



LAND USE ELEMENT AIR QUALITY SUPPLEMENT

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SANTA BARBARA COUNTY
COMPREHENSIVE PLAN



County of Santa Barbara
Planning and Development
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FINAL AIR QUALITY SUPPLEMENT to the Land Use Element of the Santa Barbara
County Comprehensive Plan

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1.0 INTRODUCTION ¹

The County of Santa Barbara is an area which exceeds the federal ambient air quality standard for ozone, a regional pollutant. Portions of the County also are in a nonattainment status for other federal air quality standards: the South Coast area exceeds the 8-hour moving carbon monoxide standard and the northern portion of the County exceeds the total suspended particulate standards. As such an area, the County prepared an Air Quality Attainment Plan (AQAP) in 1979 under the mandates of the federal Clean Air Act Amendments of 1977. The 1979 AQAP demonstrated that the area could not attain the federal ozone standard by the required attainment date of 1982 despite the implementation of all reasonably available control techniques on stationary sources. The 1977 Clean Air Act Amendments require that air quality plans include "... such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standards (for which the area is in a nonattainment status), including, but not limited to transportation controls..." Since the success of certain aspects of transportation planning is an integral part of land use planning, and since emission growth from population related sources contributes to the overall emission growth in the County, land use control measures have been postulated as aiding future air quality planning efforts.

The Land Use Measures presented in this document were presented in draft form in the 1979 AQAP. The stationary source control and transportation control portions of the AQAP were adopted in May, 1979. An extension on the Land Use Measures was provided in order to fulfill the consistency requirement of the Clean Air Act between the local general plans and the AQAP. Since the AQAP adoption, the Land Use Measures have undergone review by several General Plan Advisory Committees throughout the County, the South Coast Air Quality Policy Task Force and the North County AQAP Steering Committee. Also in the interim period the Environmental Impact Report for the Land Use, Circulation, and Environmental Resources Management Elements of the Santa Barbara County Comprehensive Plan was completed. Modifications to the AQAP Land Use Measures for the unincorporated areas have been made in response to the comments of the various committees as well as to the findings of the EIR on the Comprehensive Plan. At the present time the cities of Santa Barbara, Santa Maria, Guadalupe, and Lompoc have adopted the AQAP Land Use Measures for their respective jurisdictions, while those for Carpinteria are still undergoing the review process.

The Land Use Measures present a coordinated approach to integrating air quality planning techniques into the County's land use planning program. The Land Use Measures are envisioned to serve as the Air Quality Supplement to the Land Use Element of the County Comprehensive Plan. The following section presents a discussion of land use planning issues related to air quality planning, describing background studies and policy options for the County. The Land Use Measures are presented on pages 16-22.

2.0 LAND USE CONTROL MEASURES

Land uses and the pattern of development have direct and indirect influences upon air quality. Land uses directly contribute to air pollution problems through pollutants emitted at the site. Examples of this are pollutants emitted from natural gas used for residential space heating and the pollutants emitted from industrial operations. Since technical devices can be installed on these types of operations, responsibility for their control has been assumed by the APCD. Land uses contribute to air pollution indirectly through their pattern and relative locations. For any given land use pattern, transportation needs must be met whether it is through automobiles, transit, bicycles or walking. These transportation modes contribute different amounts of pollutants to "the air and determine the impact of regional land use patterns on air quality. It is through this link of land use patterns, transportation needs, and air quality, that the following discussion and recommendations are based.

2.1 The Current Land Use Pattern and Growth in Emissions

The urban forms in Santa Barbara County have been molded in large degree by the same social desires and economic forces that have acted throughout Southern California. The current transportation system, almost exclusively designed for the automobile, has allowed a land use pattern to evolve that emphasizes sprawling residential and commercial developments, and that leads to long distance automobile commutes. This land use pattern has, in turn, affected the transportation system since an effective public transit system is very costly to establish and operate. The public has been left with little alternative except the automobile for the necessary work, shopping, and personal trips.

In the study of future options for Santa Barbara County, it is evident that new development will be accompanied by additional sources of pollution. Land use and transportation patterns will affect the type of transportation selected by residents, customers, and employees associated with the new growth. Projections made by the APC assuming a continuation of current trends, show a continual increase in the use of the automobile (Nordsieck, 1978). This increase will be at a rate higher than that projected for population increases and will be experienced in both vehicle miles traveled (VMT) and vehicle trips.* Hence, people are projected to be driving their cars longer distances

* These increases are in part a function of a change in the age structure of the population, a decrease in household size, and an increase in the number of households with more than one wage earner as well as more often. (These projected increases in auto use were part of the assumptions used in the Future Emission Projections of the AQAP. As noted in the AQAP, automobile emissions will be reduced in future years due to the more restrictive vehicular emission standards mandated by federal and state regulations. However, any actions that can be taken to reduce automobile use and VMT

will further reduce the pollutants contributed by motor vehicles. Land use policies which can provide for a reduced level of automobile use can contribute to the region's ability to attain and maintain the air quality standards.

2.2 Actions to Mitigate This Effect

Recognizing the impact of future growth in population and automobile use, certain steps may be taken to mitigate its effects. After determination of the appropriate future population levels, the additional housing required could be built at higher rather than lower densities. A second step would be the encouragement of clustered development (such as clustering of multi-family housing adjacent to a neighborhood convenience store) in the urban areas that are served by transit lines to the downtown areas. Land use measures including options similar to the above would encourage future development that is not dependent upon the automobile. Future development must also be integrated with the existing development so that the resulting urban form is very well suited for alternate modes of transportation such as transit and bicycles. The following sections discuss land use issues associated with automobile driving and procedures available for the reduction of automobile driving.

2.21 Land Use Design

Automobile trips from the home to work and shopping represent 21% and 13% respectively of the automobile trips made within the County. The characteristics of these two trip categories also make them the most likely to be influenced by government incentives and disincentives. The work trip is regularly patterned in the morning and evening while the shopping trip is oriented toward convenience when goods and services are equally available at different locations. Other trips such as social and recreational trips are not as likely to be influenced since they involve more complex factors and are more randomly dispersed in time and destination. Using employment and shopping centers as destinations for the work and shopping trips, attention can be directed at reducing the need for automobile use and increasing the availability of optional transportation modes. Accessibility to the destinations is generally a function of the distances between the destinations, or in the case of transit, the elapsed time it takes to get from origin to destination. Hence, if the accessibility to shopping and employment centers is improved, it can be expected that a shift will be made from automobile to bicycles, walking, or transit. In order to do this, alternatives must be made feasible which requires proper land use design within each community.

The first step in improving accessibility is the identification of the factors that influence and determine accessibility. The factors include: the density of land uses, the mixture of land uses, and the transportation network connecting the land uses. It has been observed that in the more dense urban areas of Santa Barbara County a greater percentage of trips are made by bicycles, walking, and transit. Also present in these more dense areas are a greater mixture of land uses and provisions for bicycles, pedestrians, and transit.

In order to encourage the location of the future development at densities necessary to encourage a shift from automobile driving to bicycles, walking, and transit, it is necessary to define the distances people are willing to travel via the above non-transportation modes. This information is available from several local reports and studies that examine the distances people ride bicycles, walk, and ride the bus. The characteristics and attributes of the local users of these non-automotive transportation modes are also available from these studies. These findings are valuable since they may be used in order to assure that recommendations are responsive to the local attitudes and conditions in Santa Barbara County. Where local data is limited, studies from other areas have been used for comparison and supplementary input. The studies indicate the 50th and 85th percentiles of the distances people bicycle, walk, or ride the bus. The percentiles are as follows:

	Percentiles (approx.)	
	50	85
Bicycling Distance	1.5 mi.	3 mi.
Walking Distance	.5 mi.	1 mi.
Duration of Transit Ride	15 min.	30 min.

These distances can be used to identify vacant parcels within a community that display the potential for good accessibility via bicycles, walking, or transit. These parcels should be evaluated for high density development. As a corollary, the distances can be used to identify those parcels with low or poor accessibility which should be developed at lower densities. By doing this, the number of future dwelling units that will be in the high accessibility areas will be maximized, and the number of units in the outlying areas that are difficult and inefficient to serve by transit will be minimized. Such "rearranging" of future dwelling units may be accomplished without affecting the total number of dwelling units, only their relative locations. The above distances have been applied in the Land Use Measures as part of an evaluation procedure to determine the suitability of development proposals for particular locations.

2.22 Land Use Mixtures

As an adjunct to improving accessibility to shopping and employment centers by either increasing or decreasing residential densities, accessibility conditions can be improved by integrating commercial and residential uses. This can take the form of: (1) providing residential units as a component of commercial or office/professional developments or, (2) permitting small commercial establishments as a part of larger residential developments. In both of these situations, care must be taken to prevent the creation of undesirable noise, traffic, lighting, or similar adverse impacts. If such mixed land uses are provided, residents will gain opportunities for shopping and/or employment that is convenient and close by, thus diminishing the need for some automobile trips.

2.23 Urban/Rural Boundaries

The urban/rural boundary line is another tool that affects the number of automobile trips in a community. By determining the location and size of areas for future urban development, the urban/rural boundary line can be used to encourage tight, compact development or to permit broad, sprawling development. The choice between these two extremes is important since there will be ramifications on the type of transportation used by people for their work, shopping, and social trips.

Compact development resulting from closely-drawn urban/rural boundaries will focus urban development pressures on the existing urban area; encourage redevelopment of some areas by enhancing the land value and increasing the economic desirability of centrally located parcels; maximize the use of existing transit corridors, streets, and bikeways; and minimize the distances people walk, bike, bus, or drive to work and shopping. Sprawling urban development due to loosely-drawn urban/rural boundaries will permit some leapfrogging of urban development; increase urban pressures on agricultural land; and increase the trip length for work and shopping trips. Hence, for air quality purposes, an urban/rural boundary that minimizes distances that people need to travel for work and shopping would be beneficial since this would enhance the use of bicycles, walking, and transit while decreasing the need for automobile driving.

2.24 Drive-Through Facilities

Another land use issue that affects air quality is the proliferation of drive-through facilities and windows such as those used by banks and fast food restaurants. The pollutants of concern associated with a drive-through facility are those emitted by the automobiles that are attracted to the facility, namely, carbon monoxide, reactive hydrocarbons and nitric oxides. Of these, carbon monoxide is the pollutant of greatest concern due to the localized nature of the pollutant and the health effects associated with elevated carbon monoxide levels.

The automobile is the largest source of carbon monoxide in the County. Drive-through facilities act in a cumulative manner to encourage the use of the automobile. Such facilities cause localized elevations in carbon monoxide levels, known as CO "hot spots", due to the emissions generated by the idling vehicles using the facilities. The following section discusses issues associated with drive-through facilities, including elevated carbon monoxide concentrations, attainment efforts and the effectiveness of the control measure to mitigate the localized air quality impacts.

The federal 8-hour moving standard for carbon monoxide has been violated during the winter months in recent years on the South Coast of Santa Barbara County, placing the South Coast in a nonattainment status for carbon monoxide. As such, the area is required to implement measures to control carbon monoxide emissions. Attainment of the 8-hour moving CO standard was projected by 1982 in the AQAP, based upon the CO reductions due to the implementation of the Annual Motor Vehicle Inspection Program (MVIP). Due to delays in the implementation of the MVIP program caused by

the California Legislature, other CO control measures must be implemented to ensure attainment of the CO standard by 1982. In addition, the federal Environmental Protection Agency requires local air quality planning agencies to look closely at CO "hot spots" in order to develop and implement effective control measures for these problem areas for the required update of the AQAP due in 1982.

Carbon monoxide (CO) is a primary pollutant since it is emitted directly by sources, rather than formed in the atmosphere like secondary pollutants such as ozone. As a result of this, CO is a "localized" pollutant with concentrations that closely follow the distribution in space and time of motor vehicle traffic. For these reasons, CO is of a different nature than ozone and specific actions are available that are directly effective on CO sources. One of these actions is the prohibition of drive-through facilities. This action would be effective since it would act upon the circumstances associated with the generation of CO and localized elevated CO levels.

The CO emissions from idling automobiles at a drive-through facility affect the facility's customers and employees as well as other persons nearby. Several studies have examined the impact of drive-through facilities on CO emissions and air quality. A study by Donald Myronuk, Ph.D., entitled "Carbon Monoxide and Sulfur Oxide Levels Attributable to Use of Drive-Up Window Facilities" found that a group of vehicles waiting in line with engines idling results in concentrations ten times greater than the same vehicles driven into a lot, parked, and shut off. The report states that there is the "possibility that in the line of cars waiting bumper to bumper, intakes of heaters and air conditioner fans in the cars are being flooded with exhaust gases from the car ahead. The air in the interiors of the vehicles would probably reach significant levels and pose a health threat to both adults and children."

The possibility has been also raised that employees of drive-through facilities are exposed to CO generated by the customer's automobiles. The CO emissions may be sucked into the building's ventilation system, frequently located on the rooftop, or through pneumatic tubes used between the customer and the employee.

The environmental impact report prepared by John C. Jostes and Richard A. Nordsieck for the Bank of Montecito Motor Bank in Santa Barbara, compared emissions associated locally with a drive-through bank and emissions associated with a park-and-walk bank. Results of the comparison showed emissions for an average visit to the drive-through bank to be 41.8 grams/visit and emissions for an average visit to a park-and-walk to be 20.9 grams/visit. Therefore, under average conditions the emissions from the drive-through facility are twice those from the park-and-walk facility. The difference in emissions is amplified as cars queue and waiting times escalate.

Pollutant emissions of CO and HC from automobiles are greatly increased at idling and lower speeds than at running speeds. As an example, the rate of CO emissions is over 8 times higher at 5 mph than at 55 mph. Similarly, hydrocarbons are emitted at a rate almost four times greater at the lower speed. Hence the long idling times that may be

necessary at drive-through windows when several vehicles are waiting, are accompanied by the periods of highest emissions from automobiles.

The effect of drive-through facilities is also apparent through their accumulative aggravation of problems in areas with high concentrations of CO (known as CO hotspots). The location of a drive-through facility in areas with heavy traffic congestion or prolonged idling times can accentuate potential or existing CO hotspots. Such an effect can be multiplied by the presence of several drive-through facilities in a concentrated area. At the present time there are approximately 35 drive-through facilities in the South Coast.

Drive-through facilities act in a cumulative manner to encourage the use of the automobile. A prohibition of drive-throughs will act to counter this trend. Emissions from automobiles can be minimized through clustering of several stores in a shopping center that can be served by a transit stop or a single stop in the automobile. Drive-through facilities do not encourage clustering but in fact are counterproductive to the concept. Drive-throughs encourage people to drive automobiles between different stores or drive-throughs.

A prohibition of drive-through facilities is consistent with the AQAP Land Use Measure goal of decreasing the use of the automobile. As noted in the AQAP the automobile is the single largest source of CO and RHC in the County. In any given establishment, the drive-through window aspect serves only the automobile drivers. However other alternatives are available that serve pedestrians, transit users, bicyclists, as well as drivers after they have parked their vehicles, e.g., exterior walk-up windows, walk in counters, etc. A prohibition of drive-through facilities is only prohibiting the drive-through aspect of the proposed project. The only benefit of drive-through facility is that of the convenience for the automobile user. This effect is demonstrated by the fact that establishments with a drive-through facility are greater vehicle trip generators than equivalent establishments without the drive-through aspect. In addition to reducing high localized levels of carbon monoxide, the prohibition of drive-through facilities acts to fulfill one of the mobile source emission control strategies identified by the 1977 Clean Air Act Amendments; controls on extended vehicle idling. The prohibition is a cost effective action for the reduction of CO emissions since the only identifiable cost will be a reduction of investment by certain types of establishments (e.g., fast-food restaurants, banks) while the effect on consumer prices should be negligible.

In summary, a prohibition of drive-through facilities is justified for the following reasons: the facilities are associated with high localized levels of carbon monoxide contributing to CO "hot spots", which would adversely affect employees and customers; the facilities encourage automobile use, the largest source of carbon monoxide and hydrocarbons in the County; the idling emissions generated by the automobiles using the facilities are greater than the emissions generated by the automobiles operating at greater speeds, and are twice the emissions generated by a park and walk facility. The prohibition of drive-through facilities is thus an effective action for the reduction of carbon monoxide emissions which would have a direct impact on air quality.

2.25 Jobs/Housing Balance

Land use patterns established by the County and cities have significant influences upon the need for residents to travel between different areas of the County. The extent to which the general plans of the County and cities provide a balance of job and housing opportunities within each Housing Market Area (HMA) of the County will influence the work trip length. In the Comprehensive Plan EIR analysis of housing/job balances within each HMA, the assumption is made that employees will select housing located within the same HMA as their job if such housing opportunities are available. If the housing opportunities are not available, people will be placed in a position of selecting housing in another HMA with the attendant adverse impacts upon air quality; energy, fiscal, and social concerns.

Creation of job/housing imbalances within the HMA's are adverse from the air quality perspective due to increases in the VMT associated with the work trip caused by increases in the proportion of employees commuting long distances. The average trip length for the work trip in Santa Barbara County is 4.9 miles (Burnworth, 1980). However, the long distances between the HMA's of the County range from 24 miles between Lompoc and Santa Maria to 32 between Santa Ynez and Santa Maria. (The average distance between adjacent housing market areas is 27 miles.) If the proportion of employees commuting the long distances between the HMA's is significantly increased, then the VMT projections for work trips could increase, possibly affecting the accuracy of the regionwide VMT projections.

Long distance commuting brings additional problems to the air quality situation due to the following circumstances. Pollutants are emitted in more than one region if the commute is from either Lompoc or Santa Ynez to Santa Barbara or Santa Maria. Mitigation measures for the long-distance commute are very limited. Service by public transit is prohibitively expensive and alternative transportation modes such as carpools or vanpools for the work trip can reach only a very limited portion of the available commuters due to difficulties in scheduling, destination, and convenience. The availability of mitigation measures or transportation alternatives for the shopping and other long distance trips is non-existent. As a result, long distance trips induced by job/housing imbalances remained mitigated only to a very limited degree.

2.26 Growth Management

For planning purposes the AQAP assumed the growth in population noted in Table 1. Using this population growth, the AQAP modeling efforts projected future air quality levels. If population growth takes place at levels significantly different from these assumptions, additional control measures may be necessary to ensure attainment and long term maintenance of the federal air quality standards. The stringency of any additional control measures would need to be defined by additional air quality modeling incorporating the revised population growth rates. At the present time, the availability of any additional control measures is limited.

An option available to insure that growth takes place at levels approximating those assumed in the AQAP is growth management. Under such a procedure, three alternatives are available: management of housing production, management of commercial and industrial expansion, or some combination thereof. In order to determine which approach would be most effective, it should be noted that the purpose of the control measure (i.e., growth management) is to decrease automotive emissions. VMT is the largest category of emissions and is affected by the creation of new origins and destinations within a community. Hence, VMT reductions must be derived from curtailment in the growth of both origins and destinations. If growth management addresses only one of these, trips will still be entering or leaving the community and hence, still generating emissions within the community. The common origin of trips is the home, and the common destination is work or shopping. Thus, to be an effective air quality control measure, growth management will have to address housing production as well as commercial and industrial expansion. In doing so, steps will be taken toward gaining and maintaining a balance of both origins and destinations (i.e., homes, shops, and industry) within each community.

An additional type of growth management option that would be beneficial for air quality is the establishment of growth priority areas for commercial and industrial facilities. This would involve the identification of commercial and industrial areas within communities where industrial and commercial growth would be most beneficial. Determination of these areas would use criteria regarding the availability and/or location of public services (transit, police, fire, and water), housing, complementary shopping opportunities, community facilities, etc. Commercial and industrial areas where these attributes are readily available would receive the highest ranking or priority for growth. Conversely, the areas without some or all of these attributes would be rated at lower priority levels for growth. In this manner, commercial and industrial growth would be directed to areas where services and housing are already available and hence, the automobile trip to work or shopping would be minimized or possibly even changed due to a bicycle or transit trip. Growth priority areas would also improve the efficiency of the public transit by maximizing the use of existing transit lines and facilities (e.g., transit centers); increase the effectiveness of public investments (e.g., capital improvements, redevelopment efforts, housing rehabilitation programs); and avoid cases of "leap-frog developments" within urban areas.

TABLE I
 Countywide Population Projections

Planning Area	1970 Census	1975 Special Census	1980 County Planning Department		1990 County Planning Department		
			Projection used in AQAP & RTP	Projection with ^B and without water ^{AC}	Projection used in AQAP & RTP	Projection without water ^A	Projection with ^B water ^B
Carpinteria	9,959	13,084 ^D	14,375	15,750 ^D	16,688	14,687 ^D	17,406
Montecito	7,747	8,954 ^D	9,375	8,938 ^D	10,625	8,125 ^D	10,438
Santa Barbara	72,535	74,608 ^D	79,688	77,250 ^D	84,687	80,062 ^D	78,625
Goleta	60,184	69,664 ^D	71,062	66,906 ^D	78,000	61,281 ^D	77,406
South Coast							
Total	150,425	166,310	174,500	168,844	190,000	164,155	183,875
Santa Ynez	8,328	11,250	10,625	14,156	12,125	17,812	16,312
Lompoc	31,163	30,271	33,500	30,500	35,000	31,219	31,000
Vandenberg	16,566	13,616	15,281	13,750	15,312	13,438	13,438
Santa Maria	33,295	33,875	36,000	34,750	38,734	37,094	36,875
Orcutt	19,477	20,335	20,625	21,282	21,250	23,656	23,469
Guadalupe	3,858	3,808	4,125	3,781	4,313	3,719	3,719
North County	1,212	1,140	1,313	1,156	1,406	1,219	1,187
Total	113,899	114,295	212,469	119,375	128,140	128,157	126,000
County Total	264,324	380,605	295,969	288,219	317,219	292,312	309,875

Assumes no construction with well water.
 Assumes decision to import water on April 1, 1980.
 These two projections are identical since a decision to
 import water will not affect population levels immediately.
 Existing water moratoria identified with part of Carpinteria
 and all of Montecito and Goleta.

Future integration of air quality planning into more generalized growth management actions based upon resources (e.g., water, energy) or fiscal (e.g., schools, services) constraints must account for the “holding capacities” of airsheds. Briefly, holding capacities portray the finite abilities of airsheds to absorb and assimilate pollutants. These abilities are influenced by such variables as the concentration, location, duration, and rate of pollutant emissions, in addition to the dispersal, transport, solar radiation, and topographic characteristics of the airshed. Application of the holding capacity concept recognizes that the capacity may be exceeded through either a rapid or gradual increase in emissions that is not offset by comparable decreases elsewhere in the emissions inventory. Hence a situation is created whereby the overall level of emissions in the airshed exceeds the holding capacity and violations of the NAAQS occur. Also recognized by the holding capacity concept is the mixture of emission source categories that comprise the emission inventory and the potential for emission trade-offs between the source categories. As an example, emission trade-offs might be considered between approval of additions to a petroleum storage facility, and the implementation of certain transportation controls or parking restrictions. The type of data necessary to establish holding capacities requires the use of dispersion modeling. This is a much more sophisticated computer modeling than the Ozone EKMA model used in the AQAP and the EIR for the Comprehensive Plan since more variables including time and location are considered. Such being the case, future air quality planning work for growth management that incorporates holding capacities will require more data, computer modeling, and financial resources.

2.27 Air Quality Planning Procedures

The approval of land use projects which affect air quality (e.g., residential, commercial, and industrial developments) is a responsibility shared by several jurisdictions. The County and cities are the major approval bodies while UCSB and other agencies are also parties in the process. The air quality impacts of these projects are frequently evaluated as “individually insignificant on regional air quality” in the environmental documents prepared during the project approval process (Negative Declarations or Environmental Impact Reports). However, the cumulative effects of individual projects can be very significant over the long term on regional air quality. For example, between June 1978 and October, 1979, the Santa Maria office of the APCD evaluated approximately 70 ND/EIR's ranging in scope from single lot splits to very large projects. Most of the projects were small in size and only incrementally added to the emissions inventory. The APCD projected however that the cumulative impact from the approval of the seventy projects without mitigation measures would be essentially the same as approving four large stationary source operations which would be subject to the APCD New Source Review Regulations. At the present, there is no procedure requiring the examination of the cumulative impacts of individually insignificant projects.

In order to assess the present and future air quality impacts of these projects, consistent emission assumptions are necessary. In addition, uniform air quality review criteria and air quality planning guidelines need to be established for use by all jurisdictions in order that the jurisdictions equally share the responsibility for air quality attainment and

maintenance. These aspects all point out the regional nature of air quality planning and the need for a regional approach to the situation. The indirect source review procedure establishes mechanisms through which (1) air quality planning information can be distributed to different jurisdictions of the County, and (2) a set of standard emission projections can be established for evaluating the air quality impacts of land use projects.

A second air quality planning procedure that is required by the Clean Air Act is the annual Reasonable Further Progress (RFP) report that must be prepared by the County and submitted to the Air Resources Board and the federal Environmental Protection Agency. This report analyzes the County's progress towards the attainment of the federal ambient air quality standards vis-à-vis yearly reductions in the County's emission inventory. In order to fulfill this responsibility, monitoring of approvals of land use developments and transportation projects by the Cities and County is necessary. The collection of this data (e.g. numbers of building permits) on a quarterly or semi-annual basis should be satisfactory for integration into the annual RFP report.

2.3 The Effect of Land Use Measures On Automobile Use

As noted above, the land use measures are directed only toward future development in Santa Barbara County, thus posing a problem: To what degree can it be expected that new development will be able to improve the existing conditions? Outside of the possibility of redevelopment or a replacement and restructuring of many existing public and private improvementsⁱ, future development will mean additions to the current urbanized area and hence aggravation of the current air quality problems. Following recognition of this situation, the land use measures can be accepted as an alternative path which may be followed in order to minimize the impact of future development. Simply stated, the land use measures will not provide for net emission reductions, they will only act to moderate the growth of emissions. However, since growth in urban development is assumed in the AQAP, the moderating effects of the land use measures will act to decrease the associated growth in emissions.ⁱⁱ Indications of the potential decreases in emissions as a result of alternate land use patterns are made in several studies. Listed below are descriptions of the relative changes in automobile use and emissions resulting from different land use patterns. The patterns shown to be most beneficial have been used in generating the incentives and actions included in the land use measures.

Transportation planners have recognized the differences in automobile use by residents of lower-density, single-family units versus typically more-dense, multi-family housing and planned unit developments (PUD's). The trip generation tables used in forecasting the number of daily trips from the different types of dwelling units display these

ⁱ At the present time there are public redevelopment or community improvement activities in Summerland, Santa Maria, Lompoc, Santa Barbara, and downtown Goleta. These are on a relatively small scale but can serve as catalysts for further activities.

ⁱⁱ The land use measures have numerous impacts on other issues such as housing supply, the protection of environmentally sensitive areas, energy conservation, the conversion of agricultural land, etc.

differences. Relative to the number of trips forecast for a single family unit, PUD's are forecast at a level 20% lower, townhouses and condominiums 45% lower, and two-story garden-apartments 45% lower (Institute of Transportation Engineers, 1976). The Institute of Transportation Engineers, in compiling these forecast tables, noted that the factors tending to increase trip generation rates were greater distances between the dwelling units and the central business district, larger dwelling unit sizes, and higher incomes of the occupant. Trip generation rates used in the traffic forecasting efforts in Santa Barbara County by APC differentiate between multiple housing units and single housing units. In seven of the ten categories of "type of housing" and "vehicle availability", drivers in single housing units are expected to generate 7-35% more trips than drivers in multiple housing units. These trip generation rates are only a reflection of an existing situation and should not be interpreted to indicate that a shift in the type of housing units would be followed by a respective shift in trip generation rates. However, these rates are indicative of a trend in automobile use and housing type that is recognized and applied in Santa Barbara County and could be expected to continue in some degree in the future.

Another study of PUD's surveyed the relationship of automobile ownership, VMT, and the income of the residents. The conclusions reached by the study indicated that the residents of PUD's located within two to five miles of the central area have annual VMT averages 1/3 lower than the national norm. The factors contributing to this situation included a reduction in automobile ownership and a lower percentage of work trips made by the automobile.

The Costs of Sprawl (Real Estate Research, 1974) analyzed several different community development patterns, their associated vehicle trip generations, distance factors, and resultant VMT. Using the South Coast as an example, the additional increment of emissions from a land use pattern fashioned under the land use measures would be approximately 3/4 of the emissions which could be expected if the land use measures were not followed. This would be a one-quarter reduction in the potential level of pollutants from future growth.

A study which analyzed the use of the automobile relative to a series of land development scenarios is "Energy and Land Use: Analysis of Alternative Development Patterns." (Roberts, 1976). Significant variations on the order of 28% to 113% were evident in the VMT increases forecast for different patterns further supporting the effect of land use patterns on VMT. The land development pattern based upon a greater urban density and access to transit showed a significant increase in transit use on the order of 1/3 to 1/2 over the baseline ridership figure.

The "higher densities" considered in the above studies are comparable to the densities of many existing developments in Santa Barbara County. Examples are the Sesame Tree Apartments on Storke Road in Goleta, the Village Green development on Cieneguitas Road near Foothill Road, and Bonnymede in Montecito. The question of the satisfaction of the residents in developments of similar density has been examined in several studies. These studies indicate that the satisfaction of residents in higher

density development has been more closely tied to the degree of design elements and considerations provided than the density of dwelling units. Design elements identified by residents as playing important roles in their housing choices included the feeling of a neighborhood, the proximity to open space and recreational areas, the availability of views from the dwelling unit, the size of the project, and the degree of clustering within the project (Urban Land Institute, 1973). Resident satisfaction remained constant at densities of 2.5 to 8.5 dwelling units per acre. At densities above this the significance of the project size and design increases in order to maintain resident satisfaction. Synthesis of these two trends indicate that residents do not find the higher densities of townhouses and similar housing types to their disliking so long as strong emphasis is simultaneously applied to the design aspects of the project.

Another aspect of higher density development is the increased feasibility of transit use. A study of density and transit use in major urban areas indicates that a threshold exists around seven dwelling units per acre. Above seven units per acre, densities are present to sustain significant transit use (Pushkarev, 1977). This threshold is supported in another report which identifies a level of six to eight dwelling units per gross acre as necessary to achieve the densities necessary for economical mass transit (Rodgers, 1976). Moreover, an increase in density above seven units per acre also produces a reduction in auto travel. This reduction is related in part to a decrease in automobile ownership brought about by diminished convenience and increased cost associated with the storage and use of the automobile. Alternative forms of transportation, including bicycling and walking, become more practical with more dense development. A second factor involved in the transit use and density relationship concerns a greater accessibility by transit to non-residential uses as the density of the non-residential uses increases. As such, the potential transit user has a greater variety of stores, offices, and places of employment available from a single transit stop, and hence is more likely to choose transit as the mode of transportation. Other advantages of higher density, assuming a constant future population, include: conservation of energy used for transportation purposes, conservation of land, conservation of energy used for space heating, provision of housing at lower costs than is possible at low densities, and an improved ability to meet the needs of smaller household sizes that are projected for Santa Barbara County.

A consideration in determining which land use measures are most effective is the relationship of reductions in average daily trips versus reductions in VMT. Two aspects of this are noted below; the cold start/hot soak cycle, and the correlation of trip generation and income.

The “cold start” and “hot soak” cycle refers to the emissions released as a result of a vehicle trip, independent of the length of the trip. The cold start occurs when an automobile engine is started up after having not been run for several hours. The warming-up process of the engine leads to greatly increased exhaust emissions during the warm-up period. The hot soak takes place at the end of an automobile trip after the engine is shut off. The gasoline remaining in and around the carburetor is vaporized by the engine heat and escapes to the atmosphere. The federally mandated controls on

automobiles are reducing the emissions occurring during the normal running of the automobile. Hence, as these emissions are decreasing, the emissions released during the cold start and hot soak cycle begin to play a larger role. As noted above, the cold start and hot soak emissions are a function of the number of vehicle trips so actions must be taken to reduce trip-making activity. The importance of measures such as clustering commercial activity centers grows since this would facilitate one-stop shopping if the automobile is used. In addition, some parking management techniques may play a larger role since they could act to encourage single-instead of multi-destination trips.

The correlation of trip generation and income has been identified to be very high in different studies. The results have shown that as the income of the household increases, the generation of automobile trips increases. Certain other factors such as dwelling type have influence upon this relationship, but income explains the majority of the variation in trip generation. It has also been shown that middle-income households are more likely to make the switch to transit use than higher-income households (Pushkarev, 1977). Such evidence points out that higher income households are willing to pay a higher price for their use of the automobile than other income groups.

In a study of compact growth options for the San Francisco Bay Area, land use measures comparable to those listed below under Land Use Measures have been applied by ABAG to determine the potential reductions in VMT and vehicle trips. The results of this study forecast a reduction in anticipated growth in VMT of 10.9% and in vehicle trips of 2.1%. While translation of such figures cannot be made to Santa Barbara County due to the great differences in the scale of the region, population, transportation systems, and densities, the relative changes are interesting. The land use measures appear to have much greater impact upon the distances traveled than the generation of vehicle trips. This is due to some extent to the greater rate of increase projected for VMT and hence greater potential reduction in this factor.

The studies cited above all document the potential beneficial reduction in VMT or vehicle trips from the implementation of land use measures. Detailed quantification of this potential for Santa Barbara County has not been made in this study due to the limited timeframe of the study and the lack of acceptable models to relate land use policy actions and future air quality. However, a synthesis of the above studies shows a positive reduction of growth in VMT and vehicle trips in Santa Barbara County as a result of the land use policies.

3.0 POLICY RECOMMENDATIONS:

The preceding sections of this report discussed land use issues associated with transportation planning and the positive benefit on air quality available through proper transportation and land use planning techniques. In summary, land use measures are important for the following reasons: Any action which can be taken to reduce automobile use and hence vehicular miles traveled (VMT) will aid in reducing the pollutants contributed by the automobile. The automobile is the single largest source of hydrocarbon, nitric oxide, and carbon monoxide emissions in Santa Barbara County. Land use measures which can aid in reducing automobile use can thus contribute to the region's ability to attain the federal ambient "air quality standards. Due to the long term benefits of future land use planning, implementation of land use measures which result in reductions in automobile use can aid in the long term maintenance of good air quality once the federal air quality standards have been attained in Santa Barbara County. It is to this end that the following land use measures are recommended for adoption for the unincorporated areas of the County.

3.1 Land Use Measures For Unincorporated Areas of Santa Barbara County

GOALS SIGNIFICANT INCREASES IN THE USE OF BICYCLES, WALKING, AND TRANSIT.
REDUCED USE OF THE AUTOMOBILE.

Policy A Direct new urban development to areas within existing urbanized areas without endangering environmentally sensitive areas or open space resources.*

Measure A-1 Encourage mixture of residential and commercial/ industrial uses in and around commercial/industrial areas.

Implementing Action:

- a) Amend zoning requirements in Ordinance 661 and 453 to permit residential uses in conjunction with certain commercial and industrial uses. Performance standards should be used to avoid adverse impacts (e.g., noise, odor, lighting, etc.) on residential uses.

Measure A-2 Encourage neighborhood convenience establishments. The permitted commercial uses are intended to serve the needs of the new residents and immediate surrounding neighborhood.

Implementing Action:

- a) Adequate design or performance standards to protect surrounding neighborhoods and residences must be incorporated into any amendments

Measure A-3 Within each Housing Market Area, the County should encourage infill and an equitable balance between the production of housing and jobs generated by the economic sector consistent with population growth policies, the availability of services, and environmental concerns.

Implementing Actions:

- a) Provide in EIR's an analysis of project impact upon the areas' jobs/housing relationship.

*Open space resources include park lands and planned unit open spaces. Endangered environmentally sensitive areas include those areas with known significant archaeological sites, known habitat for rare or endangered species, known butterfly trees, (trees where butterflies congregate in large numbers), rare or endangered native plants, etc. These areas are endangered by development which would destroy necessary habitat, etc. Areas such as this include El Estero in Carpinteria for Clapper Rail, More Mesa for White Tailed Kite, etc.

- b) Update Comprehensive Plan EIR housing/jobs analysis periodically to access cumulative impact of project approvals.
- c) In sewage treatment plant expansions ensure that the Section 316 requirements of the Clean Air Act, regarding consistency with the Air Quality Attainment Plan, are met.
- d) Expand efforts for the provision of low and moderate income housing opportunities near services and transit service.

Measure A-4 Support a growth management program for the South Coast in order to assure compatibility with their Quality Attainment Plan growth forecasts.

Measure A-5 Residential densities should be determined with use of the Accessibility Criteria (see Attachment A) except where findings are made that topography, existing physical conditions, unmitigable traffic impacts or circulation problems, or potential lack of services would create undesirable circumstances.

Implementing Action:

- a) Amend zoning ordinance as per above measure.

Measure A-6 The County should develop and adopt innovative ordinances to foster infill uses of urban land and prevent urban sprawl.

Policy B Promote the conservation and rehabilitation of existing urban development.

Policy C Increase the attractiveness of bicycling, walking, transit, and ridesharing.

Measure C-1 Amend zoning ordinance to require developers in all residential, commercial, industrial, and community facility zones to: 1) provide convenient access to development from transit stop where feasible; 2) provide physical improvements deemed necessary by transit operator and the County in order to facilitate transit service (e.g., transit shelter, bus pockets).

Measure C-2 Amend ordinances to require developers in all residential, commercial, industrial, and community facility zones to where appropriate: 1) provide convenient access to the development from bikeways where feasible; 2) require construction of adopted bikeway system segments as part of any new development; 3) payment of fees of preceding requirement for the development of bikeways separated from traffic either at a later date and/or at a different location; 4) bicycle storage facilities in non-residential developments.

Measure C-3 Provide alternate means of meeting a portion of the parking requirements for commercial, industrial, and educational facilities.

Implementing Actions:

- a) Study of incentives for transit on South Coast. Incentives to be studied include providing free or subsidized MTD bus tokens to customers and employees; other pricing mechanisms.
- b) Encourage enrollment of employees in carpool/vanpool program by major employees. Continuation of program will be the responsibility of the employer. The Ridesharing Office of the Area Planning Council is establishing and coordinating van pooling programs for employers and employees.

Measure C-4 Update County Bikeway Plan (GP-19) with regard to the needs of commuters and shoppers; initiate implementation of County Bikeway Plan.

Implementing Actions:

- a) Evaluate bikeway classifications of GP-19.
- b) Evaluate opportunities for designations of new routes.
- c) Establish priority list for development of bikeways.

d) Pursue funding for development of bikeways for shoppers and commuters.

Policy D Restrict the development of auto-dependent facilities.

Drive-through facilities are regulated by County Ordinances 3156 and 3157 adopted by the Board of Supervisors on April 21, 1980.

Policy E Improve the integration of long-range planning and project approval procedures with air quality planning requirements.

Measure E-1 Continue process to achieve and maintain consistency between growth forecasts used in local planning efforts as per ARB Resolution 79-50 item 20 (see Attachment B).

Measure E-2 Establish (with assistance from the OAQP) quarterly or semi-annual reporting procedures to monitor the incremental impacts of project approvals and growth. Regionwide evaluation and reasonable further progress (RFP) requirements will be addressed by the OAQP.

Measure E-3 Development of consistent regional forecasts (e.g. population, household sizes) following 1980 Census.

Measure E-4 The decision makers should use the Accessibility Criteria in evaluating the suitability of proposed projects and mitigation measures.

Measure E-5 Adopt procedure for implementation of Indirect Source Review as described below.

Implementing Actions:

- a) The guidelines are drafted by OAQP with input from the public, cities, county, and other governmental agencies. (The guidelines will address issues such as type and scale of project affected, threshold criteria, time limits for review procedures, factors for determining consistency, emission factors for different types of developments, design information for transit and bicycle accessibility, etc.)
- b) The guidelines are submitted to the County of Santa Barbara for approval. (The guidelines are simultaneously submitted to the cities for approval.)
- c) The guidelines are approved by the Board of Supervisors.
- d) The Department of Resource Management applies the guidelines to discretionary and "major" projects as part of the CEQA process. For projects outside of the County's authority in the unincorporated areas

the comparable environmental review body shall apply the guidelines in the same manner as the Department of Resource Management.

- e) The Department of Resource Management shall make a preliminary finding of consistency between the discretionary and “major” project, the guidelines, and the AQAP Land Use Policies and Measures. The finding shall be made prior to the decision of preparing an ND or EIR as required by CEQA. Documentation of the reasons for the finding must be recorded.
- f) The ND or EIR is prepared according to the CEQA process.
- g) The Department of Resource Management shall make a final finding of consistency using any new information generated in the CEQA process. Documentation of the reasons for the finding must be recorded.
- h) For those projects which in the opinion of the Department of Resource Management may have a significant impact upon air quality, the APCD shall be asked to comment in detail before the project proceeds past the final environmental review stage.

The above process is diagramed below.

Preparation of Guidelines

Guidelines drafted by OAQP

Guidelines submitted to
County

Guidelines approved by
County

Application of Guidelines

The Department of Resource Management applies guidelines to discretionary projects and "major" projects

The Department of Resource Management makes preliminary finding of consistency

ND or EIR prepared

The Department of Resource Management evaluates ND or EIR

The Department of Resource Management makes final finding of consistency

Decision on project by
County

ACCESSIBILITY CRITERIA			
RESIDENTIAL DENSITY	ACCESS REQUIRED TO:	VIA	TRANSPORTATION/MAXIMUM TRIP MODE / LENGTH ^d
20.0 DU/acre or 12.3 DU/acre	1) Commercial (CBD, district, or major neighborhood) AND 2) Office/Professional or Industrial Park	2 of the following	Bicycle/1.5 mi. ^a Walking/.5 mi. ^b Transit/15 min. ^c (with 1000'-1250' walk to transit stop)
4.6 DU/acre	1) Commercial (CBD, district, or major neighborhood) AND 2) Office/Professional or Industrial Park	2 of the following	Bicycle/1.5-3 mi. ^a Walking/.5-1 mi. ^b Transit/15-30 min. ^c (with 1,000'-1250' walk to transit stop)
		OR 1 of the following	Bicycle/1.5 mi. ^a Walking/.5 mi. ^b
1 or more acres/DU or 3 or more acres/DU	1) Commercial (CBD, district, or major neighborhood) OR 2) Office/Professional or Industrial Park	1 of the following	Bicycle/3-5 mi. ^a Walking/1-1.5 mi. ^b Transit/30-45 min. ^c (with 1000'-1250' walk to transit stop)
Residential Ranchette	1) Commercial (CBD, district, or major neighborhood) OR 2) Office/Professional or Industrial Park	All of the following	Bicycle/>5 mi. ^a or not accessible Walking/>1.5 mi. ^b Transit/>45 min. ^c (or 1500' walk to transit stop)

^aThese are general guidelines and are subject to heavy influences by motor vehicle volume and speed, hazards, roadway gradient, roadway surface, intersections, and type of bikeway.

^bThese are general guidelines and are subject to heavy influences by surrounding land uses, walkway gradient, intersections, and separation from motor vehicles. Direct access to shopping areas can be increased via walkways.

^cFrequency and destinations of transit service must be suitable in order for transit to be feasible. Elapsed time is major constraint to expanded transit use. Assumptions for average speeds: 15 mph - local bus; 25 mph - express bus.

^dSources: Waterfront Area Transportation Study, Report of Santa Barbara Bicycle Paratransit Demonstration, MTD On-Board Survey, Atascadero Creek Bikeway Survey, Transportation Plan: Santa Barbara CBD (incomplete list).

Attachment B

California Air Resources Board (ARB) Resolution 79-50, item 20:

Local General Plan Conformity With the State Implementation Plan (SIP)

BE IT FURTHER RESOLVED. that the Board (ARB) finds that to meet the Clean Air Act requirements for consistency of the SIP and other planning programs, Santa Barbara County has committed to develop a well-defined process and schedule to achieve, monitor, and maintain consistency between regional growth forecasts, plans and those aspects of local general plans which affect the emissions forecasts in the AQAP. The Board requests Santa Barbara County develop a work plan to develop this mechanism by August 31, 1979;

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¹ [Resolution No. 81-100](#) (Case No. 77-GP-11 & 80-GP-12) Adopted March 9th, 1981 (Adopted Air Quality Supplement to the Land Use Element)