification of Weak Link in Network (consider various ways of identifying weak link):

   (1) one-time (yearly or average of six peak days) excess of link capacity during any hour, or two to six consecutive hours

   (2) the estimated percent of outside recreationists falls below a pre-established standard (e.g., 50 percent) during the peak hour or peak period of the peak recreation day

   (3) the link is over capacity for some arbitrary number of peak recreation days (e.g., eight)

   (4) the link is over capacity for some percentage of days during a particular season (e.g., summer)

9. Outputs

   a. beach use levels

   b. parking

   c. link traffic levels

   d. local vs. outside traffic

   e. recreation vs. non-recreation traffic

APPENDIX G-2

INITIAL ORIGIN-DESTINATION PROBABILITY MATRIX

Origin Node	Destination Node 1*	2	3	4	5	6	7	8	9	10	11	12	13
1	.00	.01	.30	.06	.06	.08	.09	.05	.07	.10	.10	.03	.05
2	.01	.00	.30	.06	.06	.05	.04	.02	.03	.18	.17	.03	.05
3	.30	.60	.00	.02	.01	.01	.01	.00	.00	.00	.00	.05	.00
4	.07	.13	.04	.00	.05	.05	.04	.02	.04	.06	.07	.40	.03
5	.08	.12	.04	.05	.00	.05	.04	.02	.04	.07	.06	.40	.03
6	.10	.10	.04	.04	.05	.00	.05	.03	.06	.06	.04	.40	.03
7	.12	.08	.04	.04	.05	.05	.00	.04	.07	.05	.04	.40	.02

*For location of these nodes, see Figure IV-3.

APPENDIX G-3

VARIABLES USED IN PEAK RECREATION DAY SIMULATION PROGRAM

Variables	Description
ACRDCAP	One-dimensional array; access road capacity for each beach.
ADDTRIP	Three-dimensional array computed for each alternative future which contains additional trips from each origin to each destination for each period. These are added to TRIPS.
ARRIVE	One-dimensional array computed for each alterantive future and each hour giving the number of trips actually arriving at the beach. The different between ARRIVE and TRYS is due to ACRDCAP.
ATTRACT	An indicator of attraction for the next best beach after a particular beach has overflowed. Equal to ROOM(K)/ CAP(K) for the "Kth" beach.
BAREA	One-dimensional; beach area for each beach in square feet.
BEACH	One-dimensional array computed for each alternative future and for each hour indicating the number of beach user vehicles at each beach.
BSTDUSE	One-dimensional array computed for each value of STD indicator for each beach, its capacity converted from square feet per to vehicles using STD, BAREA, and assuming 3 persons per car.
CAP	One-dimensional array computed from either (the minimum) BSTDUSE or PARKING indicator, the capacity of each beach in units of vehicles.
COEF	One-dimensional array of coefficients computed under program control to correct the elements of PROB after the peak period of the recreation day.
DEPART	One-dimensional array computed for each alternative future and for each hour giving the number of departures from each beach.
FLOW	One-dimensional array computed for each alternative future and each period giving the total trips on each path between specific origins and destinations.

(Appendix G-3 continued)

Variables	Description
FROM	One-dimensional array computed for each alternative future and each period containing all of the trips from each origin. See TO.
ID	Subscript referring to a destination node.
IO	Subscript referring to an origin node.
IPASTPK	The period in the recreation day at which the number of arrivals begins to decline.
IPATH	Two-dimensional array: N x N where N = number of nodes. Identifies relevant trip paths in the network. IPATH (2,7) = 17 indicates that trips from node #2 (origin) to node #7 (destination) must travel on path #17.
IPER	Subscript referring to a period in the recreation day.
IPOP	Subscript referring to an alternative future (scenario) for the subregion.
ISUB	A subscript referring to the subregion district.
JSTD	Beach usage standard area 100 square feet per person and 600 square feet per person in Half Moon Bay. See STD.
JTURN	Turnover rate. See TURNOV.
LOCFLOW	One-dimensional array computed for each alternative future and each hour giving the number of trips on each link which can be attributed to subregion residents. See TOTFLOW; VISFLOW.
MAXPER	The number of time periods in the recreation day (e.g., 8 hours were assumed in the HMB peak recreation day).
OVFLOW	One-dimensional array computed for each alternative future and for each hour giving the trips overflowing from the beach due to ACRDCAP, PARKING, or CAP.
PARKING	One-dimensional array: acres available or required for parking at each beach. It may be read in as a constraint, or computed in the program as a requirement to accommodate beach users.
POP	A one-dimensional array which is read in that contains the population in the subregion for each alternative future.

(Appendix G-3 continued)

Variables	Description
PPROB	Two-dimensional array which is read in that gives the probability that a trip is made from origin "i", (for all origins except beaches) to destination "j". See PROB.
PROB	Two-dimensional array containing all of the elements of PPROB above, and the probabilities for trips from beaches computed under program control. The probabilities of trips made from beaches to other destinations are computed in the program based on the proportion of beach users arriving from each origin. The values of this probability matrix change after the peak hour (IPASTPK).
RECVEH	Two-dimensional array which provides data on the trips from each source exterior to the subregion for each hour in the recreation day of MAXPER hours.
ROOM	One-dimensional array computed for each alternative future and each hour which gives the remaining room for vehicles at each beach. Equal to CAP(K) - BEACH(K) for beach "K".
RV	One-dimensional array equal to RVEH (IO,IPER,IPOP) for each values of IPER and IPOP. That is the number of vehicles from each origin for a fixed period and alternative future.
RVEH	Three-dimensional array indicating the number of vehicles from each origin, for each period, and for each alternative future. It is computed using estimates of regional and subregional growth, including estimates of housing within the subregion.
STD	Same as JSTD except in floating point mode.
TO	One-dimensional array computed for each alternative future and each period containing all of the trips to each destination. See FROM.
TOTFLAG	Program flag: logical condition indicator.
TOTFLOW	One-dimensional array computed for each alternative future and each period giving the total trips on each link of the network. See LOCFLOW; VISFLOW.
TOTFROM	One-dimensional array computed for each alternative future which contains all of the trips from each origin during the recreation day.
TOTRV	One-dimensional array indicator, the total number of vehicles from each origin during the recreation day.

(Appendix G-3 continued)

Variables	Description
TOTTO	One-dimensional array computed for each alternative future which contains all of the trips to each destination during the day.
TOTVEH	The total of all vehicles from all origins during the recreation day.
TRIPS	Three-dimensional array computed for each alternative future indicating the number of trips from each origin to each destination for each period. It is computed from RV and PROB.
TRYS	One-dimensional array computed for each alternative future and for each hour giving the number of trips directed to a beach.
TTRIPS	Two-dimensional array computed for each alternative future containing the total trips in the recreation day from each origin to each destination.
TURNOV	Same as JTURN except in floating point mode (e.g., 1.5 or 3.0 users per day per unit facility at beaches in Half Moon Bay subregion).
UNITS	One-dimensional array that contains the number of housing units for each district corresponding to a node in the simplified subregional network. In Half Moon Bay there are four such districts. The data is read in for each alternative future.
VISFLOW	One-dimensional array computed for each alternative future and each hour giving the number of trips on each link which can be attributed to subregion visitors. See LOCFLOW; TOTFLOW.

APPENDIX G-4

PARAMETERS USED IN THE HALF MOON BAY SUBREGION PEAK RECREATION DAY SIMULATION

1. Number of hours and temporal duration of the peak day: eight hours in Half Moon Bay, from 11 a.m. to 7 p.m.

2. Four round trips per local housing unit. (This is lower than the five to seven round trips expected by CALTRANS. It was based on an analysis of the July 4, 1974 traffic data.)

3. Beach access road capacity: 600 cars per hour.

4. Total parking area at each beach: in Half Moon Bay the required parking for each beach was calculated based on beach area, one car per 300 square feet of beach.

5. Parking area for each car: .0091 acres per car (400 cars per acre). (This is the lowest feasible parking standard which allows increased beach use.)

6. Standards for beach use: 100 - 600 square feet per person.

7. Turnover rate at beaches: 3.0 - 1.5.

APPENDIX G-5

TRANSPORTATION MODEL: BASIC ASSUMPTIONS

The following decision rules set forth the basic assumptions used in the simulation model. They are also identified in the program flowchart.

Decision Rule 1: The number of recreationists entering the subregion on a peak recreation day for the year 2000 is calculated using the assumptions discussed in Chapter IV. The recreationists are disaggregated by hour, and the same values are used for each scenario.

Decision Rule 2: When a period (IPASTPK) which occurs late in the recreation day is reached, the trip probability matrix is adjusted to reflect the fewer number of trips with beach destinations.

Decision Rule 3: Trips that return to origin from destination under fixed rules, such as shopping trips or beach trips returning in accordance with the turnover rate and the proportion returning from each origin, are added to the trips calculated using the probability matrix to obtain the total trips along each path and eventually, each link.

Decision Rule 4: Overflow from the beaches occurs if the access road capacity is exceeded or if the beach cannot receive any more visitors based on a use standard of 100 square feet per person. Parking is not a capacity constraint in this analysis, since the required parking is one of the outputs of the analysis. However, parking would easily be entered as a constraint in order to establish its effect on

(Appendix G-5 continued)

overflow trips. When a beach overflows, the turn-aways proceed to the beach with the most excess capacity. In other regions, distance is based on a measure of perceived non-crowdedness, that is, the beach with:

$$\max \left\{ \frac{\text{available unused beach area}}{\text{total beach area}} \right.$$

or

$$\max \left\{ \frac{\text{beach visitor capacity - beach users}}{\text{beach visitor capacity}} \right.$$

Decision Rule 5: The normal departure from beaches is: trips leaving the beaches will be allocated to destinations based on the proportion that originated from each node. (Assume an eight hour day with six hours of departures from beaches. Departures equals number on the beach times a turnover ratio divided by 6.0.)

APPENDIX H

TABLE OF CORRESPONDENCE BETWEEN COASTAL PLAN AND COASTAL ACT POLICIES*

CP†	Act+	CP	Act	CP	Act
1	30210, 30213, 30244, 30253	21	30231	44, 45	30251
2	30230	22	30231, 30240(b)	46	--
3	30231	23	30504, 30254	47	--
4	(30255)	24	30231, 30236 (30240[b])	48	--
5	30233(a[1] & [3]) 30234 (30210, 30212)	25	--	49	
6	--	26	30230, 30240	50	
7	Section 15	27	30240	51, 52, 53	30251
8	--	28	30240(b)	54	
9	--	29	30007.5, 30250(a)	55	
10	Section 15	30	30241, 30242	56	
11	30263(4)	31	--	57	30007.5, 30250, 30251
12	--	32, 33	30241	58	30253(5)
13	--	34	30242	59	30250(a), 30252(2)
14	30231, 30240(b)	35, 36, 37	30241	60	30250(a)
15	30230, 30231, 30233	38	30243	61	30254
16	30233	39	--	62	30255
17	30607.1	40	30243	63	30250(a,b)
18	30233(b)	41	(30233[a{6}]) (30240[a])	64	30253(1)
19	30235 (30211, 30251)	42	(30250[a])	65	--
20	--	43	30253(3,4)	66	--
				67	30253(1)

*Section numbers in parenthese indicate only an indirect correspondence or partial reference to the Coastal Plan policies. Other references generally show a correspondence of issues covered, but the policies are not necessarily equivalent.

†Coastal Plan

+Coastal Act of 1976

(Appendix H continued)

CP	Act
67	30253(1)
68	--
69	30253(1)
70	30253(2)
71	
72	
73	
74	
75	
76	
77	
78	30264, 30413
79	
80	--
81	30260
82	--
83	30262, (30253[3])
84	
85	
86	--
87	
88	30263, (30253[3])
89	30260
90	--
91	
92	30261(a)
93	--
94	--
95	
96	
97	30261(b)
98	--
99	30253(4), 30252
100	(30605, 30606)
101	30250, 30254
102	30254, (30241[d])
103	30252
104	30254, 30251
105	(30251, 30212.5) 30252
106	30252(4)
107	--
108	(30252)
109	--
110	
111	
112	--
113	
114	(30210)
115	(30252[4])
116	
117	30701
118	30233(1,2) 30705, 30706
119	
120	--
121	30210, 30213
122	30211
123	30212, 30210, 30211
124	30210
125	
126	30213
127	
128	30210
129	--
130	
131	30210
132	30220, 30221
133	30222
134	30220, 30221
135	(30235, 30255)
136	30223
137	30212.5
138	
139	--
140	
141	30252(6)
142	30210, 30240
143	(30240)
144	
145	--
146	
147	30224
148	(30210, 30212)
149	
150	--
151	30244
152	30251
153	
154	(30607)
155	--
156	
157	(30210, 30221)
158	
159	
160	--
161	
162	

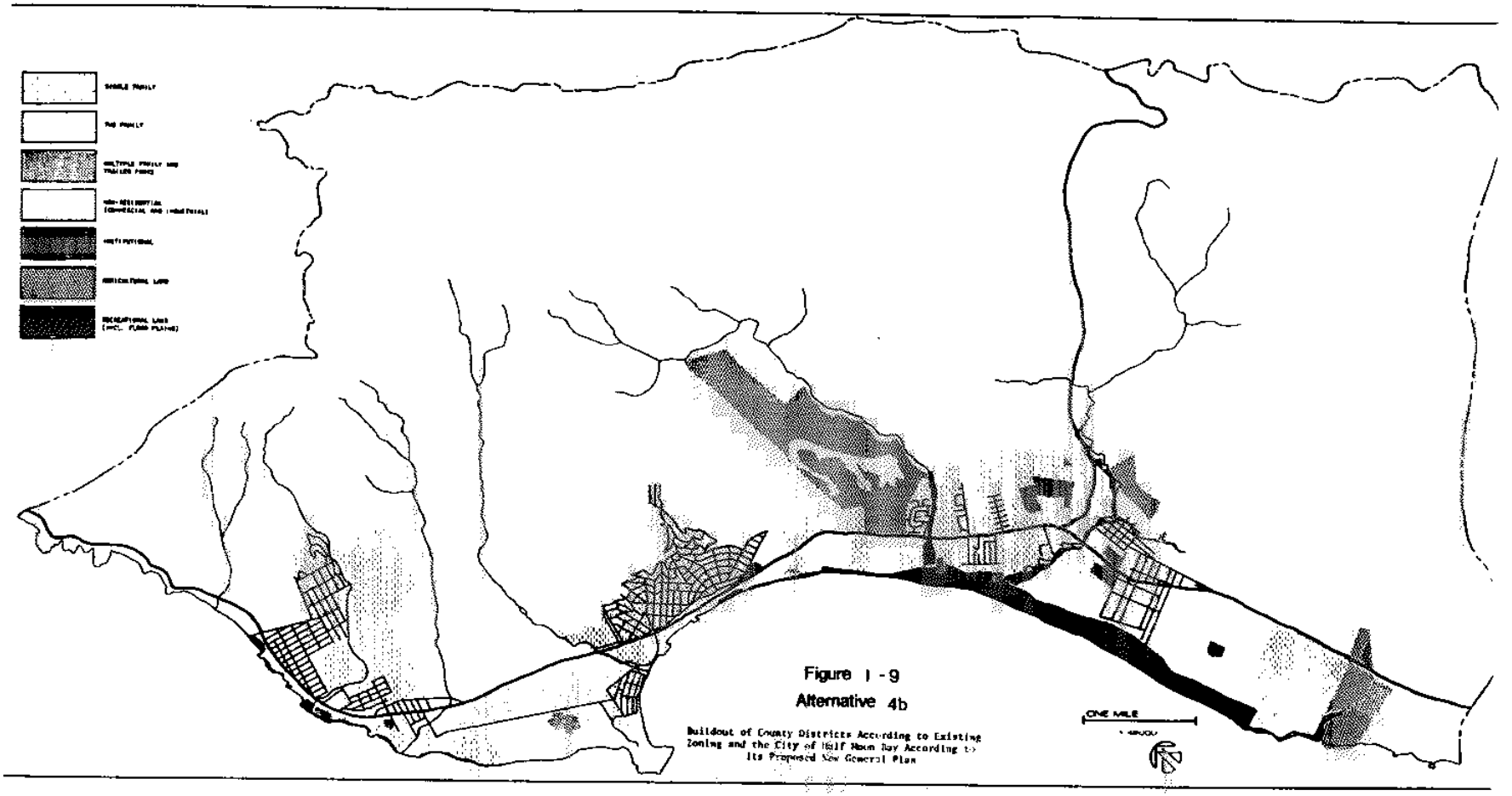

Figure 1 - 9

Alternative 4b

Buildout of County Districts According to Existing Zoning and the City of Half Moon Bay According to its Proposed New General Plan

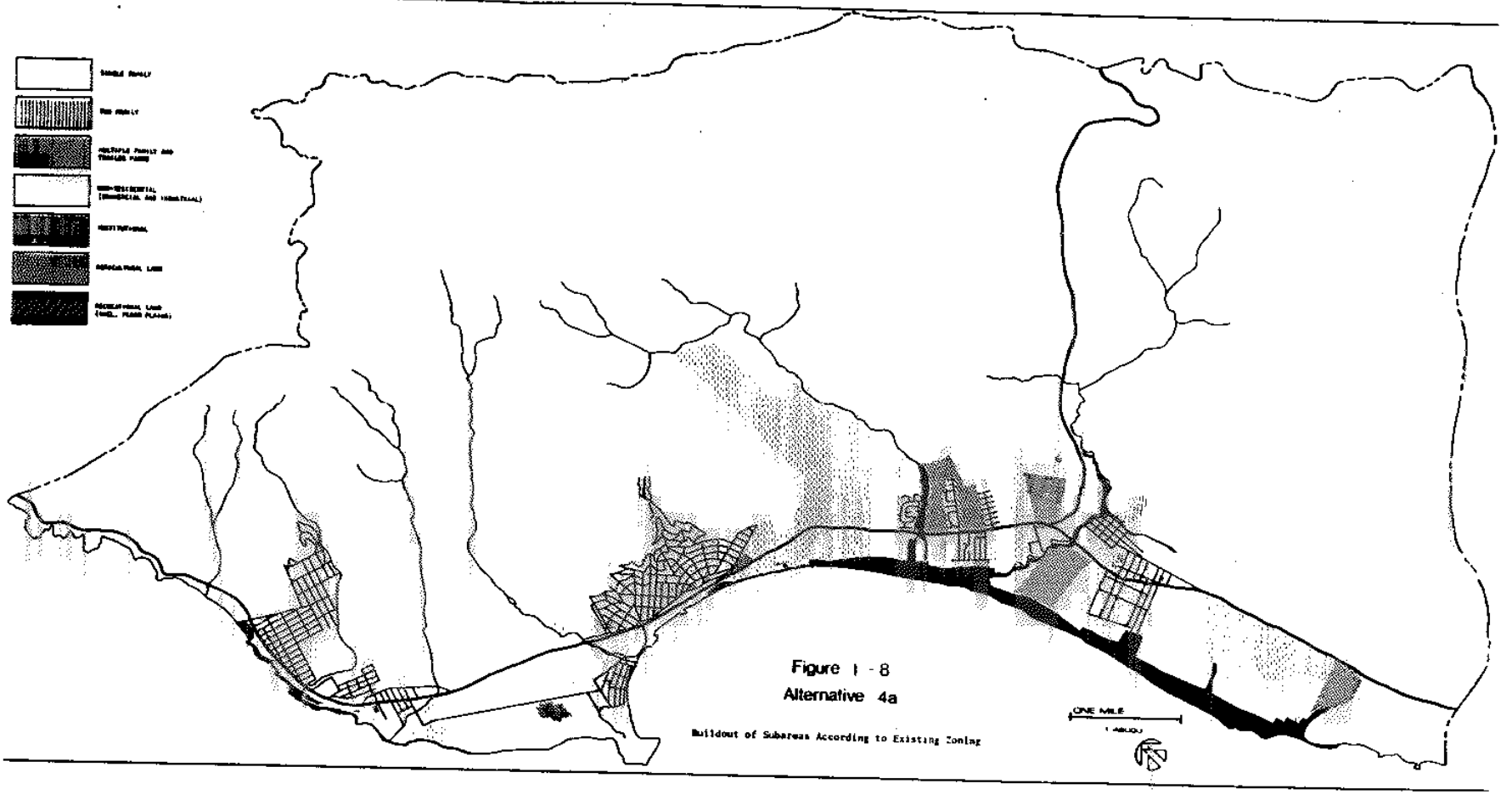

Figure 1 - 8

Alternative 4a

Buildout of Subareas According to Existing Zoning

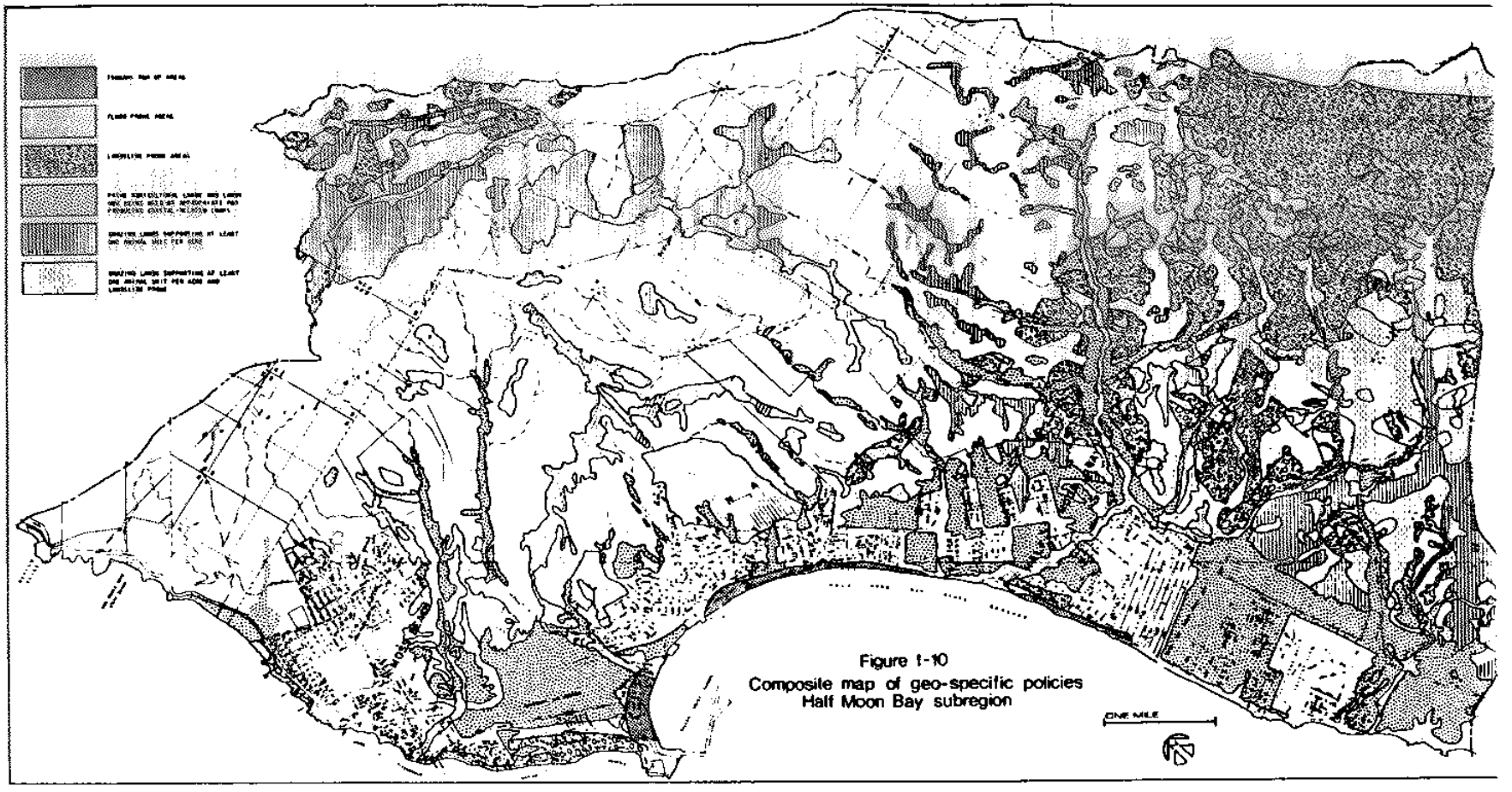

Figure 1-10
Composite map of geo-specific policies
Half Moon Bay subregion

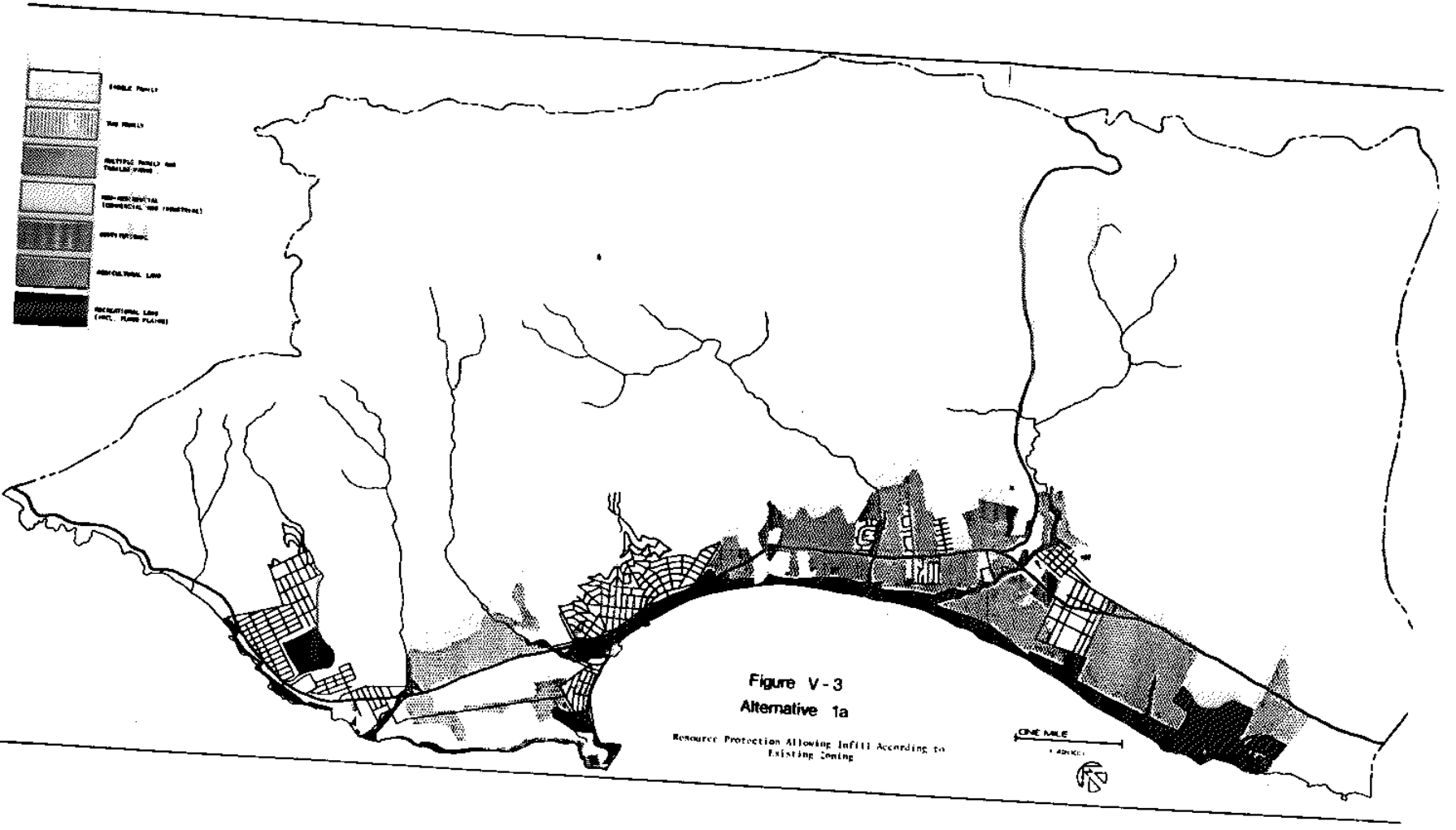

Figure V-3

Alternative 1a

Resource Protection Allowing Infill According to Existing Zoning

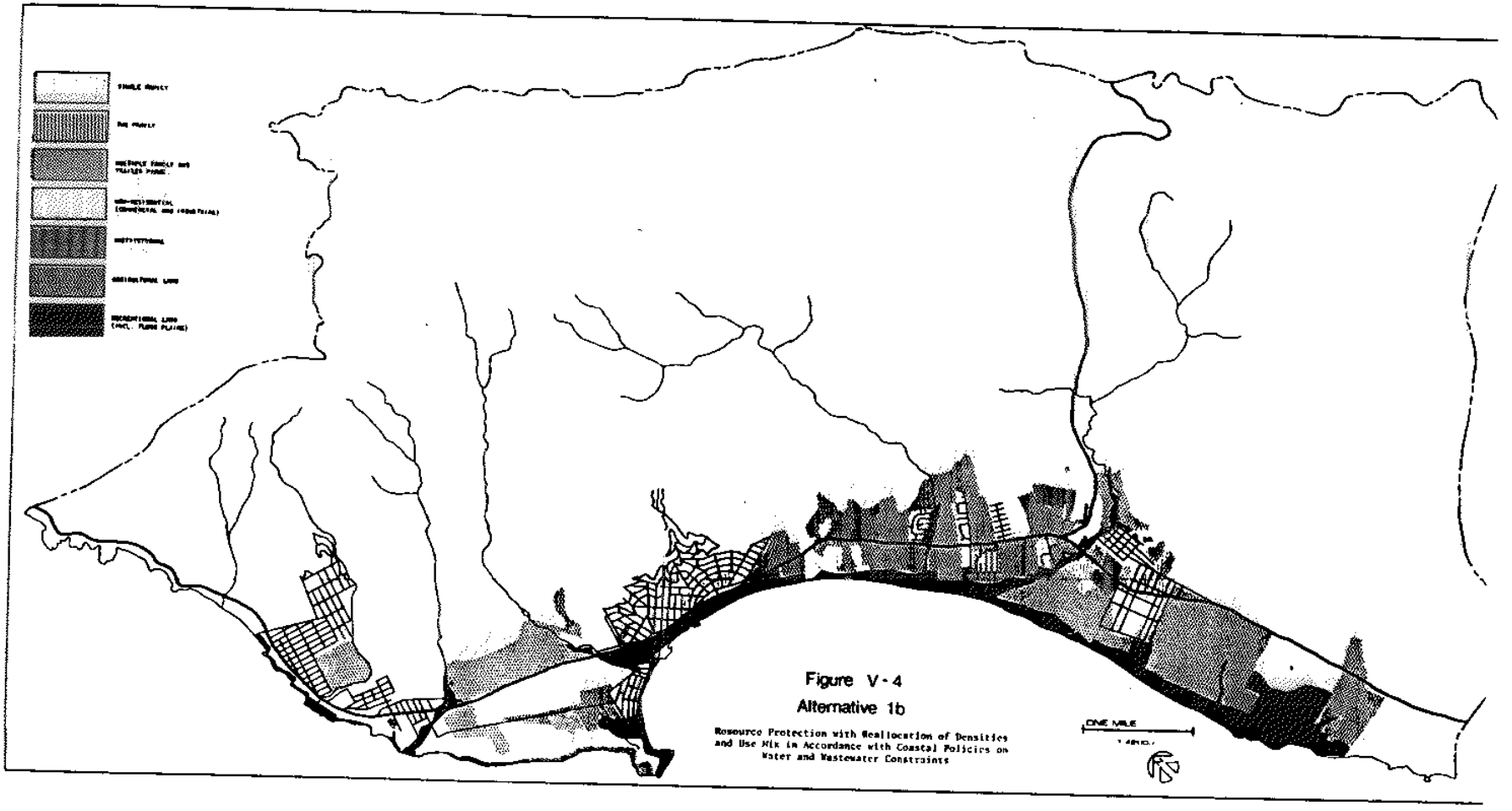

Figure V-4

Alternative 1b

Resource Protection with Reallocation of Densities and Use Mix in Accordance with Coastal Policies on Water and Wastewater Constraints

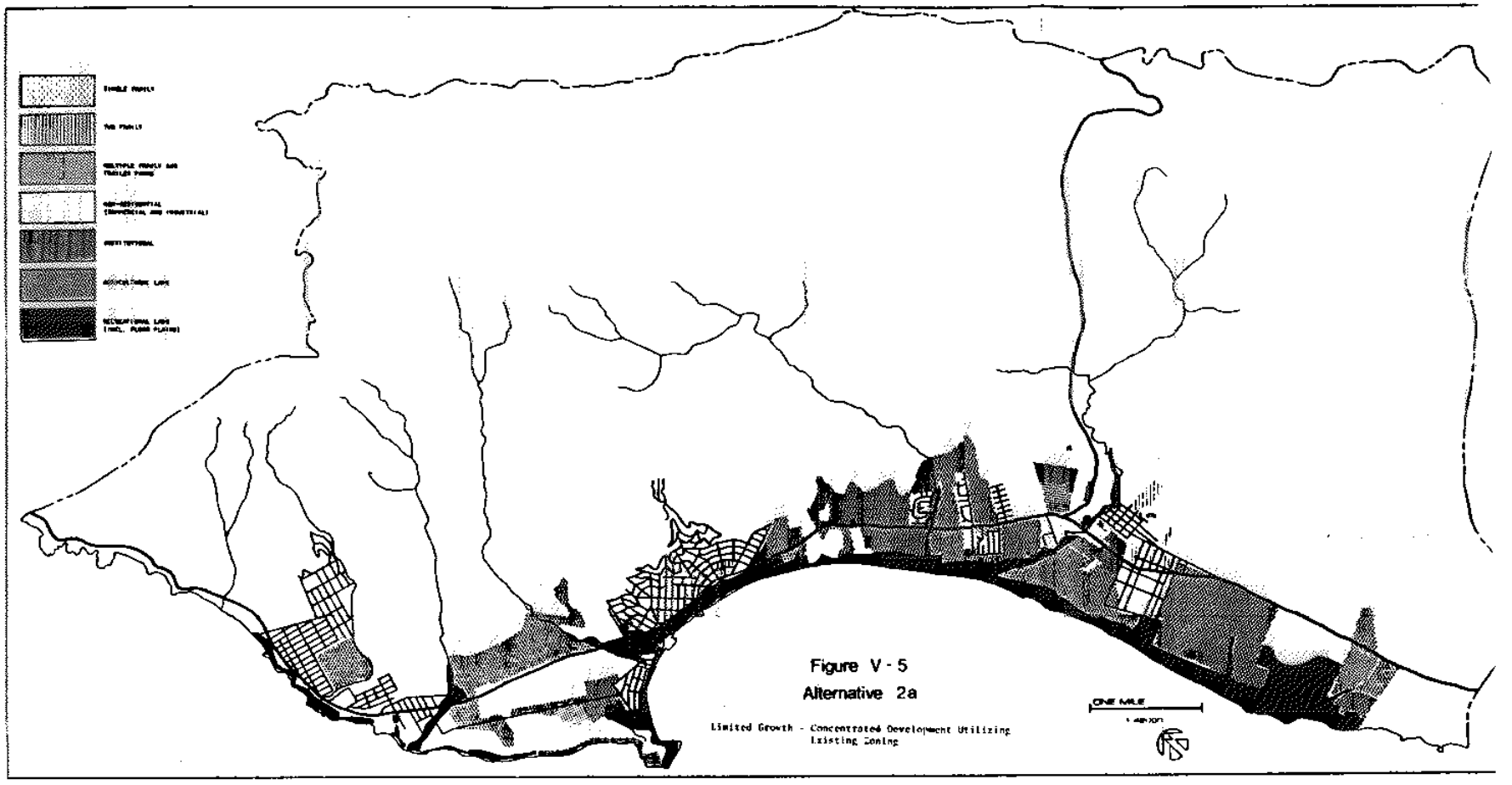

Figure V - 5

Alternative 2a

Limited Growth - Concentrated Development Utilizing Existing Zoning