

CHAPTER II

CIRCULATION

A. INTRODUCTION/PURPOSE

Merced County adopted its first Circulation Element in 1978. Current state law requires a circulation element to include:

"the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals and other local public utilities and facilities, all correlated with the land use element of the General Plan" (Government Code Section 65302(b)).

The purpose of this Circulation Chapter of the General Plan is to develop a plan to provide for the movement of people, goods, energy, water, effluent, storm water and communications to accommodate anticipated land use activities throughout the County. The reader will find that the Circulation Chapter covers many issues which are related to other chapters of the General Plan which affect physical development of the County, including the Land Use, Housing, Open Space, Noise and Safety Chapters. The Circulation Chapter is divided into three sections which address automobile transportation and the road system, alternative modes of transportation (public transit, rail, air and bicycle routes), and other infrastructure issues (water, sewer, gas, storm drainage facilities, etc.)

B. CIRCULATION CHAPTER ISSUES**1. Automobile Transportation****a. Automobile Transportation and the Road System**

Automobile transportation is a basic part of our everyday life as it provides us with freedom and mobility. Automobile access to roads, or the lack thereof, has been and will continue to be a major influence in the location and intensity of different land use activities. Roads serve different purposes for various land uses. For example, roads are a means to distribute products and provide access for employees in industrial and commercial employment centers, whereas a simple cul-de-sac in a residential neighborhood is used by residents to reach connecting streets, providing access to shopping and other activities. As a result of these various trip purposes, roads are designed, constructed and maintained differently.

In order to correlate the Land Use and Circulation Chapters, Merced County has generated a traffic study report for the year 2000. (The Traffic Study Report is in the Technical Appendices of the General Plan and is incorporated herein by reference.) The Traffic Study Report suggests various road improvements to provide an acceptable level of service for continued development and growth through the next 10 years or so. It is important to note that the suggested road improvements from the Traffic Study Report are a result of studying various factors such as historical and projected growth, existing and anticipated land use activities which would occur as shown on the Land Use Policy Diagram, existing road improvements and traffic volumes, regional influences, and more.

Automobile and truck transportation will continue to be the primary mover of people and commodities through the year 2000. Therefore, as population growth and traffic increase, it will be vitally important to the County's economic health to properly improve and maintain its circulation system.

This section of the Circulation Chapter is further divided into subsections on developing a functional road system, improving and maintaining the road system, and providing adequate access to the roads.

b. Developing a Functional Road System

Merced County contains a variety of roads which have different characteristics. Some roads are two-lane dirt roads which serve rural areas, other roads have four-lanes and serve urban areas with much higher traffic volumes. All different types of roads serve two primary functions - to provide access to individual parcels, and to accommodate the movement of goods, services and people. The relative importance given to either of these two functions helps determine the purpose and designation of a road, and ultimately results in determining the standards of design and construction. In architecture, the term "functional design" is used to indicate that a building is designed to accommodate the different activities which will occur within its walls. This is similar for the road system. The design characteristics of different roads and their relationship to one another is based upon their capacity to serve the functions of access and movement. For example, a two-lane "local" road is generally designed to provide direct access to abutting parcels and is characterized by lower traffic volumes and speeds. In contrast, a four-lane "freeway" is designed to carry large traffic volumes at high speeds for longer distances. As a result, access points to "local" roads are not controlled as much as access points to "freeways." Table II-1 shows the functional road classification system for Merced County and their respective characteristics.

TABLE II-1

THE FOLLOWING TABLE PRESENTS THE DIFFERENT FUNCTIONAL ROAD CLASSIFICATIONS FOR MERCED COUNTY AND THEIR RESPECTIVE CHARACTERISTICS:

<u>Road Type</u>	<u>Typical Right-of-Way Range</u>	<u>Typical Access Controls</u>	<u>Typical Intervals Distances</u>	<u>Typical Speeds</u>	<u>Typical Traffic Volumes</u>	<u>Other Design Features</u>
Local Roads	50' - 70'	Direct access ¹ generally allowed but controlled in exceptional circumstances	0 - ½ mi. in urban areas, larger intervals in rural areas	5 - 30 mph in urban areas and higher speeds in rural areas	0 - 3000 ADT ²	Designed to prevent through traffic in residential areas
Minor Collectors	50' - 80'	Direct access ¹ generally allowed but should be minimized	1/4 - 3/4 mi. in urban areas, larger intervals in rural areas	20 - 40 mph in urban areas and highway speeds in rural areas	2,800 - 10,000 ADT	Collects traffic from local roads and connects with roads which carry higher volumes of traffic at greater speeds
Major Collectors	50' - 100'	Direct access ^{1,3} points generally allowed but at greater intervals shared access should be encouraged	3/4 - 2 mi. in urban areas, larger intervals in rural areas	30 - 50 mph in urban areas, possibly higher in rural areas	3,800 - 20,000 ADT	Similar to minor collectors but vehicle trips are typically longer distances. On-street parking is generally undesirable
Arterials	80' - 120'	Controlled ^{1,3} access for new subdivisions. Shared access shall be encouraged	1 - 3 mi. intervals in urban areas, larger intervals in rural areas	35 - 55 mph in urban and rural areas	9,600 - 40,000	Similar to major collector but vehicle trips are typically longer distances. Frontage roads should be considered, on-street parking is undesirable
Freeways	120' +	Fully controlled access	As determined by CALTRANS	55 + mph	15,000 - 90,000	Frontage roads are necessary to direct traffic to access points. Emergency parking only

1. Direct access points should be from roads which are designed for access, not movement; i.e. first to local roads, then minor collector roads, and so on.
2. Average Daily Trips
3. Left turn movements from specific projects may be prohibited.

Using the functional classification system as a template, the County has designated various roads to accommodate traffic movement through the next decade. Together, the Countywide Circulation diagram and individual Specific Urban Development Plan (SUDP), and Rural Residential Center (RRC) maps make up the official Road Circulation Plan for Merced County.

All major thoroughfares not shown on the Countywide Circulation diagram are identified in SUDP or RRC maps (which are included in the Appendix to this Chapter). These major thoroughfares include: minor collectors, major collectors, arterials and freeways. All other roads are considered local roads.

It is important to note that the diagram and maps indicate roads necessary to accommodate future land uses designated in the land use diagrams and may not reflect existing conditions. Rather, these reflect an end-state condition which the County will strive to achieve up to and beyond the year 2000. Unanticipated future land use activity can also change the function of a road and adjustments may need to be made to reflect future conditions.

In Merced County, the actual design and construction of a road is administered by either the Merced County Department of Public Works or CALTRANS (for State Highways). In rare instances, private roads may be constructed which may not meet the design and construction requirements of the County or State. Private roads typically function as local roads by providing direct access to adjacent properties.

c. Obtaining and Maintaining the Road System

Growth presents a unique set of circumstances the County of Merced must consider, specifically as it relates to obtaining necessary road improvements and continuing maintenance. With new development comes additional traffic, which then places additional demands upon the existing road system. Different land use activities will place various demands on the road system. For example, land uses which rely on trucking in rural areas may cause rapid structural deterioration of roads, whereas residential, commercial and industrial projects in urban areas will likely generate higher traffic volumes. It will be important to maintain an acceptable level of service along roadways as growth continues.

In previous years, the County obtained road rights-of-way from subdivisions in rural areas, but rarely required road improvements. In urban areas, the County would obtain on-site road improvements and rights-of-way for subdivisions which created five or more lots (major subdivisions); many times the road improvements for other discretionary projects would be deferred to an indefinite time for various reasons. Almost always, off-site improvements would be constructed by the County, e.g., traffic signals, new road alignments, etc. More recently, the County has placed conditions on individual development projects to provide off-site road improvements to

maintain acceptable road conditions in rural and urban areas. This reliance on private assistance is the result of the County's mounting fiscal problems. A brief overview of the road funding dilemma which the County faces is presented below.

In 1988, the County of Merced was responsible for the maintenance and improvement of approximately 1,780 miles of road and numerous bridges. As stated previously, CALTRANS is responsible for improving and maintaining all State Highways. The County's current revenue sources for road maintenance and improvements include gas taxes, fines and forfeitures and other miscellaneous sources. Both the County and State are experiencing a major shortfall of funds to properly maintain and operate the road system. Faced with increasing growth pressures locally and Statewide, these traditional methods of funding are not adequate to meet anticipated demands for such improvements as road widening, turn lanes, traffic signals, drainage projects, full interchanges at freeways, and so on. This funding dilemma is expounded in more detail in the Traffic Study Report included in the Technical Appendix of the Merced County General Plan, and in The 1988 Regional Transportation Improvement Plan, prepared by the Merced County Association of Governments (MCAG).

The current funding situation is not expected to improve during the next ten years. It is clear that the County will be unable to fund road improvements which have been suggested in the Traffic Study Report utilizing traditional sources of revenue. Therefore, the cost of most road improvements necessary to serve growth to the year 2000 must be equitably distributed to new development in urban and rural areas. Otherwise, when adequate road improvements are not available, development in certain locations may not be possible unless other sources of funding are established.

The Traffic Study Report in the Technical Appendices provides estimated costs of the necessary road improvements in various planning areas of the County. Using this as a template, the County should consider collecting a user impact fee to pay for these road improvement costs. This is one possible method to equitably distribute road improvement costs, because they are spread over a larger area. Other options include formation of improvement districts or other community wide funding sources. The County should continue to explore these and other methods to collect money for the needed road improvements.

The primary method used by the County to determine road impacts from projected growth is to identify the existing and resulting Level-of-Service (LOS) of roadways during the peak period of traffic volume. The concept of levels-of-service are determined, can be found in the Highway Capacity Manual, Special Report 209, published by the Transportation Research Board. Occasionally, the Transportation Research Board publishes interim special reports with revised capacity procedures that are to be incorporated

in future revisions of the Highway Capacity Manual; the procedure contained in these interim reports should be followed until the Highway Capacity Manual has been revised.

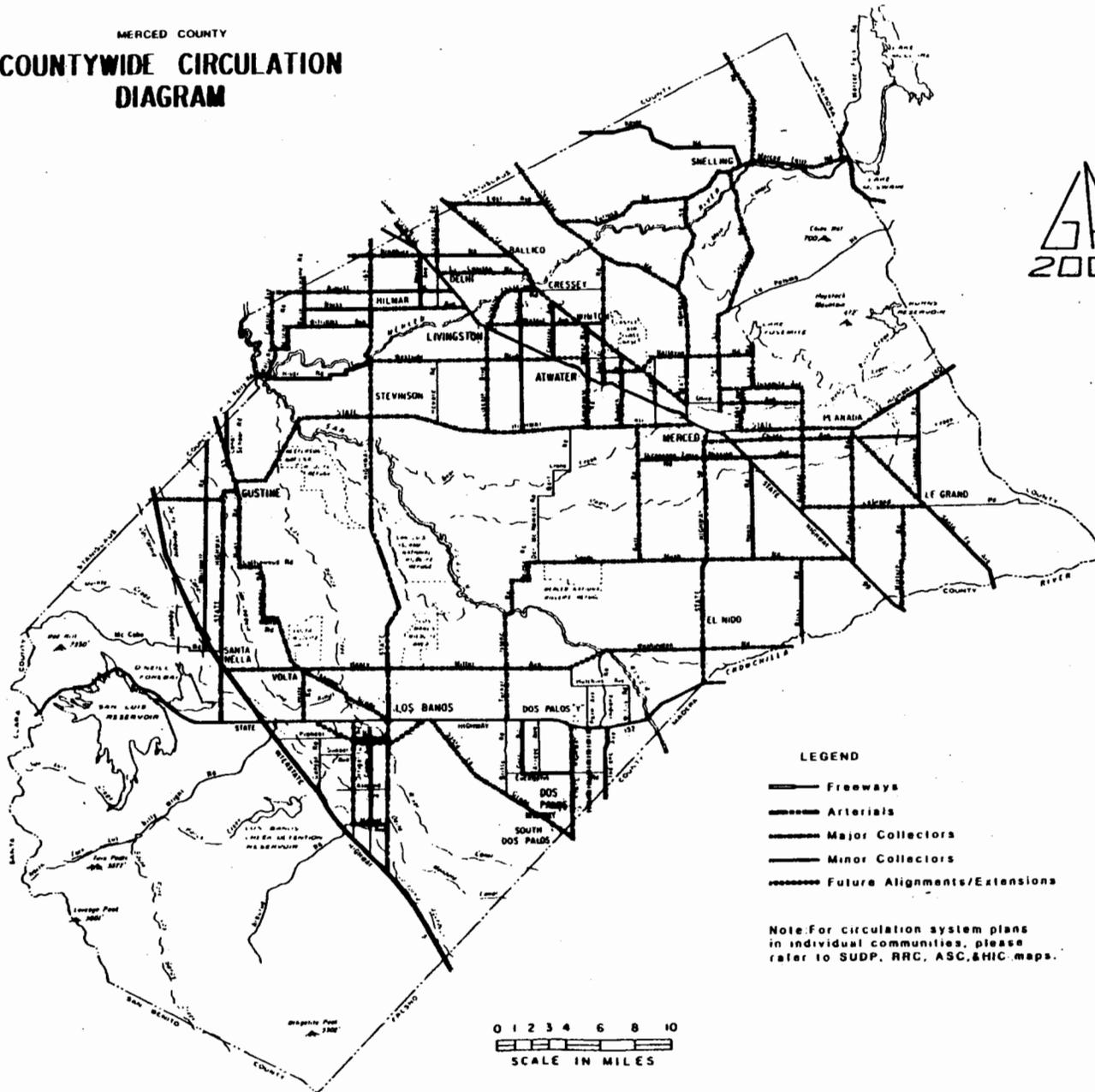
In general, six levels-of-service are defined for various components of roadways. They are given letter designations, from "A" to "F", with LOS "A" representing the best operating conditions and LOS "F" the worst. LOS "A" and "B" represent free-flow traffic with few delays. LOS "F" describes a fully congested situation where traffic is deadlocked. LOS "C" is generally accepted as a satisfactory traffic flow during periods of peak volume within rural areas. However, as a result of the increased tolerance level of motorists in urban areas as well as the high cost of obtaining LOS "C" or better, LOS "D" is adopted in many jurisdictions as acceptable during peak periods of traffic flow within urban areas.

LOS "C" has been identified in Merced County as the acceptable peak period level-of-service for roadways located within rural areas of the County. LOS "D" has been identified in Merced County to be the acceptable peak period level-of-service for roadways located within HICs, SUDPs of unincorporated areas and RRCs. There may be some roadways lying between urban growth areas where LOS "D" will also be considered acceptable; one example may include Santa Fe Drive between the Winton SUDP and the City of Atwater. The acceptable level-of-service for roadways within the SUDP of an incorporated city shall be as stipulated in the Circulation Chapter of the respective city general plan.

Level-of-service should not be the only consideration when deciding what improvements are necessary to mitigate impacts of growth. Each situation should be examined on its own merits. If improving the level-of-service for a minor component of the circulation system (such as a left turn movement from a local roadway), then the poor level-of-service for the minor component should be tolerated. Low volume movements at an intersection that may experience LOS "E" or worse should be considered to be acceptable if a high-volume through movement would be significantly compromised in the process of correcting the level-of-service of the minor low-volume movement. If a level-of-service worse than "E" occurs on a low-volume movement of a high volume intersection, consideration should be given to restricting that movement from occurring. An example of such a restriction would be to construct a physical barrier, such as a raised center median, to eliminate turning movements or crossing maneuvers at an intersection.

The County is also concerned about maintaining future road rights-of-way free from the development of structures. The construction of buildings and other miscellaneous structures can increase the actual costs of purchasing the right-of-way in the future. It can also cause a major disruption in the operations of on-site activities, i.e., building relocation. Therefore, it is

MERCED COUNTY
**COUNTYWIDE CIRCULATION
 DIAGRAM**



important to ensure new development is properly located outside road rights-of-way.

d. Providing Adequate Access

Adequate access to the public road system from private property is critical to ensure emergency vehicle access. There are two methods of providing access to publicly maintained roads: direct or indirect. Direct access is where a parcel is adjacent to a publicly maintained road and an individual driveway provides access. Indirect access is where a person must drive across other private parcels, usually along a private access easement, to reach a publicly maintained road.

Direct access points are regulated for two major reasons; they can greatly reduce traffic flow, and they can cause deterioration of the paved edges and shoulders of a public road. Direct access points to public roads are currently regulated by the Merced County Department of Public Works (along County maintained roads) and by CALTRANS (along State Highways) through issuance of "encroachment permits." Indirect points of access, are not directly controlled. However, the County and State control the point at which indirect access roads intersect with public streets through issuance of encroachment permits. Private roads are also a form of indirect access, and, if not properly constructed or maintained, may create additional financial burdens on the County, especially if the County has to take over maintenance responsibilities. Private roads have typically been created by the subdivision of property through a Planned Development (PD) application.

In some instances, a private road may be permitted for a new subdivision, such as a restricted access gated development, provided adequate regional and emergency access gated development, provided adequate regional and emergency access is provided. Direct access to public roads is a typical standard for subdivisions in urban areas with the exception of those Planned Unit Developments which contain private streets. To ensure other nearby parcels will have adequate access in the future, road plans for a larger area are often required and evaluated as part of new subdivisions in urban areas. Subdivisions in rural areas may have direct or indirect access. In all cases, discretionary and non-discretionary applications are evaluated by the County to ensure that adequate access is available.

2. Alternative Transportation Modes

It is basically recognized that urban areas within Merced County will continue to grow and will become a larger percentage of the total County population. Commuting will become more extensive to reach large employment centers within and outside of Merced County. The movement of people, goods and services through non-automotive transportation

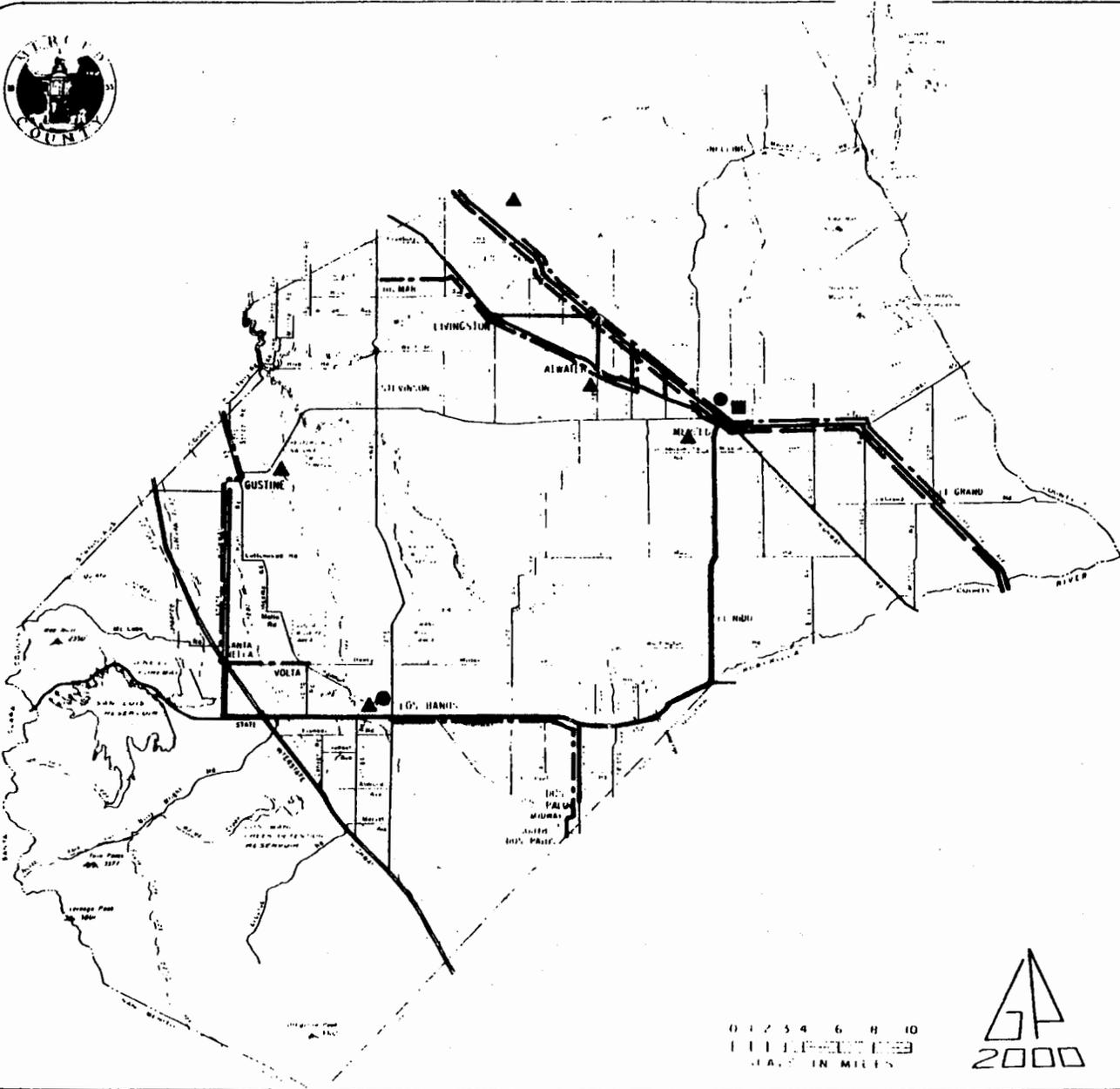
modes is, and will continue to be, vitally important to Merced County. There are several alternative forms of transportation which serve County residents and businesses. Rail and air services transporting people and freight are vital components of the local economy, providing a link to the larger regional and statewide economies. Public transit systems help ease congestion and provide important transportation services to students, elderly and the disabled. Bicycle routes help encourage residents to use bicycles as an energy efficient form of transportation and they also serve recreational function. The Merced County Association of Governments (MCAG) will play an important role in the planning and developing of alternative modes of transportation in conjunction with the County of Merced and various local cities.

This section of the Circulation Chapter will focus on issues related to these alternative transportation modes.

a. Air and Rail

Merced County is served by four municipal airports and one regional airport for public use. These airports are operated by the Castle Joint Powers Authority, and the cities of Gustine, Los Banos, Merced and Turlock. Airport locations are shown in Map 4. There are also several private airstrips in Merced County. The municipal airports are primarily utilized for private aircraft. The Merced Airport provides commercial passenger and freight air services and is the only "regionally significant" airport in the County according to criteria used by the Civil Aeronautics Board. Castle Airport, which became a civilian facility upon closure of the Castle Air Force Base in September 1995, is also proposed as a regionally significant airport serving private and commercial aviation functions. The number of general aviation aircraft based at each airport and annual airport operations are expected to increase into the year 2000 due to general population increases and because of spillovers from airports in adjacent urban areas. Additional detail on the characteristics of each public use airport is presented in the Noise Chapter, starting on page IV-11. The private landing strips will not be focused on here as they do not provide a major transportation function in the County.

One issue regarding air transportation is maintaining compatible land uses in areas which are affected by airport operations. The County and each individual city, assisted by the Merced County Airport Land Use Commission's (ALUC) policies, is responsible to determine the compatibility of land uses and appropriate restrictions on activities to protect airport operations. This topic is also discussed in more detail in the Land Use Chapter.



Public Transportation Routes & Terminals

LEGEND:

MART

- FIXED ROUTE
- - - - DIAL-A-RIDE

- AMTRAK LINE
- AMTRAK STATION
- ▲ PUBLICLY OWNED AIRPORT
- GREY-HOUND BUS TERMINAL

Note: For railroad routes and bus routes in cities and unincorporated towns refer to S.U.D.P. Maps

0 1 2 3 4 6 8 10
MILES
SCALE IN MILES



SOURCE: Comprehensive Transit Survey, M.C.A.G. 1982

MAP 4
MERCED COUNTY
YEAR 2000 GENERAL PLAN

Another issue is maintaining scheduled air carrier services at the Merced Municipal Airport. Regular scheduled commercial flights are an essential component to the economic growth of the County. Currently, United Express is the only commercial airline which serves Merced County. The airline is currently subsidized by the Essential Air Services (EAS) Program. The EAS Program provides Federal subsidies to airlines which bring their services to rural communities. This program is in danger of being eliminated from the Federal Department of Transportation budget.

Maintenance and improvements of the municipal airports is important for ensuring adequate safety and maintaining their transportation function. In the Regional Transportation Plan (RTP), MCAG estimates a funding shortfall of more than \$5,000,000 for needed projects in to 1993. Given current funding shortages, this deficiency could be expected to continue to the year 2000.

A final issue regarding air transportation is promoting those land uses around airports which can best benefit from air services, e.g., industries which utilize air carriers to distribute their products. It would be desirable to encourage industries which utilize air carrier services to locate as close as possible to the airport to promote efficiency. The Merced Municipal Airport is currently the only airport in Merced County with scheduled cargo air services. However, most cities have established industrial zones adjacent to their airports (Los Banos and Merced), and the Castle Reuse Plan promotes major aviation-related commercial and industrial reuses.

Two companies currently provide rail service to Merced County; the Southern Pacific Transportation Company (SPTC) and the Atchison, Topeka and Santa Fe Railway (AT & SF) Company. The two companies operate a total of 110 miles of track on four main lines. All lines generally traverse the County in a northwest-southwest direction. These rail lines are primarily used for the movement of freight; although two Amtrack passenger trains currently run along the Santa Fe line with one passenger station in the City of Merced. The closest freight shipment harbor to the County is at the Port of Stockton. The rivers in Merced County, though the Merced and San Joaquin Rivers are navigable waterways, are not used for freight shipment. A recent issue which has developed involves the transfer of Amtrack services from the AT & SF to the S.P.T.C line. The major local impact of this possible switch would be the relocation of the rail station in the City of Merced to a proposed multi-modal station linked with commuter bus terminals. The relocation could benefit the County by providing daily rail service to the City of Modesto and possibly a third daily Amtrack train, which would be a transit option to automobile commuters on Highway 99.

Similar to airports, certain businesses and industries which transport large amounts of freight can greatly benefit from the efficiency of locating adjacent to existing rail lines. In Merced County, businesses and industries

connect with the existing rail lines by the use of a spur line. However, spur lines can sometimes cross existing or planned roads and generally pose safety risks and inconveniences to automobile drivers and railroad operators. It must be noted that some land uses may also be incompatible with the noise emitted from use of the rail lines. (Noise incompatibility issues are discussed more thoroughly in the Noise Chapter of this Plan).

b. Public Transit

Public transit systems provide a valuable service to the County. Public transit benefits students, the disabled, the elderly, low income persons and many other residents of the County. It also assists in reducing traffic congestion, air pollution, energy consumption and the costs of personal transportation.

There are five public transportation providers in Merced County--the Merced Transit System (MTS), the Atwater Taxi Service (ATS), the City of Los Banos Van Service, the City of Dos Palos Van Service, and the Merced Area Regional Transit System (MARTS). Each of these services is explained in more detail below. The Merced County Association of Governments (MCAG) prepares an advisory Regional Transportation Plan (RTP) and improvement program in order to achieve a balance among these transportation systems.

The City of Merced operates the MTS which provides fixed routed and demand responsive services. The MTS fleet consists of ten passenger mini-buses which operate on three fixed routes and a dial-a-ride (DAR) service. The MTS provides services on weekdays from 7:00 a.m. to 5:00 p.m. with fares ranging from \$.50 to \$1.00 for the fixed route and the DAR services. The City of Merced is currently working with MCAG to determine the feasibility of establishing another fixed route system. The City of Atwater provides a demand responsive-system which operates 24-hours a day, seven days a week. The City of Atwater has made this possible by contracting with a local taxi cab company to provide this DAR service. The cities of Los Banos and Dos Palos each operate one van service within their respective boundaries as a public transit service. In the City of Los Banos, van service is available 9:00 a.m. to 3:30 p.m., Monday through Friday, and is available to senior citizens only. The City of Dos Palos operates its van service on the first and third Tuesdays of each month. It also is only available to senior citizens.

The County of Merced is responsible for operating MARTS, which has fixed route and DAR services throughout the County. Services for the MARTS is actually provided by the Merced Transportation Company, a private business, under contract with the County of Merced. The MARTS fleet consists of four, 12 passenger vans and six, 16 passenger minibuses (four are equipped with wheelchair lifts). Fixed route services connect 13

communities along three routes, the Red Route, the Green Route and the Winton-Atwater-Merced (WAM) Route (See Map 4). The Red Route operates Monday through Friday and makes two round trips daily through Merced, Beachwood, Castle Air Force Base, Atwater, Winton and Delhi. The Green Route operates Monday, Wednesday and Friday and makes one round trip through Merced, El Nido, Dos Palos, Los Banos, Santa Nella and Gustine. The WAM Route operates Monday through Friday and makes seven round trips daily through Merced, Beachwood, Atwater and Winton. MARTS also operates region specific DAR services. One shuttle operates between Merced, Le Grand and Planada; two between Winton, Atwater, Castle Air Force Base, Livingston, Delhi, Cressey, Hilmar and Ballico; one between Gustine, Santa Nella and Newman; and one between Dos Palos and Los Banos. All shuttle vehicles are equipped with wheelchair lifts. MCAG is currently working with the County of Merced to determine if another fixed route service should be added to the existing MARTS. Ridership is expected to increase steadily to the year 2000 with population growth.

Other private transportation companies also provide transit service in Merced County. Via Charter Lines offers bus transportation services through contract and charter agreements. Contract service is primarily Monday through Friday, 5:00 a.m. to 7:00 p.m., and usually operates on a fixed route service. Charter service is available year-round, 24 hours a day. Currently, the company provides contract services to the Merced County Schools System, the Merced County Regional Occupation Program and The New Hope Workshop. Via Charter Lines operates a total of 45 buses and is located in the City of Merced, near the Municipal Airport.

Greyhound-Trailways Bus Lines provides scheduled bus service through the San Joaquin Valley along Highway 99 and across the County along Highway 152. Bus terminals are located in the cities of Merced and Los Banos. Bus stops for these scheduled routes are located in the cities of Dos Palos, Atwater and Livingston and the unincorporated community of Delhi. Greyhound-Trailways also provides charter service in the County, most notably to Yosemite Valley.

The Merced Cab Company provides door-to-door service 24-hours a day to customers in the Merced urban area. About half of the company's business is senior citizens, who receive a discount. This company also provides emergency service to the ill and intoxicated after other transit operators close. The Atwater Taxi Company and City Taxi of Los Banos also provide taxi service.

c. Bicycle And Pedestrian Routes

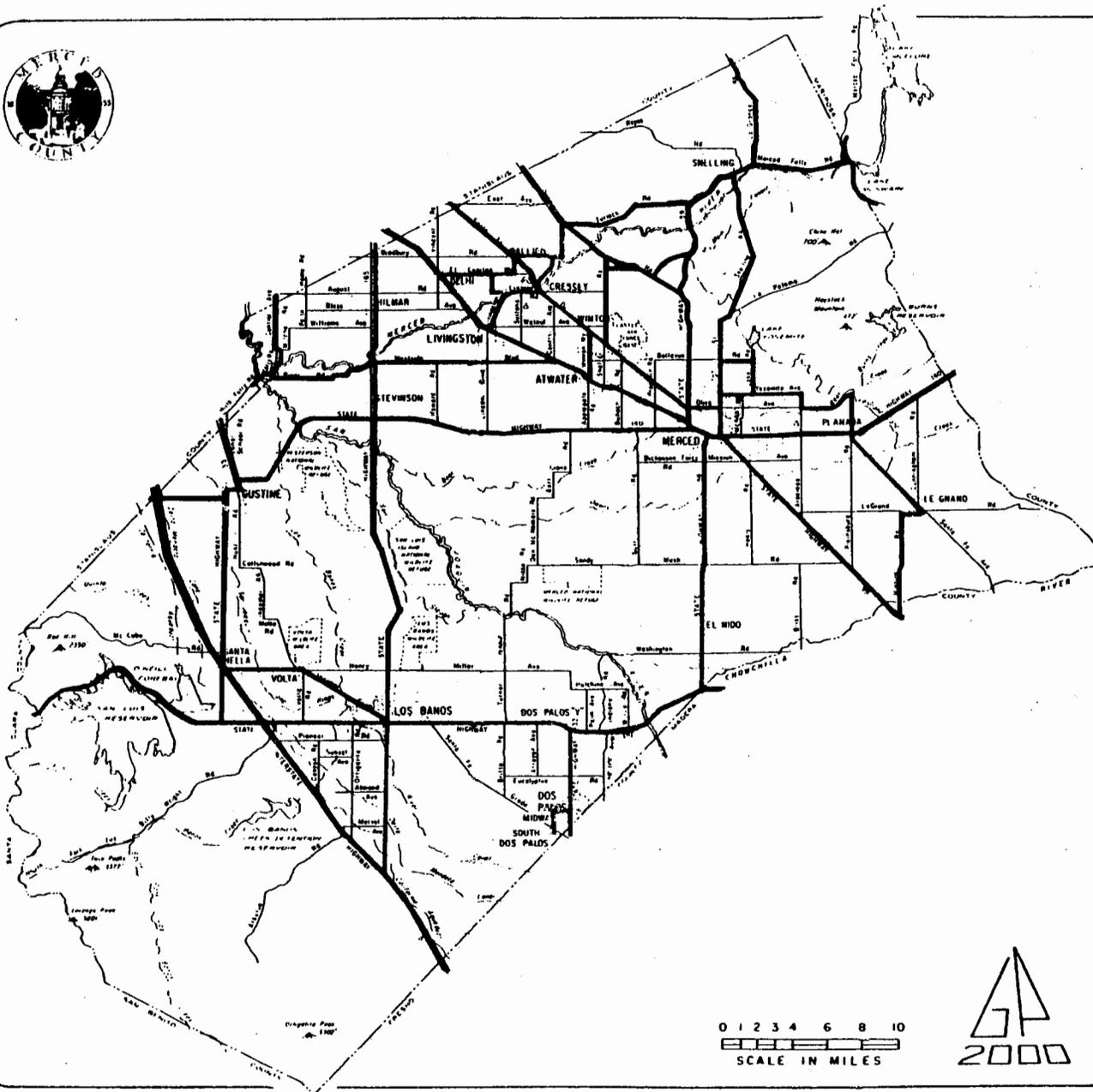
Bicycle and pedestrian routes are recognized as important alternatives to motorized transportation. Pedestrian routes in Merced County primarily

occur in the urban areas, while bike routes occur in both urban and rural area. However, both bicycle and pedestrian routes provide enjoyment, health benefits, and recreational opportunities while assisting to reduce air pollution, traffic congestion, energy consumption and personal transportation costs.

In Merced County, pedestrian routes are usually along sidewalks which parallel street patterns within urban areas to protect pedestrians from auto traffic. As the urban areas continue to grow, sidewalks will become increasingly available as they are a standard improvement requirement for new construction. Pedestrian routes in the form of hiking trails are also available to the public at local, state and federal parks and wildlife refuges.

In 1982, MCAG prepared the Merced County Regional Bikeway Plan. The Regional Plan provided background information relevant to establishing bikeways such as financial resources for funding bikeways, socio-economic factors regarding bicycle use, bicycle accident histories, and bikeway assumptions for the future. It also provided a bikeway plan which would connect the incorporated communities, unincorporated communities and recreational areas in the County together. Using this as a guide, Merced County adopted bicycle routes for individual unincorporated communities which are shown on the SUDP maps of each Community Specific Plan. This General Plan contains the Countywide Bicycle Route Plan, which is shown in Map 5. This Bicycle Route Plan takes into consideration the material provided earlier by MCAG and links together incorporated communities, unincorporated communities and recreational areas throughout the County. The Countywide Bicycle Plan also provides connections with the established bicycle routes of each city. It is important to remember that this is a plan to guide future road maintenance and improvements and may not reflect existing bikeway conditions. The future construction of bikeways will be administered by either the Merced County Department of Public Works or CALTRANS, depending upon which agency is responsible for the road.

Bike routes either have separated right-of-way travel lanes (Class I Bicycle Route) or shared rights-of-way along roads (Class II or III Bicycle Routes). Class I bikeways provide completely separated right-of-way designations for the exclusive use of bicycles and pedestrians, similar to the Lake Yosemite Bikeway. Class II bikeways provide a restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles along roads with through travel by vehicles and pedestrians prohibited, similar to "G" Street north of Yosemite Avenue. Class III bikeways provide only a shared right-of-way and is typically designated by signs. Generally, as vehicle traffic levels increase, a more exclusive right-of-way should be provided for bicyclists.



0 1 2 3 4 6 8 10
SCALE IN MILES



Countywide Bicycle Route Plan

LEGEND:

————— EXISTING AND PROPOSED REGIONAL BIKWAYS

Note: For Bikeways within Cities and unincorporated Communities refer to Specific Urban Development Plan and City General Plan Maps.

SOURCE: Merced County Regional Bikeway Plan
1982 M.C.A.G.

MERCED COUNTY
YEAR 2000 GENERAL PLAN
MAP 5

3. Other Infrastructure Issues

Local public facilities and utilities are essential to accommodate development. The variety of local service providers and agencies often create coordination problems. Anticipating the need for various public facilities and utilities and ensuring these services are available prior to development is one of the most important functions of Planning. The remaining portions of this section will cover electrical, natural gas, communications and crude oil transmission and distribution lines; canals, aqueducts and dams used for irrigation and water distribution; and urban infrastructure systems related to water, sewage and drainage facilities. The inventory and distribution of other public facilities is discussed further in the Land Use Chapter.

a. Transmission and Distribution Lines

Electricity, natural gas, crude oil and communications are all commodities distributed by either transmission lines, transmission towers, or pipelines. The larger transmission and pipelines situated in Merced County generally parallel the existing transportation corridors. (Map 6 identifies major electric transmission lines and Map 7 identifies major oil and gas pipelines.) Consequently, land use activities have been minimally affected. The major concerns that arise for the placement of future transmission and distribution lines are aesthetics, the possible removal of land from certain land use activities, and safety of surrounding residents. Probably the most noticeable impact of overhead transmission and distribution lines is their aesthetic or visual impact. Although it may be impractical to underground high power electrical transmission lines above 45 KV, other low power lines are often placed underground, particularly in urban areas, for aesthetic and safety reasons. It is generally recognized that the cost of undergrounding utilities is greater initially, but it eliminates future storm and tree damage maintenance costs. Pacific Gas and Electric Company (P.G. & E.) and the Turlock Irrigation District (T.I.D.) are responsible for the maintenance and operation of electrical and natural gas distribution lines in Merced County. P.G. & E. is currently seeking State approval for a new gas pipeline crossing western Merced County. Primarily the large petroleum corporations are responsible for the crude oil pipelines within the County.

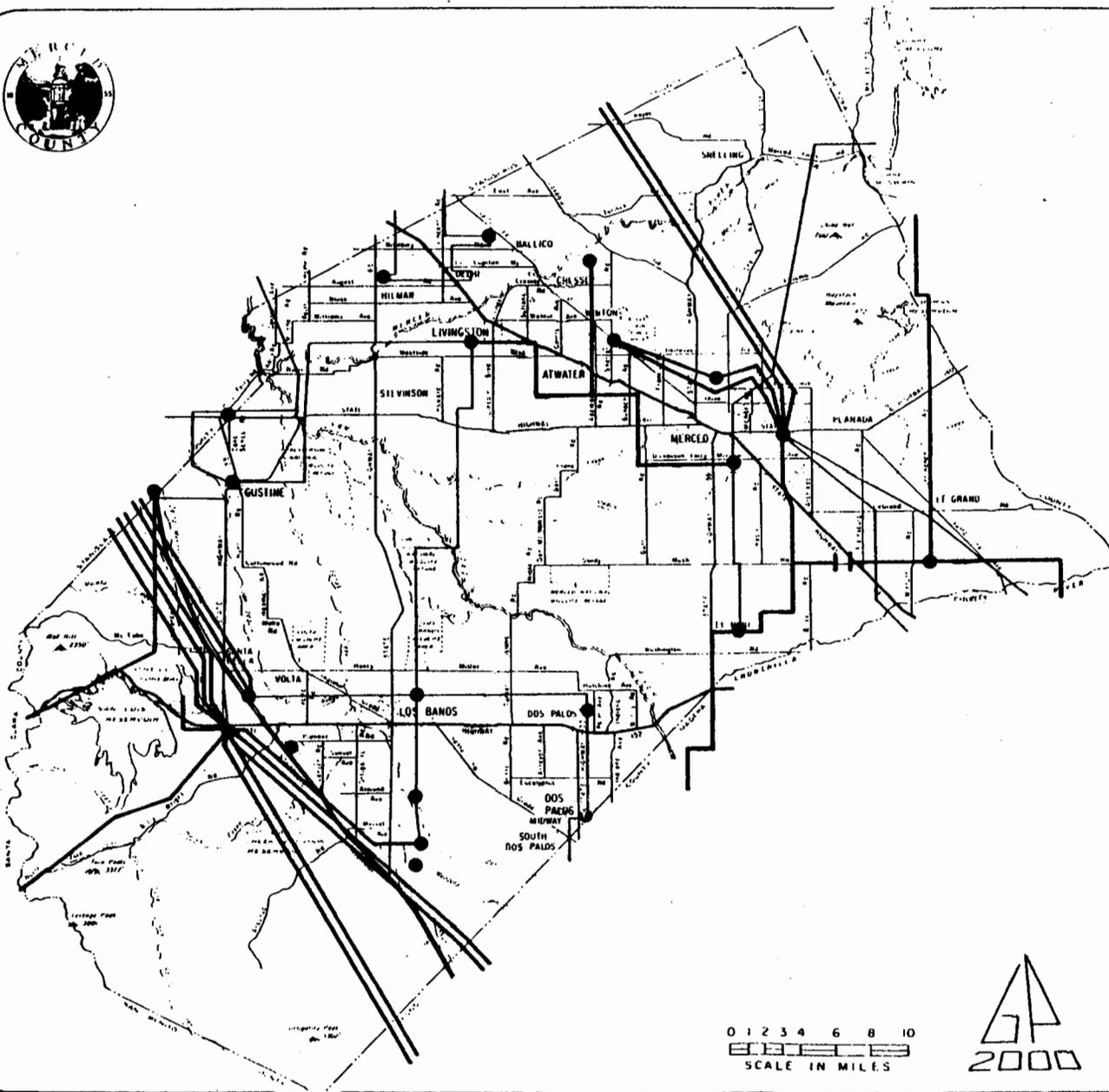
The placement of these distribution and transmission lines, whether above or underground, affects the use of land by restricting the placement of most structures within the utility easements. Even residential subdivisions are often required to maintain a ten foot public utility easement on the front of all lots for the placement of gas, electric, telephone and cable television lines serving each dwelling. The use of large amounts of land for such public facilities or utilities may also remove the land from the tax rolls. Ensuring safety from the improper placement of transmission and distribution lines is also important to the County; e.g., communications and electrical



Major Electric Transmission Lines & Substations

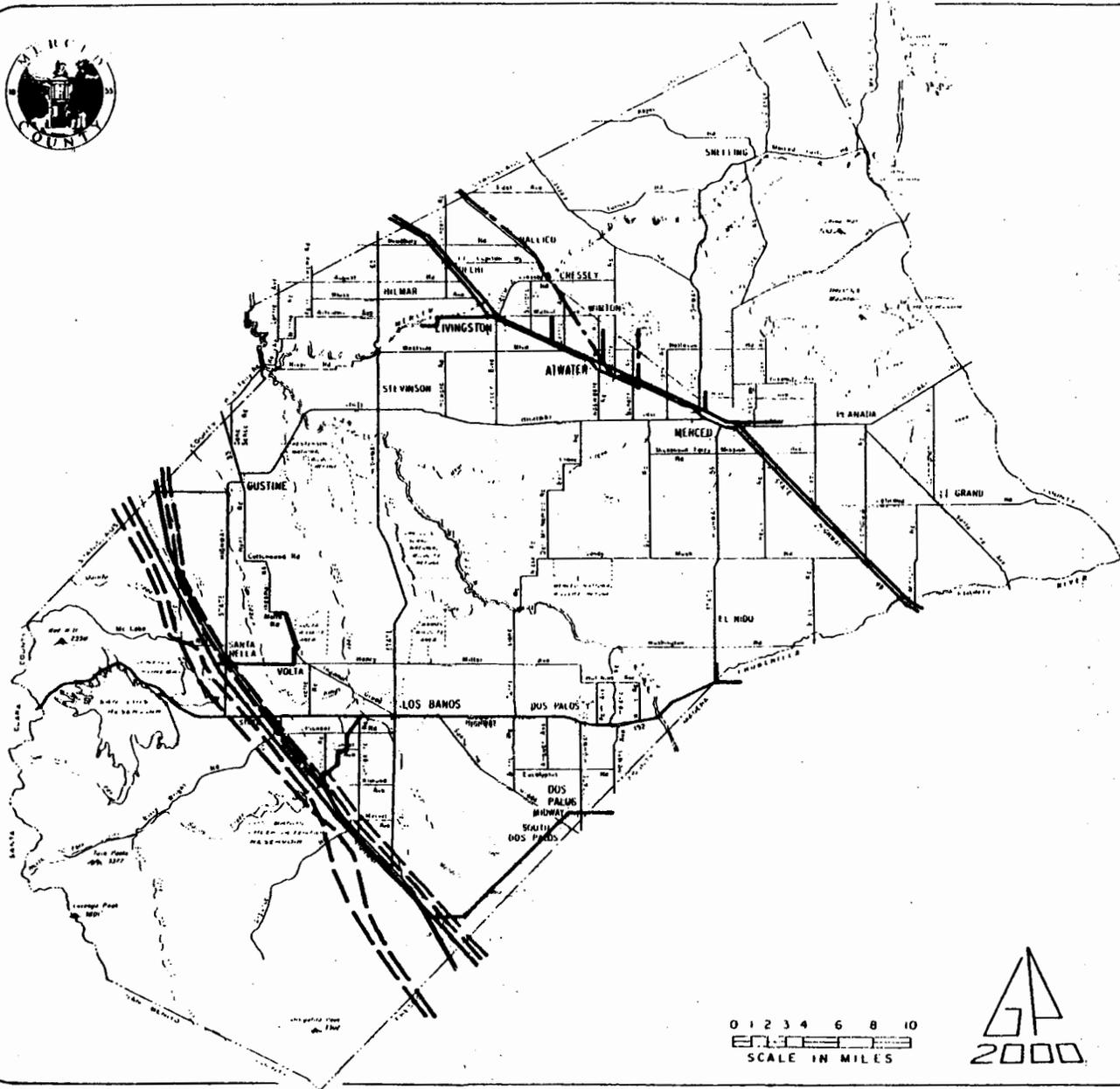
LEGEND:

- SUBSTATION
- 60 - 100 KV
- OVER 100 KV



SOURCE: State of California Energy Commission 1981

MAP 6
MERCED COUNTY
YEAR 2000 GENERAL PLAN



Major Natural Gas & Oil Pipelines

LEGEND

- NATURAL GAS MAIN LINES
- CRUDE OIL PIPELINE
- - - - PRODUCT PIPELINE (C.A.F.B.)

SOURCE: California Energy Commission - 1983 PG & E - 1989

MAP 7

MERCED COUNTY
YEAR 2000 GENERAL PLAN

transmission structures can create safety problems and conflicts with cropdusting activities in rural areas and airport approach zones. Ruptured gas or oil lines may create hazards to populated areas affected by a leak or explosion and can close important roadways used for emergency evacuations. All of these concerns point to the need for inter-agency coordination, and a joint effort in creating multi-use transportation and distribution corridors. This coordination is important for the proposed P.G. & E. 84-mile long 500 KV transmission line in the western foothills of the San Joaquin Valley. Environmental review for the "California-Oregon Transmission Project" has been completed which outlines a preferred alternative and various measures to mitigate anticipated impacts.

b. Canals, Aqueducts and Dams for Irrigation Practices

Within Merced County is an extensive water delivery system for agricultural irrigation. The physical locations of the major irrigation facilities and natural water courses are shown in Map 34 presented in the Agricultural Chapter (VII). In addition, the State is exploring the development of a proposed "Los Banos Grandes Reservoir" on the Los Banos Creek, to store water for both urban and agricultural users.

Agricultural operations typically use surface water delivered by canals or laterals, underground water delivered by pumping facilities, or some combination thereof. In contrast, water delivery for urban areas is typically from underground water sources. Local service districts usually install deep-wells to obtain higher quality water. However, some communities may use surface water for its delivery system; e.g., the Santa Nella Community Services District obtains water for its urban delivery system from the California Aqueduct. In addition, the City of Dos Palos and neighboring special water districts are considering a joint water delivery system using the California Aqueduct Canal. Both locally, and on a statewide level, agricultural and urban water users tend to compete for water, whether from surface or underground supply sources.

As agricultural areas are slowly developed for urban activities, local irrigation districts typically require canals or laterals to be placed underground for reasons of safety and liability. Although this does increase levels of safety and efficiency of water delivery, it also represents an additional cost in the development process. Problems have surfaced when smaller parcels seem to be unfairly burdened with the entire cost of placing a canal underground, even though it is used by adjacent parcels. This typically occurs when one property owner is prepared to develop a site before the adjacent property owners. This will likely continue to be an issue until an acceptable resolution is offered by individuals or local irrigation districts. An additional discussion of the water delivery systems and irrigation practices can be found in the Agricultural Chapter (VII) of this General Plan.

c. Urban Water, Sewer and Drainage Facilities

Adequate water supplies, sewage treatment systems and storm drainage facilities are basic requirements for serving urban areas planned for intensive development. Water supplies must be planned to provide potable water and adequate pressure for health and safety reasons. Sewage treatment systems must be planned to adequately treat effluent for health reasons. Storm drainage facilities must be planned for increased surface water runoff for health and safety reasons. The major parameters used in planning for these facilities include the extent of the service area, the projected service area population and the projected per capita use.

All cities and the larger unincorporated communities in Merced County have public water and sewage treatment facilities. The locations of the sewage treatment plants are identified in Map 3 in the Land Use Chapter, and capacities of the existing water and sewage treatment systems is presented in Table II-2. Other small unincorporated communities rely completely on the use of on-site water and sewer facilities. The community of Volta has, in fact, recently received approval from the Merced County Local Agency Formation Commission (LAFCO) to form a water district to correct individual well water quality problems. Also, the communities of Cressey and Stevinson are considering the formation of a water district.

A critical issue concerns the ability of individual water and sewer districts to provide adequate services for new development (this topic is discussed more thoroughly in the Land Use Chapter). The City of Dos Palos has exceeded its current sewage treatment capacity and is unable to provide additional connections at this time. This has impacted the communities of Midway and South Dos Palos which rely on the City of Dos Palos for providing sewage treatment services. The community of Winton is also near its capacity and is unable to provide additional sewage treatment services until the City of Atwater completes its proposed wastewater treatment plant expansion. It is clear that some communities do not have the water or sewage treatment capacity to accommodate anticipated growth. It is likely, therefore, that these communities will seek to expand their facilities in the future. The Merced County LAFCO will play an important role to ensure that adequate urban services continue to be available by evaluating the ability of local districts to expand services. LAFCO reviews requests to change municipal and district boundaries and is guided by the Cortese-Knox Local Government Reorganization Act of 1985.

Only the unincorporated communities of Hilmar and Franklin/Beachwood have some form of community drainage facilities which can be used by new development (although the County is pursuing a block grant for the installation of a community

TABLE II-2

SEWER AND WATER CAPACITIES

Incorporated Communities	SEWER			WATER		
	Total Capacity MGD	Average Daily Use	Remaining Capacity MGD	Total Pumping Capacity MGD	Average Daily Use MGD	Remaining Capacities MGD
Atwater ^{*1}	4.9	3.4	1.5	10.8	5.25	5.55
Dos Palos ^{**2}	.52	.65	.0	4.0	1.1	2.9
Gustine	1.0	.9	.1	3.5	1.0	2.5
Livingston	1.18	.85	.33	15.0	5.5	9.5
(Industrial)	5.0	4.5	.5			
Los Banos	2.5	2.0	.5	10.9	3.02	7.88
Merced	10.0	7.8	2.2	43.2	14.5	28.7
Unincorporated Communities						
Delhi	.4	.32	.08	3.0	.54	2.46
Franklin/ Beachwood	.4	.25	.15	3.45	.86	2.59
Hilmar	.5	.25	.25	3.0	.4	2.6
Le Grand	.14	.04	.1	1.66	.96	.7
Midway ^{**}	.09	N/A	.0	N/A	N/A	N/A
Planada	.53	.34	.19	2.59	1.0	1.59
Santa Nella	.25	.1	.15	1.2	.4	.8
South						
Dos Palos ^{**}	.12	.035	.0	N/A	N/A	N/A
Winton	.65	.56	.09	2.5	1.74	.76
Snelling	.06	.03	.03	Individual Wells		

MGD = Million Gallons per Day

N/A = Information Not Available

¹ Undergoing sewer expansion but no estimate on new capacity.

² New sewer pipeline expansion scheduled, completion date expected for late 1990.

* The Community of Winton shares sewage plant capacity with the City of Atwater.

** The Communities of Midway and South Dos Palos share sewage plant capacity with the City of Dos Palos.

drainage system in Planada). As the amount of impervious surface area increases, so will the amount of storm water runoff and the need to provide storm drainage facilities. If new development cannot connect to community drainage facilities, all storm water runoff must be accommodated on-site through percolation or detention basins. These individual basins are not as efficient as a community drainage system because they require more land area, they are an additional safety risk, and they are more expensive to maintain.

C. CIRCULATION GOALS, OBJECTIVES, POLICIES AND IMPLEMENTATION

GOAL 1:

A Road system which provides free movement of vehicles throughout the County.

Objective 1. A.:

All roads are appropriately classified by their existing and future use characteristics to effectively distribute vehicles.

Policies:

1. Establish a roadway system consisting of local roads, collector roads, arterial roads, and Freeways, adequate to serve existing and future land uses.

Implementation:

- 1) The County will continue to cooperate with incorporated cities within the County, adjacent counties, and State and Federal transportation agencies to ensure coordination of road systems.
- 2) The County will continue to consider road system improvements consistent with this Chapter as part of the annual Capital Improvement Program.
- 3) The County will review the Improvement Standards and Specifications Manual (Title 16 of County Code) to reflect the functional Classification System described in this Chapter.
- 4) The County will continue its involvement in the annual development of a Regional Transportation Plan by the Merced County Association of Governments.

Objective 1. B.:

Roadways are improved and maintained to provide an adequate peak period level of service (LOS) for existing and anticipated traffic volumes.

Policies:

2. The acceptable level-of-service for roadways located within rural areas of the County shall be LOS "C" or better.
3. The acceptable level-of-service for roadways located within urban growth areas such as HICs, SUDPs of unincorporated areas, or RRCs, shall be LOS "D" or better during peak traffic periods.
4. LOS "D" is acceptable for roadways located outside urban growth areas if the roadway services as a connector between urban growth areas.
5. LOS "E" and worse may be allowed on a minor component of the circulation system (such as a left turn movement from a local roadway) if a major component of the circulation system (such as a through movement on a collector or arterial roadway) would be significantly compromised in the process of improving the level-of-service of the minor component.
6. Within the SUDP of an incorporated city, the acceptable level-of-service shall be as stipulated in the adopted Circulation Element of the respective city, or where none is specified, as stipulated in Policies 3 and 5 of this Goal.
7. Right-of-Way dedication and roadway improvements shall be required with the approval of land use entitlements to offset circulation impacts resulting from the typical occupancy of such entitlement.

Implementation:

- 1) The County will continue to establish and collect Bridge and Major Thoroughfare Fees, and other fees adopted pursuant to law, to assist in financing improvements necessary to maintain an adequate level-of-service on roadways within the County.

- 2) The County will continue to limit the use of traffic control devices on arterial and Major Collector Roadways that will unjustifiably compromise the level-of-service on roadways within the County.
8. All methods to achieve cost effective design, construction and maintenance of existing and future roadways shall be pursued.
9. Require appropriate improvements to the structural section of County roadways for discretionary entitlements that will compromise the integrity of the existing road section as a direct result of the increase in commercial truck traffic.

Implementation:

- 1) The "Improvement Requirements" specified in Title 16 of the County Code will be used to determine appropriate right-of-way dedication and improvement requirements necessary for various entitlements consistent with this Chapter.
 - 2) The County will continue to apply the off-street parking provisions of the Zoning Code to reduce reliance on on-street parking.
 - 3) The County should continue to seek methods to fund needed roadway improvements and maintenance requirements which do not rely on traditional funding sources.
10. Existing and future rights-of-way shall be protected from encroachment of incompatible structures.

Implementation:

- 1) The existing roadway system and roadway standards will continue to be maintained by the County to ensure adequate rights-of-way are delineated.
- 2) The County will continue to require encroachment permits for work within rights-of-way.
- 3) In the review of development projects and discretionary permits, the County will not approve construction of structures within delineated rights-of-way unless it can

be determined a structure will not interfere with function of the right-of-way.

11. Road rights-of-way and improvements shall be coordinated with incorporated cities and with adjacent counties to ensure compatibility.

Implementation:

- 1) The County will continue to maintain on file copies of Improvement Standards of incorporated cities, adjacent counties and local, State and Federal Transportation agencies.
- 2) The County will continue to request the Local Agency Formation Commission (LAFCO) to require entire rights-of-way to be included or excluded in proposed annexation boundaries.

Objective 1. C.:

Appropriate levels of roadway access are provided to all existing and future land uses.

Policies:

12. In urban areas newly created lots or parcels shall front upon an improved public road. Exceptions to this policy may be permitted for Planned Developments (PD), or lots fronting on privately maintained gated roads provided adequate regional circulation and emergency access is maintained, or for access to four or fewer parcels in a Rural Residential Center.
13. Appropriate means of access to a maintained public road shall be provided through the review of discretionary and non-discretionary entitlements.

Implementation:

- 1) The County Zoning and Subdivision Code provisions requiring road frontage for new lots in urban areas and legal access for tentative rural subdivisions will be implemented at the tentative subdivision review stage.
- 2) Require private roads and related improvements, to be designed and installed to County standards as

contained in the Improvement Standards and Specifications Manual (Title 16 of County Code) and Subdivision Code (Title 17), unless it can be demonstrated to the satisfaction of the approval authority that alternative improvements will be provided sufficient to fulfill the goals and objectives of this Chapter and the respective Codes.

- 3) Continue to require encroachment permits to control access points on public roads.
14. Consideration of subdivision and parcel map applications in Rural Residential Centers shall require preparation by the applicant of a local street pattern for the 1/4 section within which the proposed division is located.

Implementation:

Local 1/4 section road plans will be required as part of a complete tentative subdivision application within Rural Residential Centers. Where a previously accepted road pattern exists for the surrounding area, new subdivisions may conform to this pattern.

GOAL 2:

A circulation system which provides for a variety of transportation modes for the safe and efficient movement of people and goods throughout the County.

Objective 2. A.:

Rail and air transportation systems which provide safe, efficient and reliable movement of passengers and freight.

Policies:

1. Support and protect the operation of public use airports.

Implementation:

Implementation of Policies 9-12 contained under Objective 9. A. of Goal 9 in the Land Use Chapter shall be followed.

2. Support the continued operation of existing rail lines and terminals.

3. Encourage coordination of air and rail passenger services with other public transportation.
4. Encourage land uses which transport large quantities of goods or materials to locate in areas served by rail or air transportation facilities.
5. Encourage alternatives to at-grade rail crossings at existing and future roads.

Implementation:

- 1) Industrial and commercial activities which involve freight movement will be encouraged to locate near airports which have air freight service and near rail lines in urban areas.
- 2) Where possible, reduce railroad spur line conflicts with existing and proposed roads.
- 3) In the design of new roads, seek alternatives to at-grade rail crossings such as bridges or tunnels.

Objective 2. B.:

An established bikeway system meeting the existing and future needs.

Policies:

6. Encourage the construction of Class I, II or III bike routes as designated in the overall Merced County Bikeway Plan and in Community Specific Plans.
7. The location and construction of bikeways shall be coordinated with incorporated cities and adjacent counties.

Implementation:

- 1) The design and construction of bicycle lanes should follow the Planning and Design Criteria for Bikeways in California, published by CALTRANS pursuant to Sections 2373-2376 of the Streets and Highways Code.
- 2) Pursue all available funding sources for the construction and maintenance of bicycle facilities from local, State and Federal funds.

- 3) Consideration should be given to installing bike storage facilities at major transportation terminals and commercial and employment centers.

Objective 2. C.:

A public transit system adequate to meet existing and future population needs through the year 2000.

Policies:

8. Support efforts by the Merced County Association of Governments (MCAG) and other public entities to improve public transportation.

Implementation:

- 1) Continue to design and expand the MARTS line to be responsive to low mobility groups.
 - 2) Pursue efforts to obtain grants and other funding to offset costs of maintaining and expanding public transportation systems.
 - 3) Cooperate in efforts to improve public awareness of, and access to, public transportation systems.
9. Encourage and develop programs which promote the use of ridesharing, car-pooling and van-pooling.

Implementation:

- 1) Pursue techniques to reduce single-driver commute trips such as mixed-use developments or private shuttle vans at large employment centers.
- 2) Consider establishing "park and ride" facilities in urban communities with a high commuter population.

GOAL 3:

An adequate system for the transmission and distribution of energy, water and information.

Objective 3. A.:

Energy and communication transmission and distribution lines are

adequately provided for within existing and future right-of-ways and easements.

Policies:

1. Electrical, gas, crude oil and communication transmission and distribution lines should parallel major roads or rail systems.
2. New transmission and distribution lines shall be encouraged within existing utility easements and rights-of-way.
3. Electrical interference to adjacent land uses shall be considered in the placement of electrical and other transmission facilities.

Implementation:

- 1) Encourage joint use utility easements throughout the County.
- 2) Ensure utility and pipeline companies and districts maintain contingency plans for potentially hazardous situations such as pipeline breaks and fallen power lines.
- 3) Coordinate with the Federal Communications Commission to ensure the proper placement of communication lines and towers.
- 4) Obtain utility easements on individual parcels at the subdivision map approval stage to provide adequate area for installation of improvements, including sewer, water, cable-television and telephone lines.

GOAL 4:

Adequate water, sewer and drainage facilities are provided to meet urban needs of the County.

Objective 4. A.:

Within designated urban areas, there exists systems for sewer collection and treatment, water distribution and storm water collection.

Policies:

1. Encourage providers of public water, sewer and storm drainage systems to maintain and expand their systems to meet the development needs of the County.
2. Effects on the capacity and distribution systems of water, sewer and storm drainage facilities shall be considered in reviews of discretionary and non-discretionary permits.

Implementation:

- 1) Assist communities and special districts in applying for grants to obtain adequate water, sewage and drainage facilities.
- 2) Utilize implementation under Policy 3 of Objective 1. B. under Goal 1 in the Land Use Chapter.

D. CIRCULATION CHAPTER APPENDIX

1. Bibliography
2. Traffic Service Characteristics By Highway Type
3. Intersection Level of Service Concept
4. Proposed Major Road Classifications

Unincorporated Communities:

Delhi SUDP

Franklin/Beachwood SUDP

Hilmar SUDP

Le Grand SUDP

Planada SUDP

Santa Nella SUDP

Volta SUDP

Winton SUDP

Atwater RRC #1

Merced RRC #1

City Circulation Plans:

Atwater

Dos Palos

Gustine

Livingston

Los Banos

Merced

CIRCULATION CHAPTER APPENDIX - PART 1

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- a. Technology Sharing Report 80-204, Design of Urban Streets, January 1980, U.S. D.O.T. Federal Highway Administration, Washington, D.C.
- b. 1982 California State Rail Plan, State of California Business, Transportation and Housing Agency Department of Transportation, Division of Mass Transit.
- c. Planning and Design Criteria for Bikeways in California, June 1978, State of California Business and Transportation Agency, Department of Transportation.
- d. Merced County Regional Transportation Plan Update, 1988, Merced County Association of Governments (MCAG).
- e. Merced County Regional Transportation Improvement Program, 1988, MCAG.
- f. Comprehensive Transit Survey for Merced County, 1988, MCAG.
- g. Regional Transit Development Plan, 1986, MCAG.
- h. Merced County Regional Bikeway Plan, 1982, MCAG.
- i. 1985 Draft Merced County Airport Land Use Commission Policy Plan, MCAG.

CIRCULATION CHAPTER APPENDIX - PART 2

TRAFFIC SERVICE CHARACTERISTICS BY HIGHWAY TYPE

Level of Service

A Two-Lane

Operating speeds of 60 mph or higher. 75% of passing maneuvers can be made with little or no delay. Under ideal conditions, a service volume of 400 passenger vehicles/hour, two-way, can be achieved.

A Multi-Lane Rural w/o Access Control

Operating speed 60 mph or greater. Under ideal conditions, volume is limited to 600 passenger cars per lane per hour or 30 percent of capacity. Average speeds are likely to be influenced by speed limits.

A Urban and Sub-Urban Arterials

Average over-all travel speed of 30 mph or more. Free flowing with volume/capacity ratio of 0.60. Load factor at intersections near the limit of the 0.0 range. Peak-hour factor at about 0.70

A Controlled Access Highways

Free flow. Operating speeds at or greater than 60 mph. Service volume of 1400 passenger cars per hour on 2-lanes, on direction. Each additional lane serves volume of 1000 vph lane.

Level of Service

B Two-Lane

Operating speeds of 50 mph or higher. Volumes may reach 45% of capacity with continuous passing sight distance. Volumes of 900 passenger cars per hour, two-way, can be carried under ideal conditions.

B Multi-Lane Rural w/o Access Control

Beginning of stable flow area. Volume at which actions of preceding vehicle will have some influence on following vehicles. Volume will not exceed 50% of capacity or 1000 passenger vehicles per lane per hour at a 55 mph operating speed under ideal conditions.

B Urban and Sub-Urban Arterials

Average over-all speeds drop due to intersection delay and inter-vehicular conflicts, but remain at 25 mph or above. Delay is not unreasonable. Volumes at 0.70 of capacity and peak-hour factor approximately 0.80. Load factor at intersections approximately 0.1.

B Controlled Access Highways

Higher speed range of stable flow. Operating speed at or greater than 55 mph. Service volume on 2-lanes in one direction not greater than 2000 passenger vehicles per hour. Each additional lane above two in one direction can serve 1500 vph.

Level of ServiceC Two-Lane

Flow still stable. Operating speeds of 40 mph or above with total volume under ideal conditions equal to 70% of capacity with continuous passing sight distance, or 1800 passenger vehicles per hour, two-way.

C Multi-Lane Rural w/o Access Control

Stable flow to a volume not exceeding 75% of capacity or 1500 passenger cars per lane per hour, under ideal conditions, maintaining at least a 45 mph operating speed.

C Urban and Sub-Urban Arterials

Service volumes about 0.80 of capacity. Average over-all travel speeds of 20 mph. Operating conditions at most intersections approximate load factor of 0.3. Peak hour factor approximately 0.85. Traffic flow still stable with acceptable delays.

C Controlled Access Highways

Operation still stable, but becoming more critical. Operating speed of 50 mph and service flow on two-lanes in one direction at 75% of capacity or not more than 5 minutes flow rate of 3000 passenger cars per hour. Under ideal conditions each additional lane above two in one direction would serve 1800 vph.

Level of ServiceD Two-Lane

Approaching unstable flow. Operating speeds approximately 35 mph. Volumes, two-direction, at 85% of capacity with continuous passing opportunity, or 1700 passenger cars per hour under ideal conditions.

D Multi-Lane Rural w/o Access Control

Approaching unstable flow at volumes up to 90% of capacity or 1800 passenger cars per lane per hour at an operating speed of about 35 mph under ideal conditions.

D Urban and Sub-Urban Arterials

Beginning to tax capabilities of street section. Approaching unstable flow. Service volumes approach 0.90 of capacity. Average over-all speeds down to 15 mph. Delays at intersections may become extensive with some cars waiting two or more cycles. Peak hour factor approximately 0.90; load factor of 0.7.

D Controlled Access Highways

Lower speed range of stable flow. Operation approaches instability and is susceptible to changing conditions. Operating speeds approximately 40 mph & service flow rates at 90% of capacity. Peak 5 minutes flow under ideal conditions cannot exceed 3600 vph for 2-lanes, 1 direction; 1800 vph each added lane.

Level of ServiceE Two-Lane

Operating speeds in neighborhood of 30 mph but may vary considerably. Volumes under ideal conditions, two-way, equal to 2000 passenger vehicles per hour. Level E may never be attained. Operation may go directly from Level D to Level F.

E Multi-Lane Rural w/o Access Control

Flow at 100% of capacity or 2000 passenger cars per lane per hour under ideal conditions. Operating speeds of about 30 mph or less.

E Urban and Sub-Urban Arterials

Service volumes at capacity. Average over-all traffic variable, but in areas of 15 mph unstable flow. Continuous back-up on approaches to intersections. Load factor at intersections in range between 0.7 and 1.0. Peak hour factor likely to be 0.95.

E Controlled Access Highways

Unstable flow. Over-all operating speeds of 30-35 mph. Volumes at capacity or about 2000 vph lane under ideal conditions. Traffic flow metered by design constrictions and bottlenecks, but long back-ups do not normally develop upstream.

Level of ServiceF Two-Lane

Forced, congested flow with unpredictable characteristics. Operating speeds less than 30 mph. Volumes under 2000 passenger cars per hour, two-way.

F Multi-Lane Rural w/o Access Control

Forced flow, congested condition with widely varying volume characteristics. Operating speeds of less than 30 mph.

F Urban and Sub-Urban Arterials

Forced flow. Average over-all traffic speed below 15 mph. All intersections handling traffic in excess of capacity with storage distributed throughout the section. Vehicular back-ups extend back from signalized intersections, through unsignalized intersections.

F Controlled Access Highways

Forced flow. Freeway acts as a storage for vehicles backed-up from downstream bottleneck. Operating speeds range from near 30 mph to stop-and-go operation.

Source: AASHO Urban Manual, p.320

APPENDIX PART-3 INTERSECTION LEVEL OF SERVICE CONCEPT

Level of Service A Volume/Capacity Ratio = 0 - 0.60

- * Free flow conditions
- * No vehicle waits longer than one signal indication

Level of Service B Volume/Capacity Ratio = 0.61 - 0.70

- * Stable traffic flow
- * Motorists rarely wait through more than one signal indication

Level of Service C Volume/Capacity Ratio = 0.71 - 0.80

- * Stable and acceptable flow but speed and maneuverability somewhat restricted due to higher volumes
- * Motorists intermittently wait through more than one signal indication
- * Occasional backups behind left turning vehicles

Level of Service D Volume/Capacity Ratio = 0.81 - 0.90

- * Extensive delays at times
- * Some motorists, especially left turners, may wait through one or more signal indications, but enough cycles with lower demand occur to prevent excessive backups
- * Maneuverability restricted

Level of Service E Volume/Capacity Ratio = 0.91 - 1.00

- * Very long queues may create lengthy delays, especially for left turning vehicles
- * Volume at or near capacity
- * Unstable flow

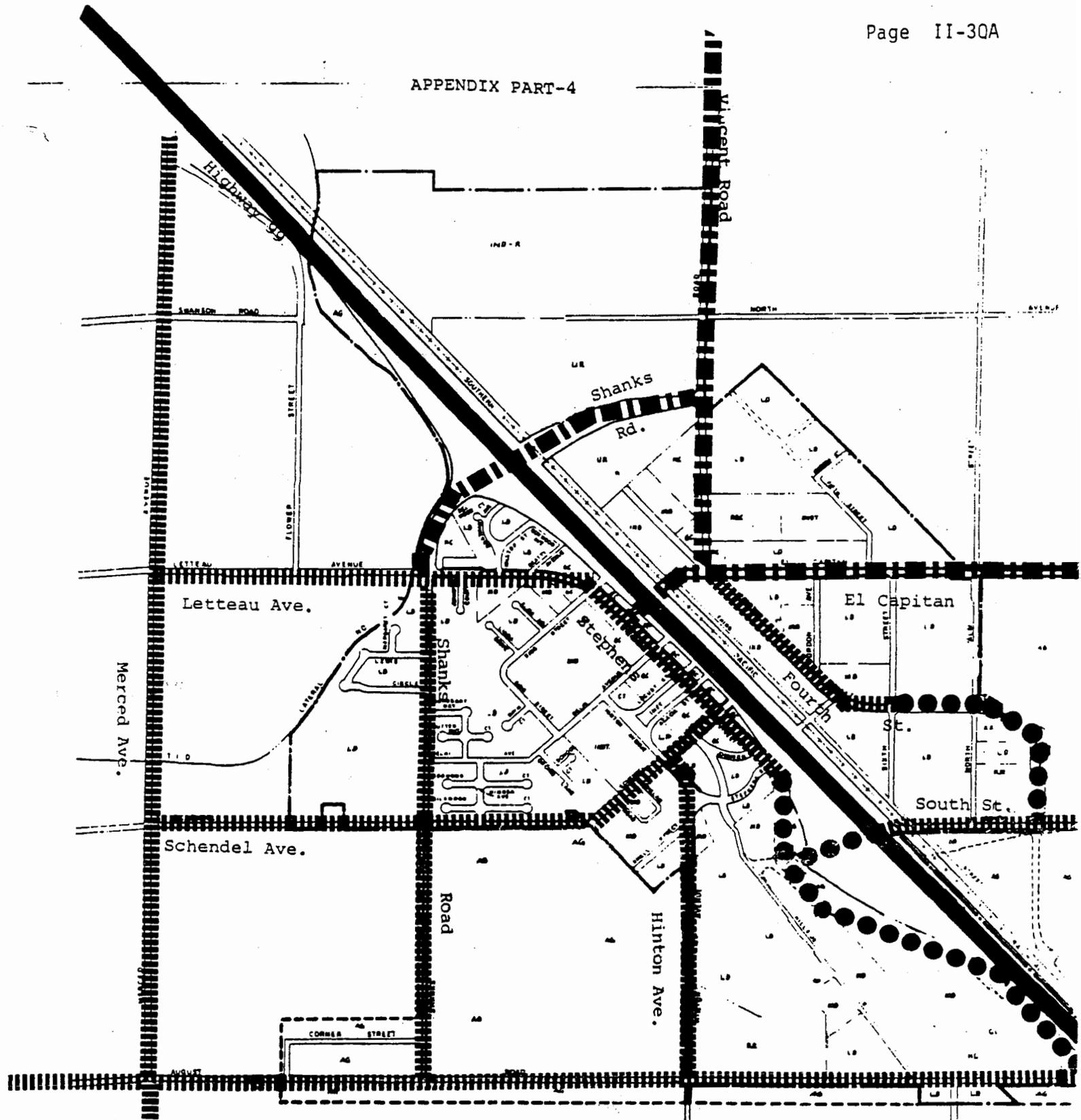
Level of Service F Volume/Capacity Ratio = 1.01 or greater

- * Backups from locations downstream restrict movement at intersection approaches
- * Forced flow conditions
- * Stoppage for long periods due to congestion
- * Volumes drop to zero in extreme cases

CIRCULATION CHAPTER APPENDIX PART 4

PROPOSED MAJOR ROAD CLASSIFICATIONS

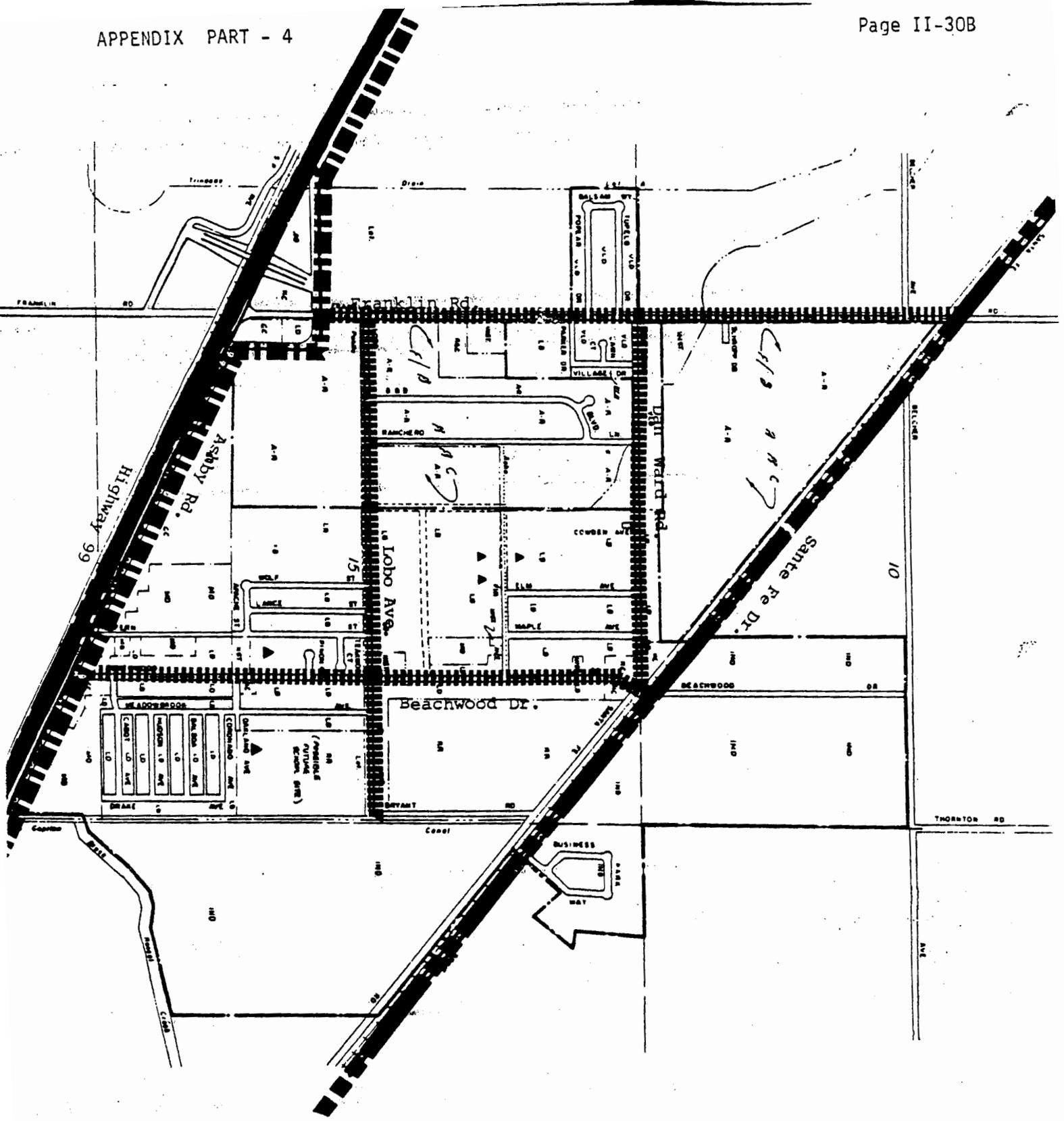
APPENDIX PART-4



LEGEND

-  Freeways
-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

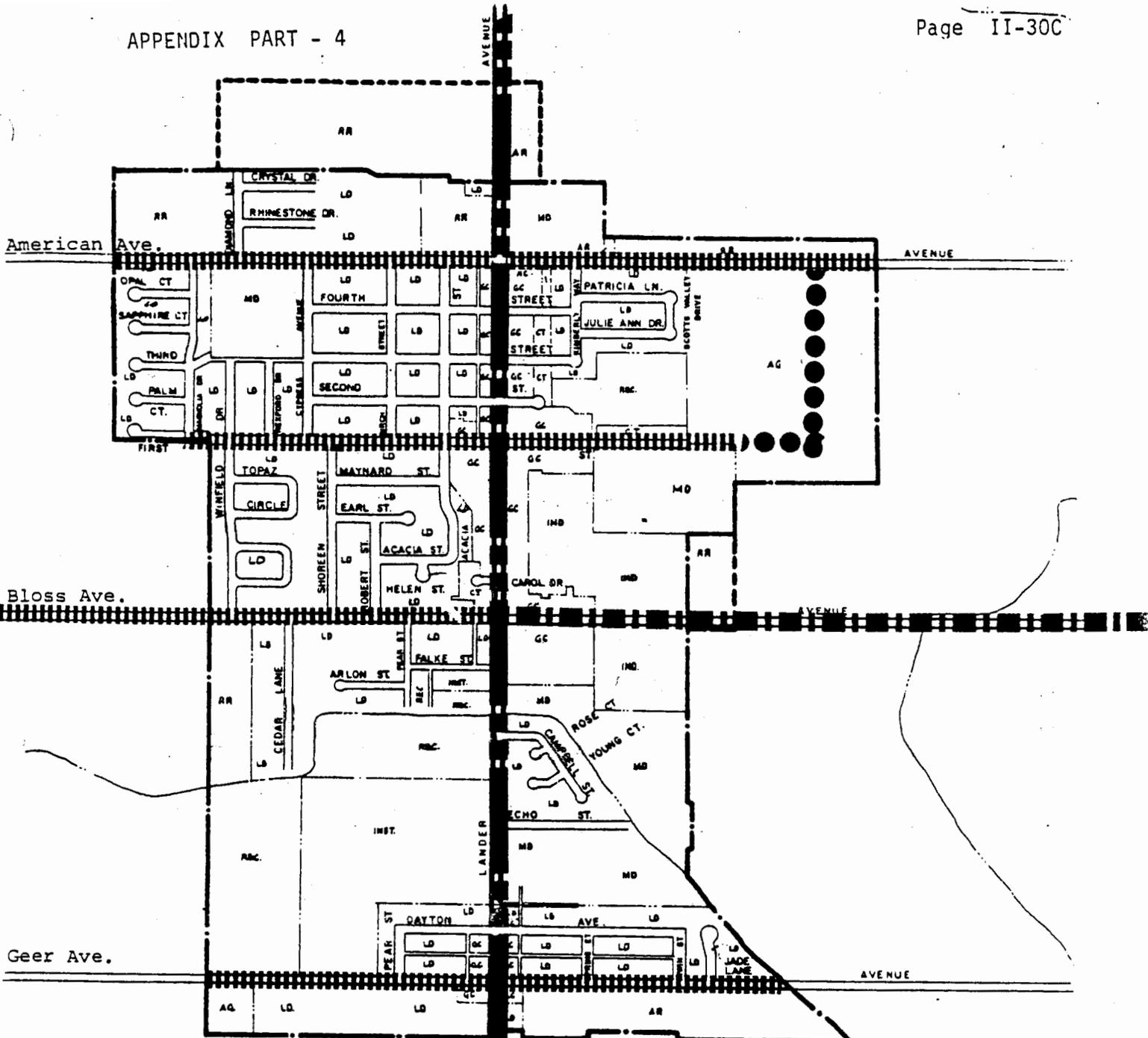
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LEGEND

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-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/Extensions

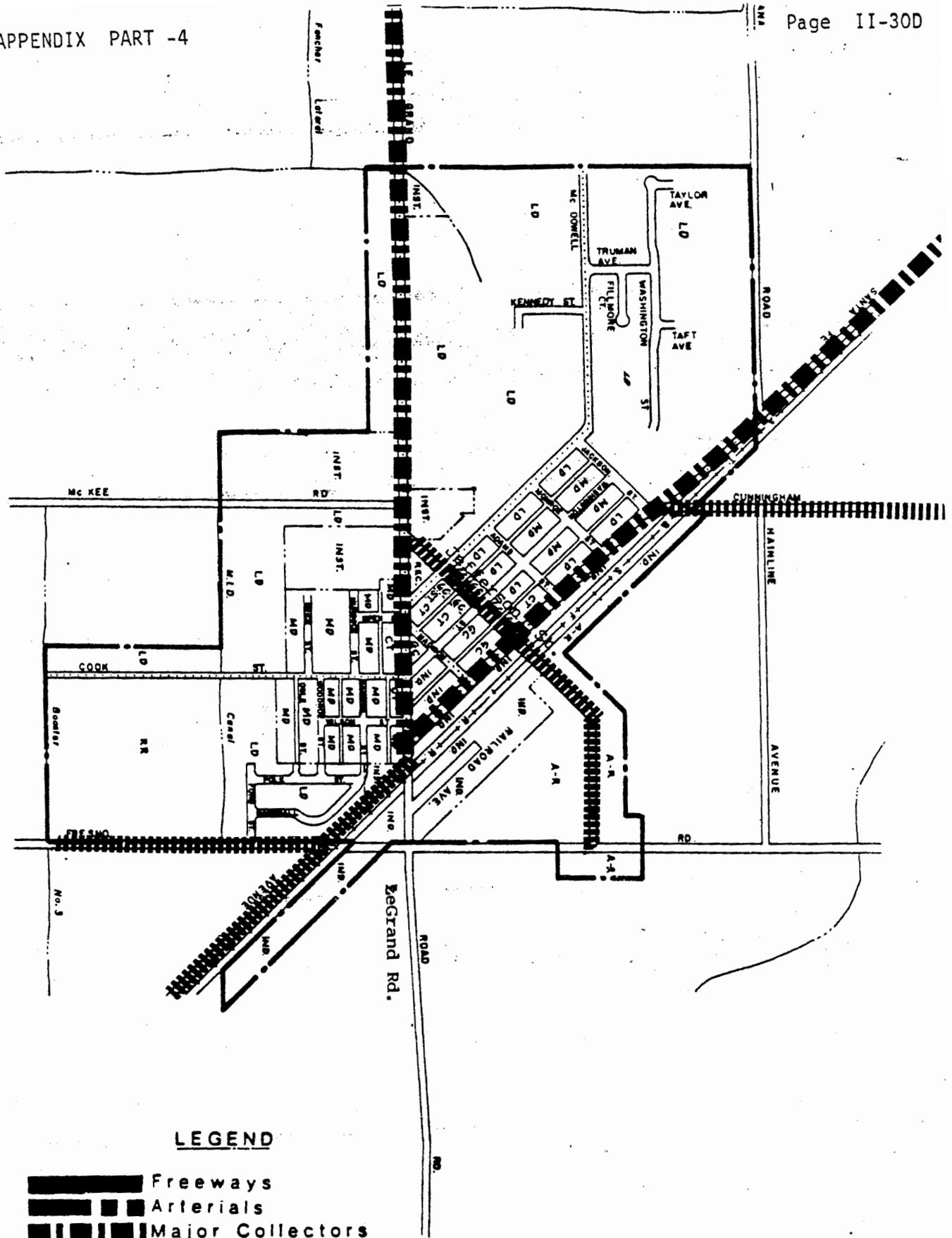
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LEGEND

-  Freeways
-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

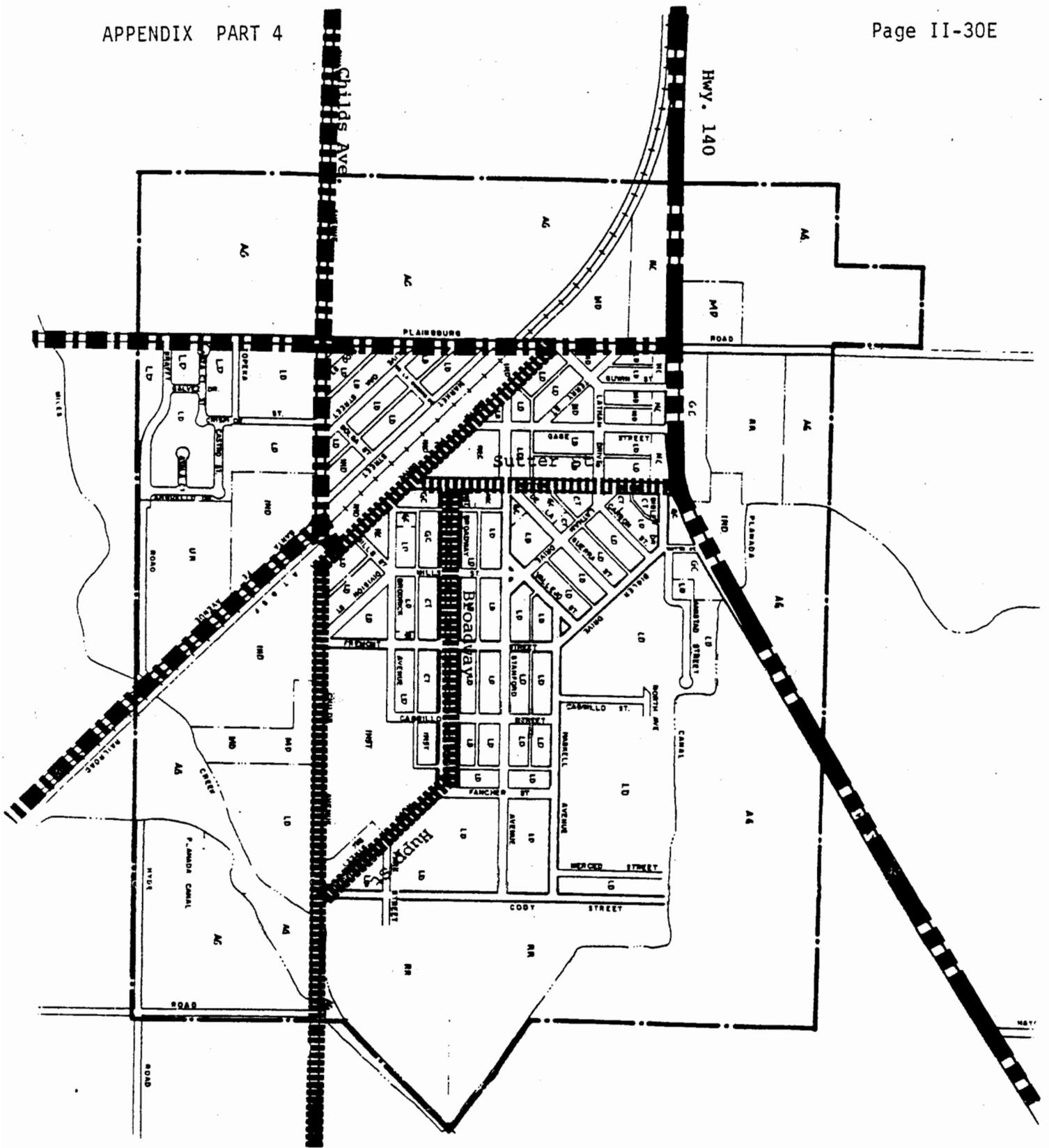
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LEGEND

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-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

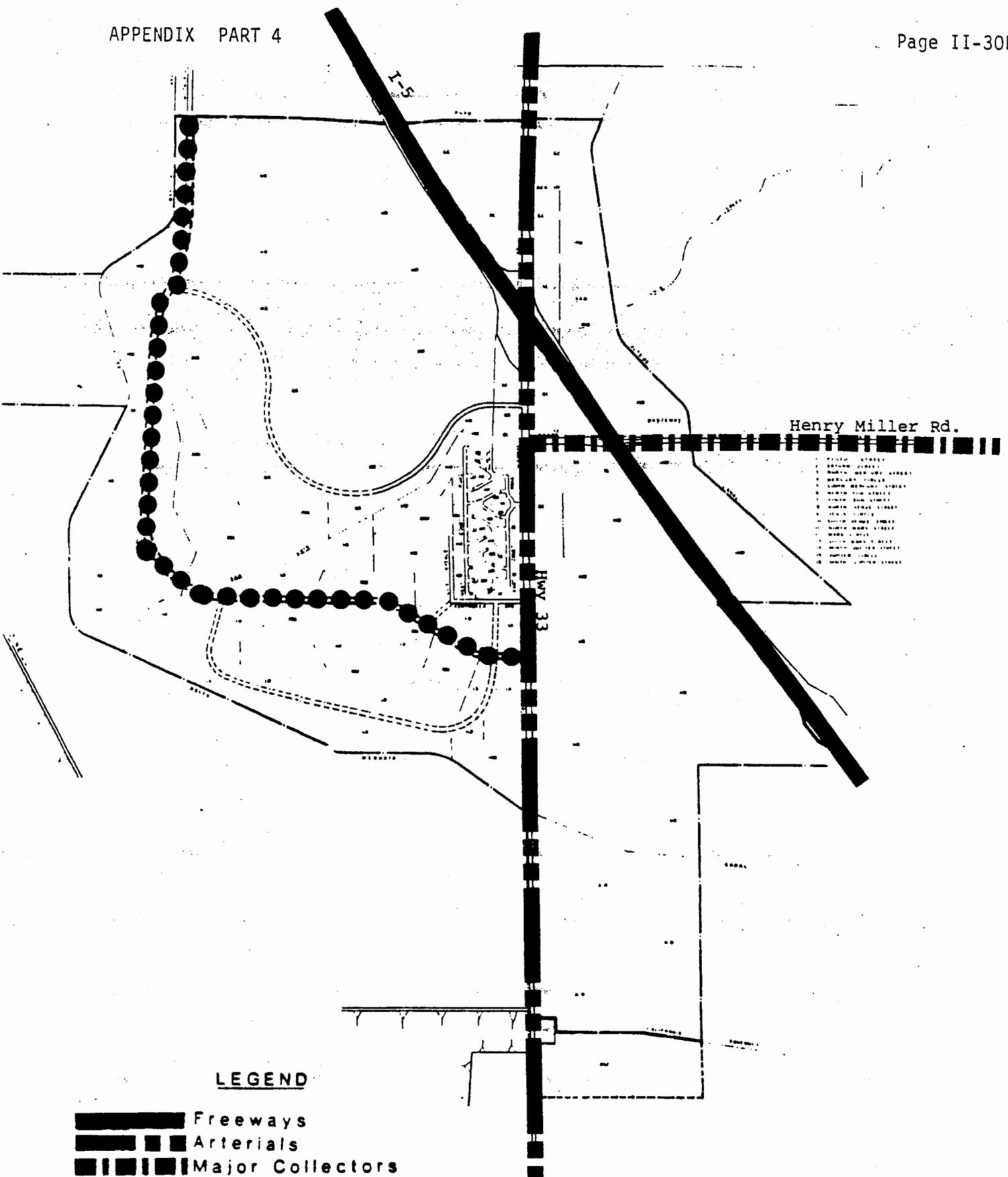
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LEGEND

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-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

planada

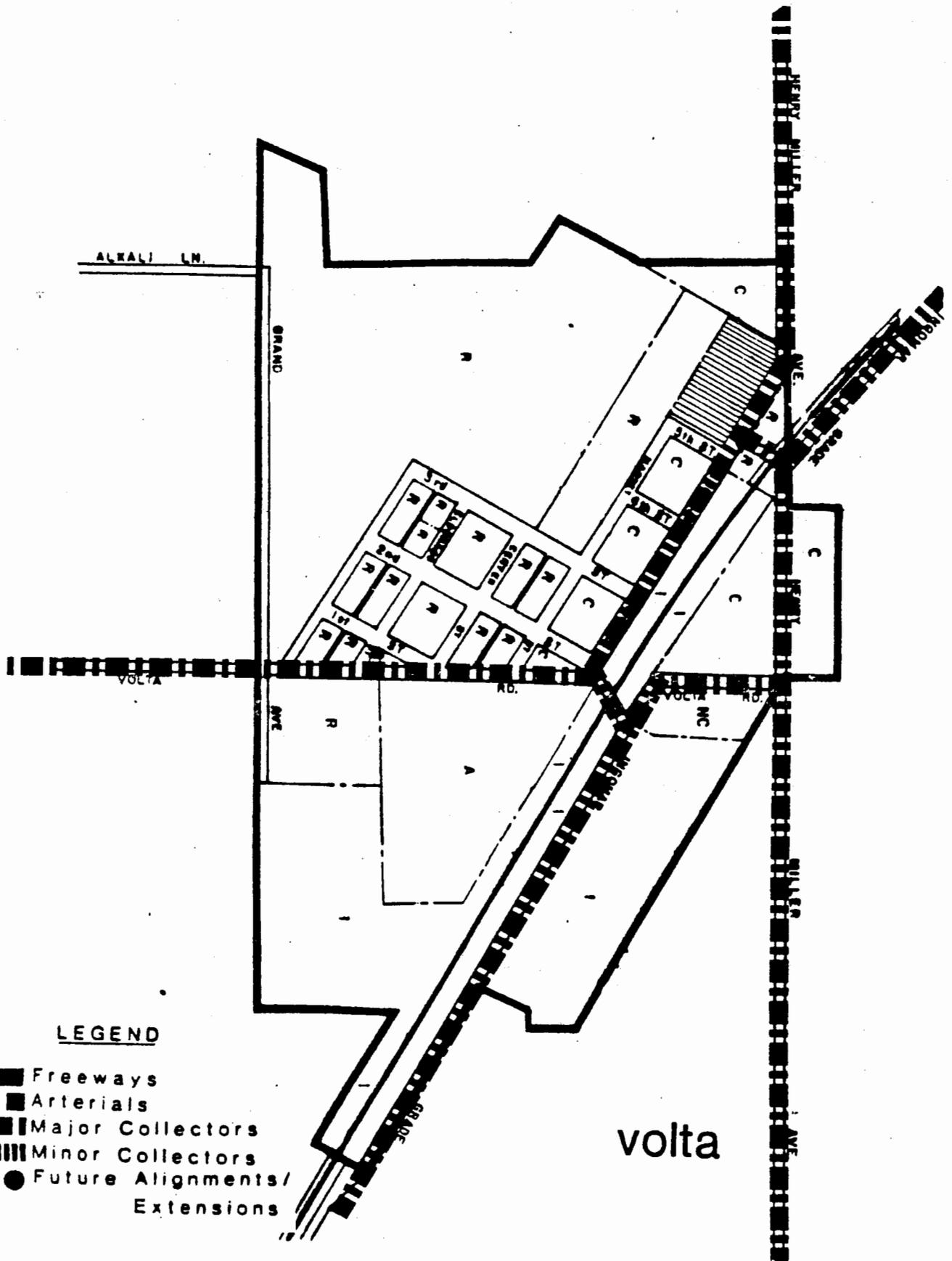


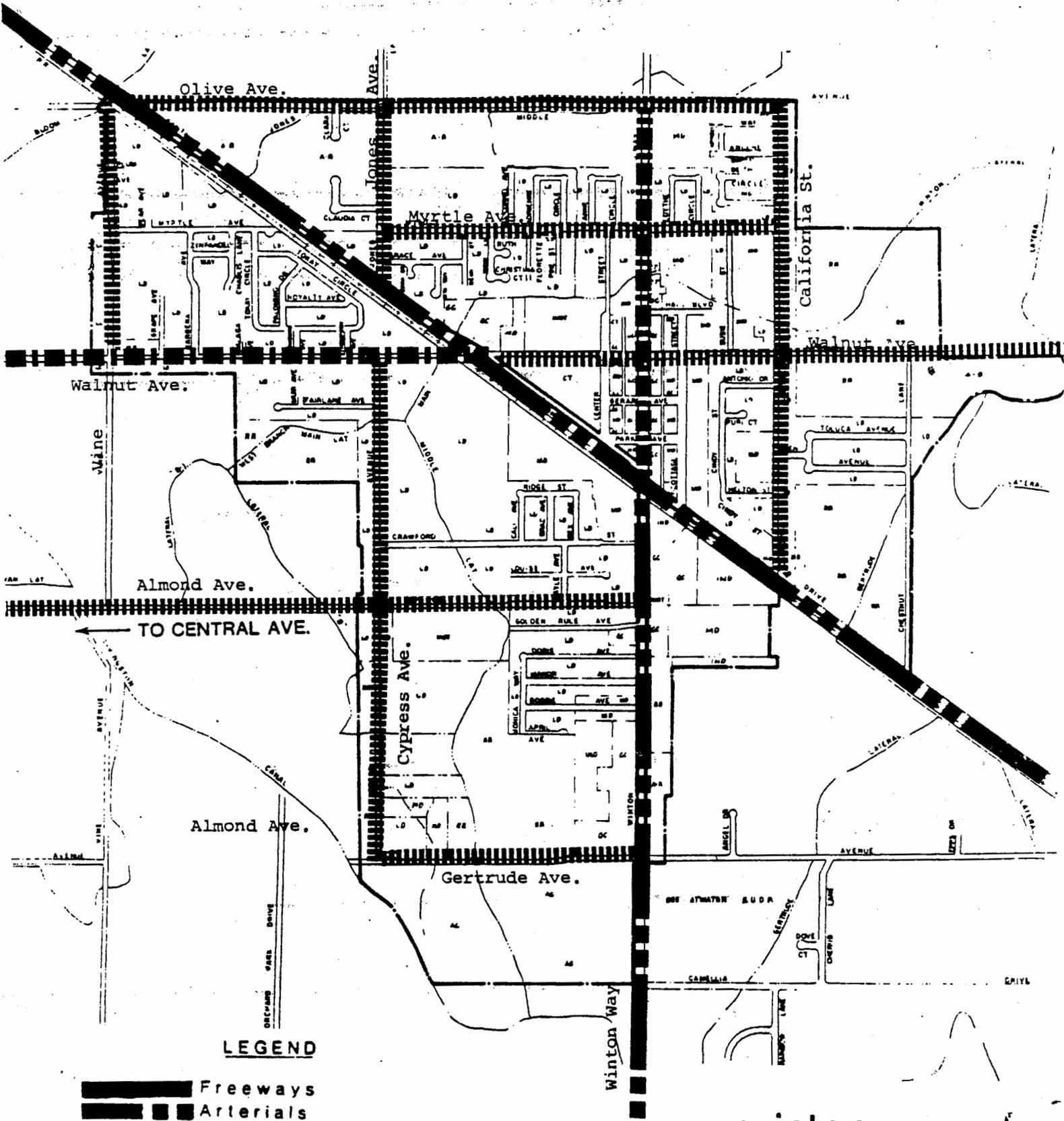
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LEGEND

-  Freeways
-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

santa nella





LEGEND

-  Freeways
-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

winton

Hwy 99

Giannini Ave.

St. B. Ave.

Mulberry Ave.

Moran Ave.

Quinley Ave.

Buhach Rd.

Station Ave.

Atwater-Jordan Rd.
TO APPLGATE RD

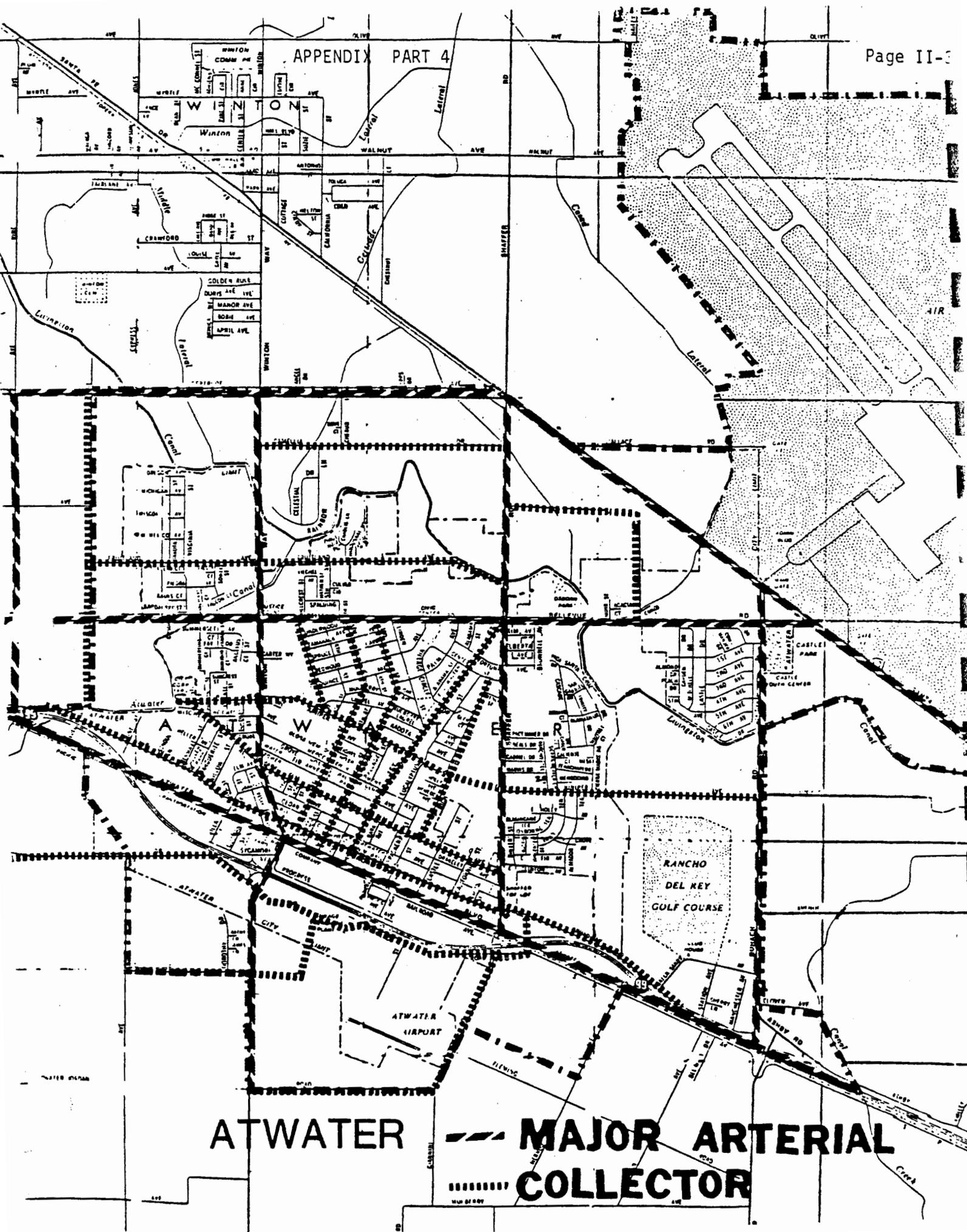
TO APPLGATE RD.

LEGEND

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-  Arterials
-  Major Collectors
-  Minor Collectors
-  Future Alignments/
Extensions

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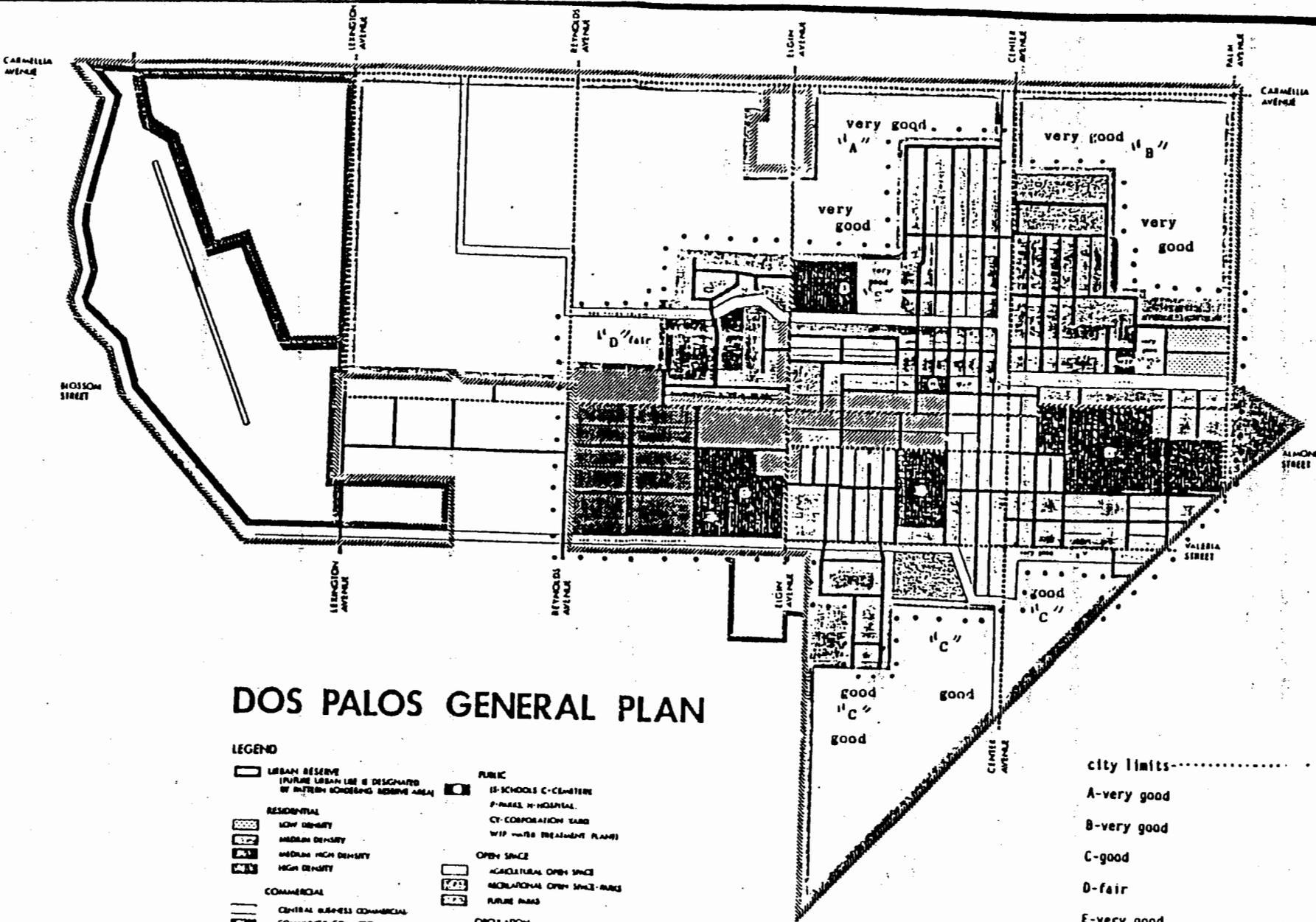


ATWATER

MAJOR ARTERIAL COLLECTOR

COLLECTOR

Map of 2009



DOS PALOS GENERAL PLAN

LEGEND

- | | |
|--|---|
| URBAN RESERVE
(FUTURE URBAN USE IS DESIGNATED BY INTERIM ZONING AND/OR MOBILE AREA) | PUBLIC
IS-SCHOOLS C-CENTERS
P-PARKS H-HOSPITAL
CY-CORPORATION YARDS
WTP-WATER TREATMENT PLANT |
| RESIDENTIAL
LOW DENSITY | OPEN SPACE
AGRICULTURAL OPEN SPACE |
| RESIDENTIAL
MEDIUM DENSITY | RECREATIONAL OPEN SPACE-PARKS |
| RESIDENTIAL
MEDIUM HIGH DENSITY | FUTURE PARKS |
| RESIDENTIAL
HIGH DENSITY | CIRCULATION
ARTERIAL |
| COMMERCIAL
CENTRAL BUSINESS COMMERCIAL | COLLECTOR |
| COMMUNITY COMMERCIAL | LOCAL |
| MIXED COMMERCIAL | ALLEY |
| INDUSTRIAL | PLANNING AREA BOUNDARY |

- city limits.....
- A-very good
- B-very good
- C-good
- D-fair
- E-very good
- F-very good
- G-very good



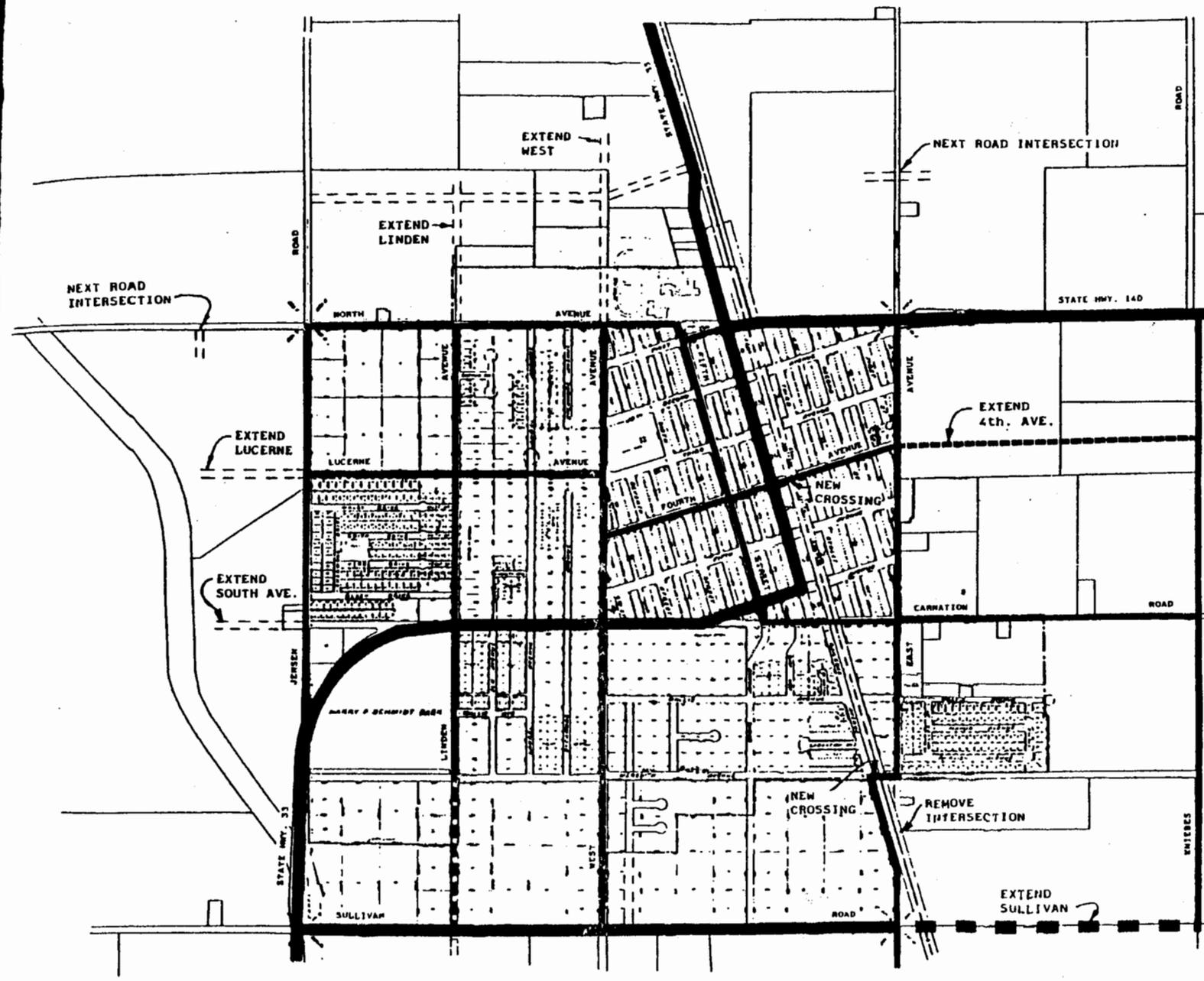
STREET & HIGHWAY PLAN

LEGEND:

-  ARTERIAL
-  PROPOSED ARTERIAL
-  COLLECTOR
-  PROPOSED COLLECTOR
-  LOCAL
-  PROPOSED LOCAL

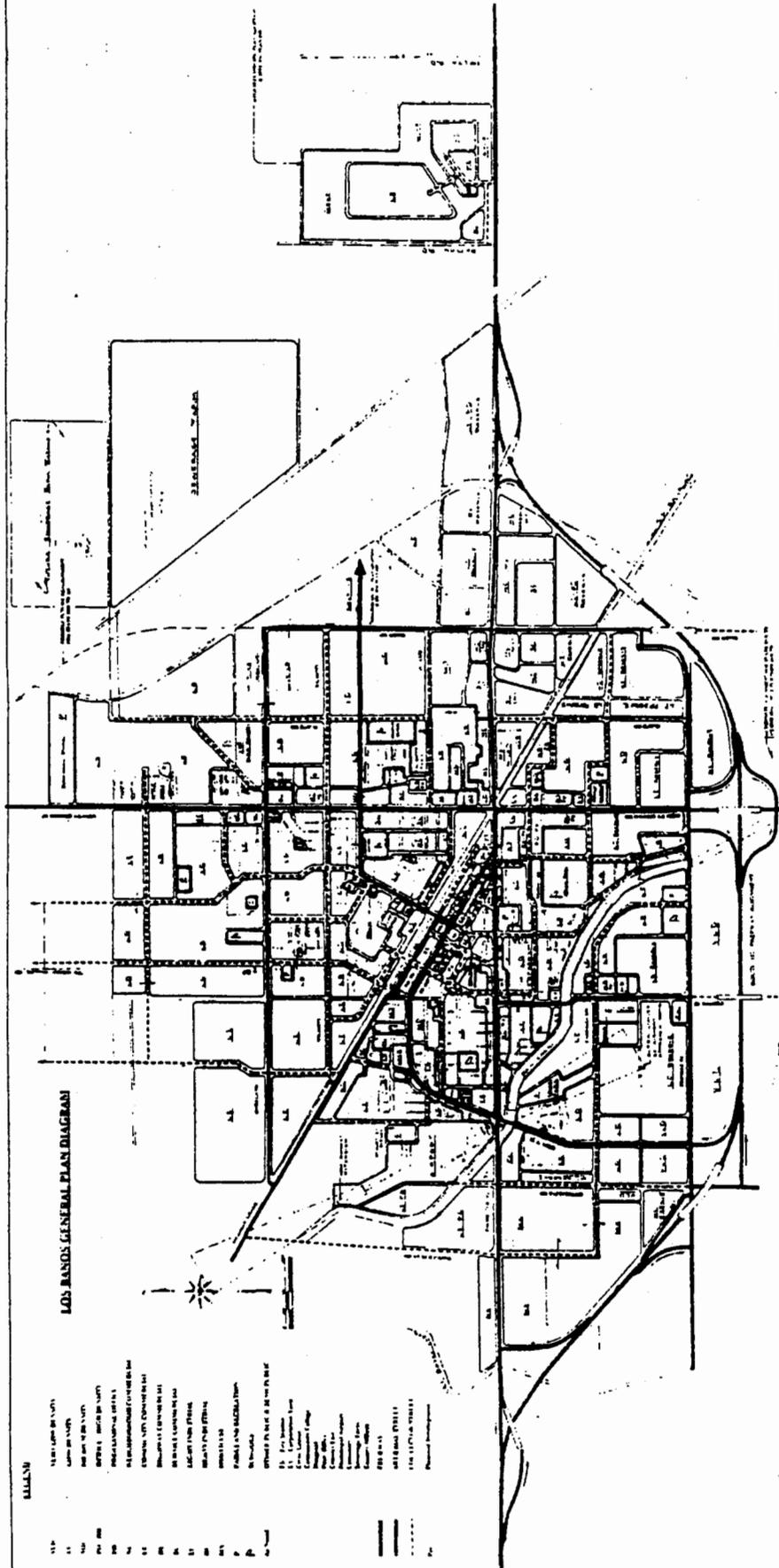


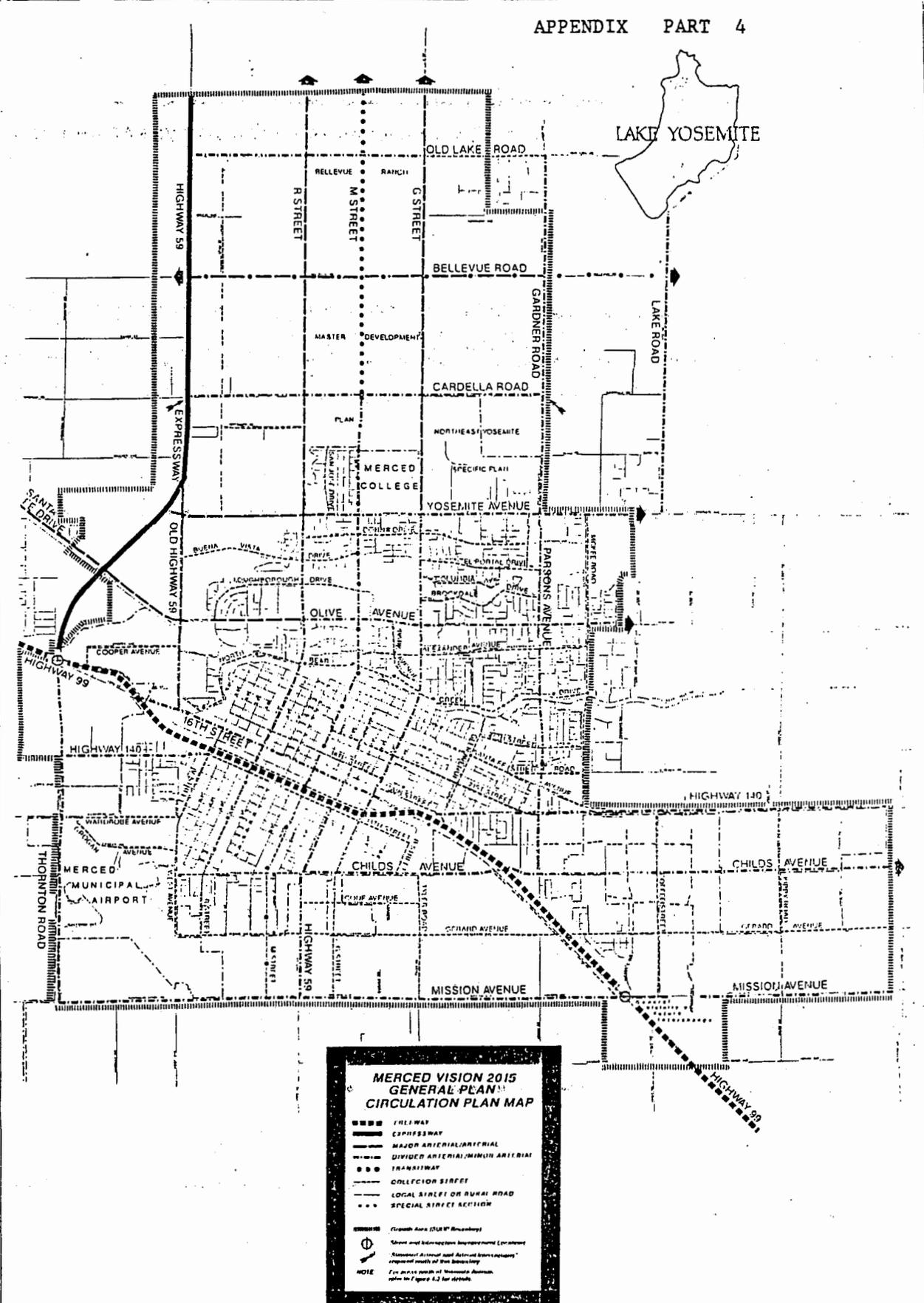
0 300 600
Scale in Feet



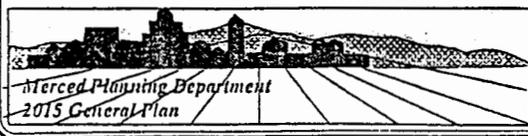
gustine

city of los banos map





Approved: April 7, 1983



City of Merced Circulation Plan