Circulation Element

EXECUTIVE SUMMARY

The Circulation element discusses how to reduce the rate of increased traffic congestion, which is increasing faster than population growth. Phoenix needs to promote more alternatives to driving alone and to decrease the number and length of trips.

Expanded street transportation system: increase capacity of major streets and freeways and promote safety for drivers and pedestrians.

Neighborhood protection: protect neighborhood local and collector streets from high-speed and cut-through traffic.

Mass transit: expand bus service, construct high occupancy vehicle lanes and build light rail transit to link village cores, employment centers and major destinations in high demand corridors.

Airport expansion: expand airport capacity and shift some service to reliever airports.

Pedestrian and bicycle environment: expand pedestrian and bicycle access to transit facilities by adding paths and trails, shade trees, lighting and grade separated crossings.

INTRODUCTION

Mobility within the city of Phoenix is important to the quality of life of Phoenix residents and the city's economy. As Phoenix and the metropolitan area have grown in population and employment, drivers have experienced peak-period congestion that is longer in duration and is spread over a wider area of the region. When residents were asked in the General Plan Survey 2000 what they most liked about living in Phoenix, after weather they said accessibility to needs. When asked what they disliked the most about living in Phoenix, traffic was first with 37 percent of residents. When asked what were the most important things that the city of Phoenix can do to improve the quality of life, the two most frequent responses were: increasing crime reduction efforts (17 percent) and reducing air pollution (15 percent). Five of the next nine responses related to transportation issues: add light rail (8 percent), expand bus service (5 percent), improve mass transit (4 percent), improve traffic flow (3 percent) and widen major streets (3 percent). When respondents to the survey were read a list of 25 ways tax money could be spent over the next 20 years, 53 percent said it was very important to widen major streets and 31 percent said it was somewhat important. This was the 11th most important item on the list of 25.

Those who have lived in Phoenix for 20 years say that congestion is getting worse every year. Those new to Phoenix from cities such as Chicago, Houston and Los Angeles see Phoenix as having little congestion when they compare it to their experience elsewhere. However, projections of travel demand and supply of facilities indicate that congestion levels will continue to increase in Phoenix. As congestion increases, people's options become limited. They avoid travel or are unwilling to travel as far when it takes more time. Congestion also increases transportation costs- the expense of time, owning and operating a car- which consume an increasing portion of household budgets. A recent study by the Surface Transportation Policy Project (a nonprofit organization based in Washington, D.C.) showed that, of large cities, Phoenix had the 7th-highest

percent of household spending on transportation at 18.2 percent. Houston and Atlanta were the highest at 22 percent.

Since the General Plan was last updated completely in 1985, substantial improvements have been made to the transportation system. See the Accomplishments section for these accomplishments in street and freeway construction, traffic safety, transit and aviation.

Only a limited number of freeway miles can be built in Phoenix, and arterial streets can be widened only so far in developed portions of the city without causing excessive disruption to its social and physical fabric. Other transportation modes are needed in the most urbanized area of the city that will complement the freeway and arterial street system. Examples include public transit facilities, programs and incentives that encourage increasing vehicle occupancy, travel demand management programs, and bicycle and pedestrian facilities.

Although large sums are being spent on transportation facilities, more funding is needed. When street system needs were identified for the 2001 city of Phoenix bond program, the cost of meeting those needs was four times the amount of the total bond program that could be allocated to streets, bridges and the program to mitigate freeway impacts. At the state level, the Vision 21 Task Force recognized that there are undoubtedly insufficient existing revenues to complete existing transportation programs. New transportation programs in Phoenix are likely to be substantially more expensive to achieve than the same improvement in transportation service then in the past or in other areas.

The Circulation element includes goals, policies and recommendations for facilitating the movement of people and goods to, from and within Phoenix. It is coordinated with the Land Use, Growth Area, Environmental Planning, and other elements, to ensure that the city improves accessibility and does not degrade the environment. Transportation energy use is not specifically addressed in this plan.

This element addresses a broad range of options for moving people and goods. It discusses ways to encourage use of the appropriate mode of travel for the distance to be traveled, in order to improve the efficiency of transportation system use. This element also places a new emphasis on improving circulation within neighborhoods by encouraging and facilitating pedestrian travel, and accommodating vehicles with speeds between those of pedestrians and automobiles. Future planning activity should include evaluation of all modes of travel.

The element also addresses airports, railroads, helicopters, parking, street naming, house numbering and building setback requirements.

RELATIONSHIP TO OTHER ELEMENTS

Transportation systems affect many other General Plan elements. For example, the land use classifications (setting the intensity of development) should be determined by the degree of accessibility the transportation system provides. Access to recreation facilities and bicycle usage (see the Recreation and Bicycle elements) are related to and depend upon the sufficiency of the street system. The Safety element has policies requiring adequate streets for emergency vehicle access. The Public Services element has a goal and policies concerning street maintenance.

Of special interest are the mutual relationships between land use, neighborhood circulation systems and public transit. Facilitating access to public transit from the interior of adjacent neighborhoods is a particular challenge when sidewalks are nonexistent, direction of travel is circuitous, or parking facilities for transit users are limited. This lack of connectivity also impedes travel to schools, local retailers and other services. The Land Use element addresses pedestrian and transit-oriented development from a land use and design perspective.

The city of Phoenix General Plan proposes an integrated land use and transportation system, which supports the urban village concept and minimizes adverse impacts on the community. Policies propose creating regulations to promote transit stations, ridership, pedestrian connections and transit-oriented development. This form of development, especially in areas where transit is needed most, will help to strengthen the goals of other General Plan elements such as Housing, and Rehabilitation and Redevelopment. An effective circulation system also acts as a valuable economic tool, providing the community with a range of transportation options.

GOAL 1 **AN EFFECTIVE MULTI-MODAL TRANSPORTATION SYSTEM:** A MULTI-MODAL TRANSPORTATION SYSTEM SHOULD BE DEVELOPED THAT WILL ALLOW THE MOVEMENT OF GOODS AND ALL PEOPLE SAFELY AND EFFICIENTLY THROUGHOUT THE CITY, ESPECIALLY INTO, AND BETWEEN, THE URBAN VILLAGE CORES.

To move people and goods safely and smoothly, transportation facilities must be available when needed by the development of new or more intense land uses. To accomplish this, the city needs to do traffic studies in advance of development for areas in which significant changes in land use are proposed. Such traffic studies would determine transportation needs and would allow the city to ensure that necessary facilities are available when the land use changes take place.

The city recognizes that the probability of building completely new freeways is remote. As shown in Figure 1, freeway levels of service will continue to deteriorate over the next 20 years. Maps showing the freeway levels of service for the past 10 years are included in the Appendix. In the future increased traffic volumes and consequent congestion in the city of Phoenix must be addressed by more effective use of existing freeway corridors and arterial streets, by additions to the types of light duty vehicles in the region's vehicle fleet mix, and by expansion of alternative transportation modes.

One of the Vision 21 Task Force's findings is that there is a need to develop an integrated, comprehensive, multi-modal transportation plan for Arizona. Such a plan must include roads, rail, transit including buses and light rail, highways, air, bicycles, pedestrians, and freight as well as travel reduction programs, pipelines, electronic transmissions, and telecommunications.

The city's Phoenix Transit 2000 plan recognizes the importance of connections between urban transit systems and other modes of transportation. In addition to private automobile travel, other transportation services in the Valley include commercial air service, private motor coach services, and bicycle and pedestrian modes. The city's development policies should improve opportunities for passengers to make quick and convenient connections between various modes of travel.

Regional transportation studies indicate that traffic density will increase and most freeways and arterial intersections will operate at or over capacity (level of service E and F) during peak traffic hours by 2020. The need for alternative mode choices will increase as the roadway system becomes more congested. With policies of maintaining freeways and arterials at least at near-capacity levels (Level of Service D), and projections of an increasing proportion of facilities operating over capacity (Level of Service F), 15 to 25 percent of trips on freeways and arterials must be shifted to other modes of travel. Most of the shift will have to be to buses and fixed guideway transit, such as the planned light rail system, as bicycle and

FIGURE 1
COMPARISON OF PM PEAK HOUR CONDITIONS ON FREEWAYS IN PHOENIX 2000 AND 2020

Level of Service	2000		2020	
	Number of One Way Miles	Percent of Total	Number of One Way Miles	Percent of Total
A, B or C (Under Capacity)	96	44%	95	33%
D (Near Capacity)	27	13%	37	13%
E or F (At or Over Capacity	92	43%	157	54%
Total	**215**	**100%**	**289**	**100%**

NOTE:
Based on the MAG EMME2 model assuming lane capacity to be 2250 vehicles per hour from the Highway Capacity Manual 2000 for a free flow speed of 55 miles per hour.

pedestrian travel is expected to remain a small portion of total trips on arterials and none on freeways. See the Appendix for a discussion of Level of Service and maps showing recent trends.

Policies:

1. Greatly expand and integrate public transit, pedestrian, bicycle and other alternative modes of transportation into the city's street system to reduce traffic congestion, improve air quality, conserve energy and provide better transportation for those who choose not to or are unable to drive.

2. Plan and design the city's transportation system to help implement the Land Use element's goals while assuring that new transportation facilities are available concurrently with changes in land use.

3. Support the Environmental Planning element goal of meeting air quality standards through efficient use of the transportation system.

4. Support the Land Use element goals of balancing housing and employment in urban villages and encouraging a mixture of land uses in neighborhoods to reduce the length and number of vehicle trips.

5. Avoid negative impacts on neighborhoods and commercial districts occurring as an unforeseen by-product of modifications to the transportation system.

6. Plan and design multi-modal and multipurpose terminals and transfer locations between transportation modes.

7. Encourage timely construction of the freeways and expressways in the adopted Maricopa Association of Governments' Plan. These include:

   - Completion of the South Mountain Parkway
   - Construction of a truck bypass connection to Riggs Road
   - Completion of the Grand Avenue Expressway in Phoenix from McDowell to Camelback roads.
   - Construction of I-10 Collector/ Distributor Roads
   - Completion of SR51 to SR101 and their interchange
   - Completion of SR 101

   See Figure 3 for a map of existing and proposed freeways.

8. Assist with the update of the Maricopa Association of Government's long-range transportation plan.

9. Promote expansion of existing freeways including:

   - Add general purpose lanes on I-17 and the Squaw Peak (SR51)
   - Add high-occupancy vehicle (HOV) lanes and HOV ramps to all freeways and freeway interchanges in Phoenix.

     Transportation planners see HOV lanes as an important alternative that will ease growing freeway congestion, improve air quality, conserve energy and increase mobility and efficiency.

   - Add arterial-street-to-freeway interchanges where needed to support planned growth, and reconstruct or expand interchanges where volumes exceed capacity
   - Add connections to the Black Mountain Parkway from State Route 101 and the Squaw Peak.

10. Support efforts to achieve and maintain at least a level of service D on freeways during peak travel periods.

    To fully accomplish this policy would require about a 25 percent reduction in single-occupancy vehicle traffic projected for most freeways in Phoenix, or a 25 percent increase

in freeway capacity without the corollary increase in demand. No planned activities can accomplish this on existing freeways. New freeways and interchanges should be planned to achieve a level of service D.

11. Upgrade the circulation within each urban village.

    Village planning committees will be consulted during transportation planning projects, and their consent is desired. Their recommendations are forwarded to the Planning Commission and City Council.

12. Improve circulation within neighborhoods that provides more direct access by automobiles, slow-speed vehicles and pedestrians to neighborhood schools, shopping and parks, while deterring cut-through and speeding traffic and promoting the safe and peaceful enjoyment of neighborhoods.

    Slow-speed vehicles include bicycles, mopeds and other vehicles with performance and operating characteristics less than conventional automobiles.

13. Allow operation of trucks only on Truck Routes, through designating Truck Routes and arterial streets, except for delivery and pickup of merchandise, materials or equipment and access to their base of operations.

    Trucks may operate on any arterial street in the city. Through truck routes are Grand Avenue west of the Black Canyon, the Black Canyon Freeway, the Maricopa Freeway, Buckeye Road west of 17th Avenue, and Grant-Lincoln from 7th Street to the Black Canyon.

    As used here a truck is a vehicle with three or more axles and is 36 feet or longer (with the exception of buses and recreational vehicles).

FIGURE 2 - Interchange at I-10 and SR 202 near Pecos Road

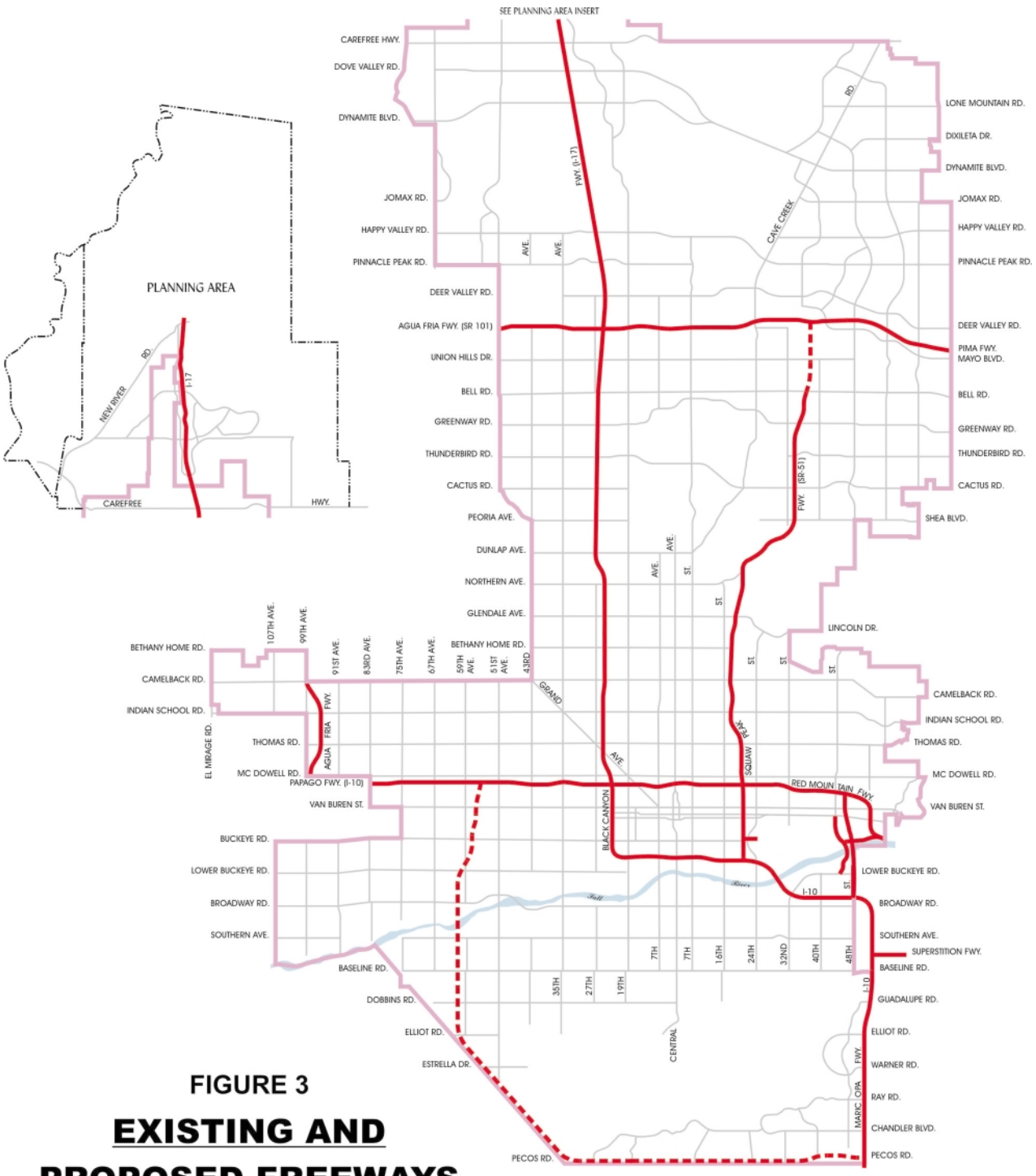

FIGURE 3

EXISTING AND PROPOSED FREEWAYS

EXISTING

PROPOSED

Fire apparatus and mass transit vehicles are also exempt from this policy.

14. Maintain continuity of trails and avoid creating barriers to bicycle, equestrian and pedestrian travel when designing new freeways and arterials.

Recommendations:

A. Require that transportation facilities, sufficient to maintain a level of service D or better during peak travel periods, are available when needed to serve the increased demand resulting from an increase in the intensity of land development with appropriate exceptions consistent with the other goals and policies of the General Plan.

B. Support regional studies of the use of HOV lanes for value lanes or HOT (High Occupancy Toll) lanes.

C. Study the feasibility and desirability of public pathways within neighborhoods to connect houses, shopping, schools and parks, and allow the use of slow motorized and non-motorized vehicles that are prohibited on arterial streets.

This element recognizes that Phoenix has a variety of neighborhood designs. In many older neighborhoods with a grid street pattern, additional pathways are unnecessary. In some newer neighborhoods with cul-de-sac design, the pathways may be very important. The desirability of installing pathways for neighborhood access should be balanced with consideration of any negative impacts on homes adjacent to the pathways.

D. Study proposed alternative transportation corridors and routes, including their social, economic and environmental impacts, prior to adoption.

E. Establish quantifiable objectives, policies and recommendations together with related performance measures, so that the city can monitor program effectiveness.

F. Construct the Rio Salado Parkway between State Route 202 and 7th Street south of the Salt River.

This is intended to be a six-lane, limited-access parkway that will be built using right-of-way other than existing arterial streets. The exact location of the parkway will be determined during a design study that will include consultation with land owners and community groups.

G. Identify a location for the connection of State Route Loop 303 between the west Valley and I-17.

An interim parkway facility may be constructed along the Lone Mountain alignment as approved by the Maricopa Association of Governments (MAG), with continued study of other routes for the permanent freeway.

H. Study ways that transportation facilities and services can provide an adequate level of service to those unable to use an automobile, including those with disabilities and those too young and too old.

I. Study ways to increase public participation in the city's and the region's transportation planning.

J. Study the definition of a truck in the City Code to determine if some heavier trucks with two axles should be restricted to truck routes and arterials for through traffic in Phoenix, as are trucks with three or more axles.

BENCHMARKS:

1. The average time it takes to get to or from work (by all modes) should be 25 to 30 minutes.

2. By the year 2020, there should be no more than 60 miles of one-way freeway segments

that are over capacity (level of service F) on the 289 miles of one-way freeway segments in Phoenix.

3. Within five years of implementation HOV lanes should carry as many person trips as adjacent general purpose lanes.

GOAL 2 **SURFACE STREETS AND PARKING FACILITIES:** A SYSTEM OF STREETS AND PARKING FACILITIES SHOULD BE DESIGNED AND DEVELOPED THAT MATCHES THE CAPACITY AND CHARACTER OF THE STREET WITH THE CHARACTER OF THE AREA AND WITH PROJECTED AUTOMOBILE, TRUCK, BICYCLE AND TRANSIT TRAVEL DEMANDS; SUPPORTS LAND USE AND OTHER GENERAL PLAN OBJECTIVES; MAKES EFFICIENT USE OF THE STREETS; ENHANCES TRAFFIC SAFETY; AND RESULTS IN ADEQUATE PARKING FACILITIES.

Surface street types are shown on Figure 4.

GOAL 2A **ARTERIAL STREETS:** A SYSTEM OF ARTERIAL STREETS SHOULD BE DEVELOPED THAT MEETS TRAFFIC DEMANDS, WHILE SUPPORTING LAND USE AND ENVIRONMENTAL GOALS.

Figure 5 shows a projection of the level of service on arterial streets assuming construction of planned street, freeway and transit facilities. A description of the meaning of level of service and maps showing currently congested arterial intersections are provided in the Appendix. Improving the capacity of arterial streets is one way to address this deterioration in service. Others include increased transit use and transportation demand management.

Improved arterial streets provide measurable benefits to motorists, including improved safety, reduced travel time, improved air quality, and more efficient use of fuel (as a result of reduced delay and interruption of travel). Further, there are substantial benefits to service, delivery and emergency vehicles. Improved arterial streets also benefit pedestrian travel, since all new streets provide sidewalks and most provide bicycle lanes. Improved traffic flow on arterials benefits the transit system through higher bus speeds and safer, more convenient travel for passengers. Finally, there are overall citywide economic benefits that result from modern, attractive arterial streets with safe and smooth traffic flow.

When asked how tax money should be spent, 53 percent of respondents to the General Plan Survey thought widening major streets was very important, while 30 percent said it was somewhat important.

Policies:

1. Support the planned improvement of arterial streets through the five-year Arterial Street Program, while assuring that project design and scheduling is consistent with the General Plan.

   See Figure 6 for a map of existing and planned arterial streets.

2. Guide new construction within street rights-of-way in accordance with the city's Street Functional Classifications and Land Use Definitions in the Street Classification System, and the Street Classification Map.

3. Attempt to achieve Level of Service D or better at signalized intersections during the morning and afternoon peak hours.

   At Level of Service D congestion becomes noticeable, although most people will accept levels of service D at peak hour. A more extensive explanation of level of service is included in the Appendix.

   To fully accomplish this policy would require at least a 15 percent reduction in projected automobile trips on most arterials in the developed portion of Phoenix. Achieving this policy in these areas would require development of transportation systems beyond those currently planned. Current and future planning efforts should identify additional means of improving transportation service.

4. Avoid discouraging pedestrian, bicycle and transit vehicle movements, when expanding intersections to include additional turning and through lanes.

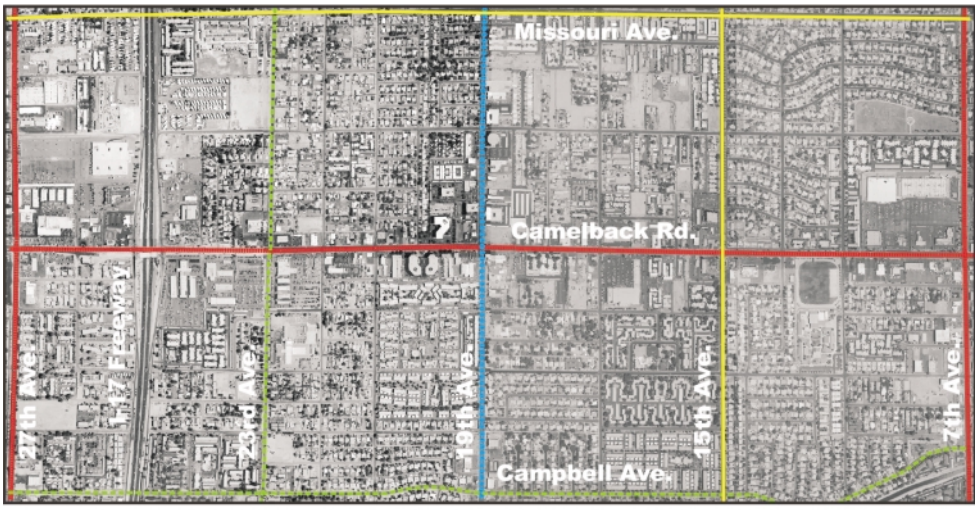

FIGURE 4
SURFACE STREET TYPES

FIGURE 5
COMPARISON OF PM PEAK HOUR CONDITIONS ON ARTERIALS IN PHOENIX 2000 AND 2020

Level of Service	2000		2020	
	Miles of Arterials	Percent of Total	Miles of Arterials	Percent of Total
A, B or C (Under Capacity)	1212	88.50%	1267	80.80%
D (Near Capacity)	87	6.40%	174	11.10%
E or F (At or Over Capacity	70	5.10%	127	8.10%
Total	**1369**	**100.00%**	**1568**	**100.00%**

NOTE:
Based on the MAG EMME2 model and Exhibit 15.2 page 15.3 of the Highway Capacity Manual 2000.

The Manual of Uniform Traffic Control Devises (MUTCD) Pedestrian Warrant System can help determine the need for traffic signals and adequate time to cross streets. The MAG Pedestrian Plan 2000 has flexible performance standards to assure the design of roadways meets the needs of pedestrians and motorists.

5. Evaluate the feasibility of grade-separated crossings where pedestrian crossing is difficult and pedestrian and other travel volume is high. When grade-separated crossings are not feasible, use the Alternative Solutions to Pedestrian Mid-Block Crossings at Canals report to provide guidance for at-grade crossings. A consultant for MAG in association with the city of Tempe prepared this report in 1999.

6. Incorporate features in the design and operation of arterial streets bounding residential areas, that discourage traffic from

cutting through adjacent neighborhoods and complement the residential areas.

7. Maintain straight alignments for both major arterials and arterials unless topography dictates curves, or unless curves are desired to enhance open space vistas or in developed recreational land uses.

8. Increase design standards for arterial streets where topography or other features restricts the ability to provide a full one-mile grid in order to maintain desired levels of service.

9. Prohibit parking both on major arterial and arterial streets.

10. Provide visually attractive environments for those who travel through an area in automobiles and buses, while still retaining an attractive environment for adjacent neighborhoods.

11. Provide appropriate street lighting that accommodates safe night use of streets by vehicles and pedestrians, and promotes security while complying with the city's Dark Sky Ordinance and not adversely impacting residential development.

12. Maintain the pavement management system as a basis for maintaining and enhancing streets in a way that is both cost effective and in accord with General Plan priorities.

13. Provide bus bays at arterial street intersections with bus service.

14. Where feasible, provide bicycle lanes and sidewalks on new arterial streets and add bicycle lanes and sidewalks when arterial streets are widened.

Recommendations:

A. Design and conduct investigations, including test cases, of methods to accommodate slow-speed vehicles crossing arterial streets at intersections.

Slow-speed vehicles include bicycles, mopeds and other vehicles with performance and operating characteristics less than conventional automobiles.

Manufacturers of slow-speed electric vehicles have attempted to establish a viable market here in the Valley. However users are limited by statute to travel on streets of 35 mph or less. As a result they find themselves unable to ride to nearby grocery stores which are frequently located on the opposite side of arterial streets that slow-speed vehicles are prohibited from crossing.

B. Study the design and location of potential "Super Streets" to increase the capacity of major arterial streets. Include in the study an analysis of the environmental impacts and impacts on adjacent neighborhoods.

As used here, "Super Streets" are major arterials that may have an Intelligent Transportation System (ITS), or may have grade separations at congested intersections to increase street capacity. Grand Avenue is being upgraded with grade separations to increase traffic capacity. Grade separation of some key intersections on streets other than Grand Avenue may be required to remove major bottlenecks, and help focus traffic onto key arterial street corridors.

C. Study the use of pricing to reduce traffic demand on arterials.

Congestion pricing is a travel demand management technique whereby road users are charged for the use of roads during periods of peak traffic. Although usually applied to limited-access freeways, it may have some applicability to arterial streets.

BENCHMARKS:

1. No more than 35 percent of arterial intersections should operate at a level of service worse than D by 2020.

Meeting this benchmark would require developing transportation systems beyond those currently planned. Current and future planning efforts should identify additional means of improving transportation service.

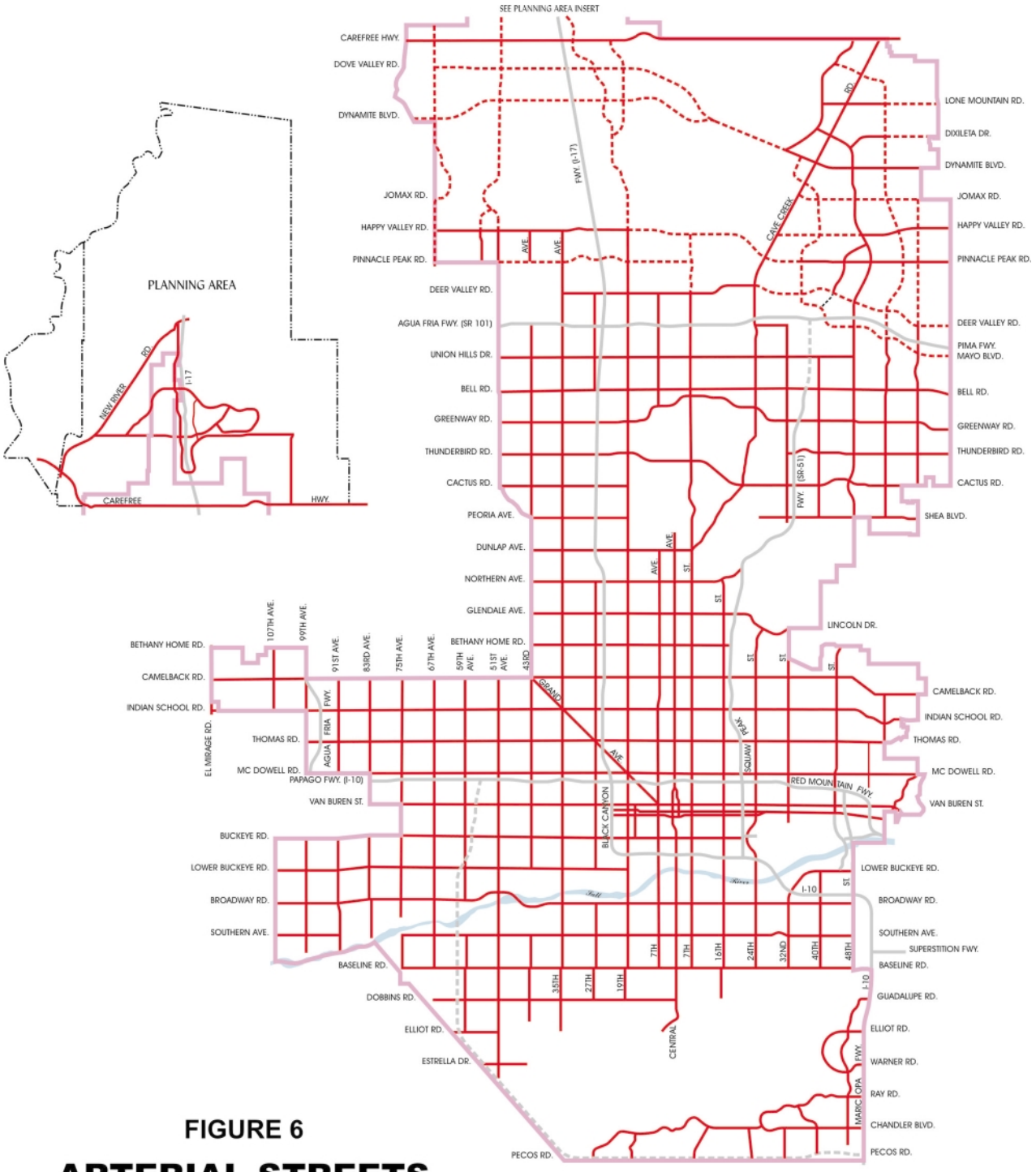

FIGURE 6

ARTERIAL STREETS

— EXISTING

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GOAL 2B **SCENIC CORRIDORS:** SCENIC CORRIDORS SHOULD BE IDENTIFIED AND MAINTAINED TO PRESERVE NATURAL AREAS, VIEWS AND AREAS OF UNIQUE CHARACTER ADJACENT TO ARTERIAL STREETS.

A scenic designation applies to a street that has or is intended to have a special character. The designation does not alter the classification for the street, but it does include special design features and policies. These design features will relate to streetscape design, landscaping in adjacent easements, and policies for compatible design of adjacent development.
A scenic designation should be a continuous feature even though it may pass through several land-use areas. Still, each street designated as scenic should be of intensity and quality that harmonizes with the uniqueness or special character of the selected route.

The basis for selecting a scenic street is:

- Preserving existing natural areas: desert, hills, or mountains.
- Recognizing the existing character or theme of adjacent areas: citrus neighborhood, palm-lined roads, undisturbed desert.
- Designating areas of special or unique character: village core, village boundary, and village's main street.
- Preserving important views: Squaw Peak, Salt River corridor, downtown Phoenix skyline, undisturbed desert.

Existing cases:

The Phoenix City Council designated the portion of Cave Creek Road in the city as a Scenic Corridor in August of 1986. A 205-foot setback from the street centerline is recommended and is actively being pursued.

Baseline Road is another existing case and intended to continue the agricultural flavor of the road through deep setbacks and use of citrus as a predominate landscape material in the setback. This treatment will let the driver, pedestrian, or bicycle rider know they are in a special area. Buildings are to be set back 44 feet from the back of the sidewalk and the setback area is to include two rows of citrus trees.

Carefree Highway Scenic Corridor Design Policies were approved by the City Council on June 11, 1997. These policies require a 205-foot setback from the street centerline, leaving a 135-foot tract of undisturbed land between the street improvements

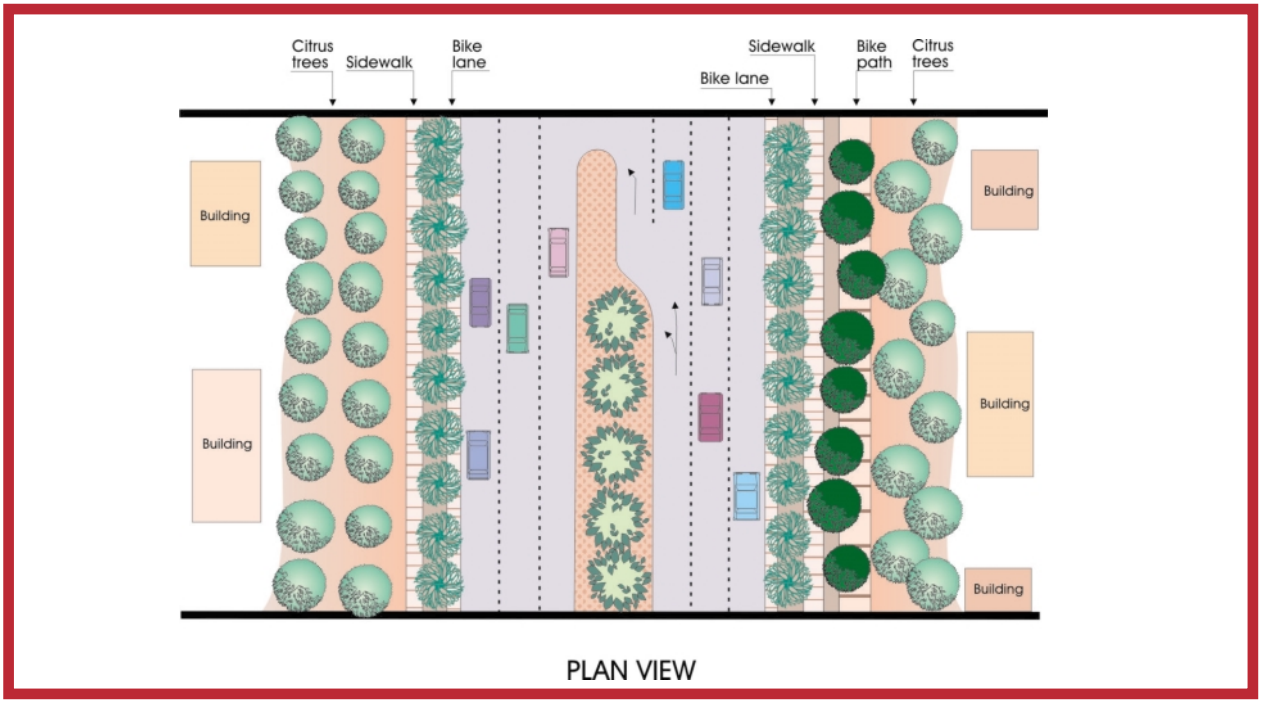


FIGURE 7 - Baseline Road Scenic Corridor

and urban development, except in commercial areas where a 120-foot setback from the centerline is required.

Dynamite Boulevard crossing the Cave Creek Wash.

Policies:

1. Designate scenic corridors that respond to their local environment as well as design goals and policies for adjacent areas.

2. Designation of scenic corridors on the Street Classification Map should be based on a plan that first enumerates goals, policies, and standards of the street.

Recommendation:

A. Amend the Street Classification Map to show Scenic Corridors as a land use category and not as a roadway cross-section and category.

B. Identify methods to ensure that landscaping within Scenic Corridors will be maintained.

GOAL 2C **COLLECTOR STREETS:** RESIDENTIAL COLLECTOR STREETS SHOULD BE DESIGNED OR RETROFITTED SO THEY FACILITATE TRAVEL FROM LOCAL STREETS TO PARKS, SCHOOLS AND

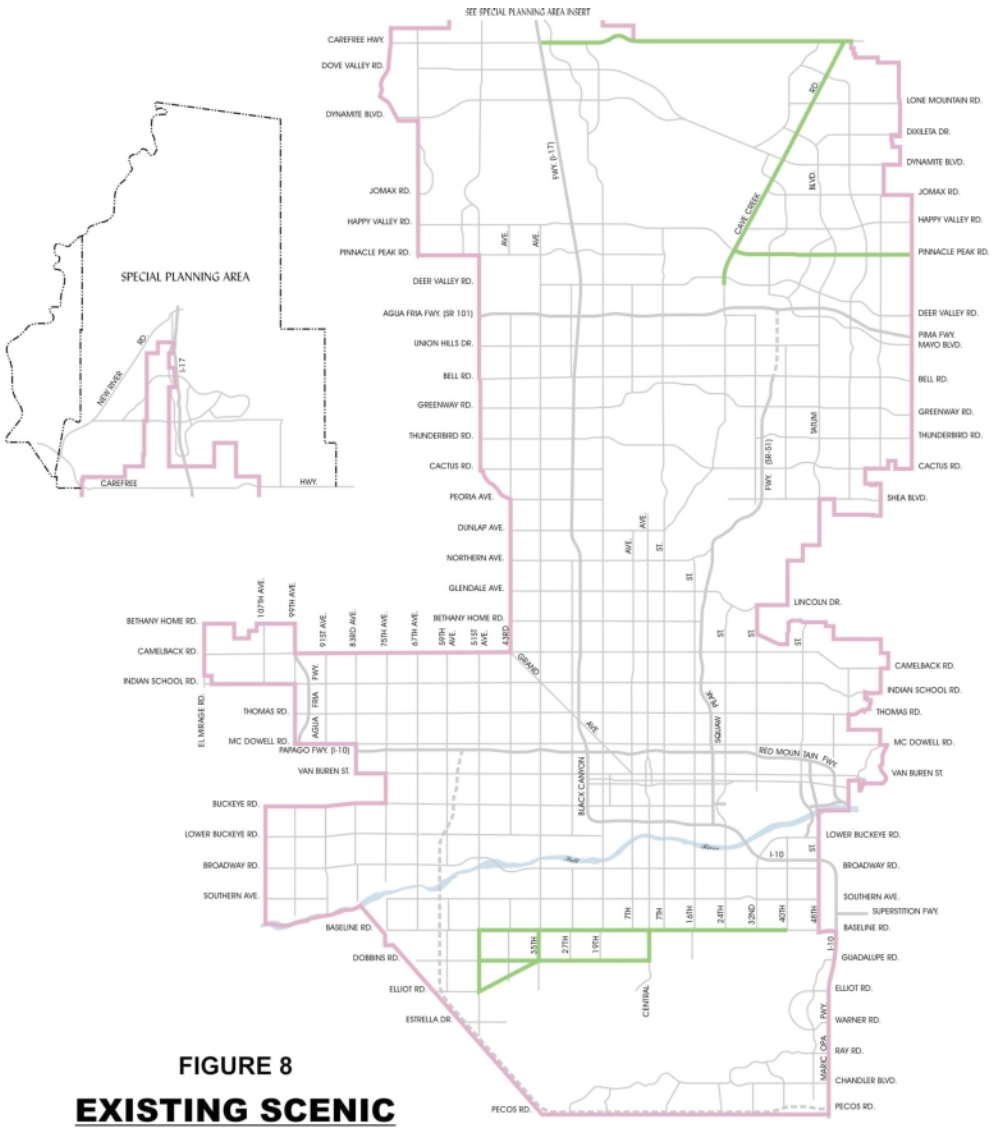


FIGURE 8

EXISTING SCENIC CORRIDORS

SCENIC CORRIDORS

ARTERIAL STREETS WHILE MAINTAINING A SAFE AND ATTRACTIVE NEIGHBORHOOD ENVIRONMENT. COMMERCIAL COLLECTOR STREETS SHOULD BE DESIGNED OR RETROFITTED SO THEY FACILITATE TRAVEL AMONG HIGH TRAFFIC GENERATORS.

Collector streets provide for short-distance trips of less than three miles. Their primary function is to collect and distribute traffic among local streets, elementary schools, neighborhood parks and arterial streets in residential areas, or among land uses that generate high traffic volumes in commercial areas. Increased traffic volume on arterial streets and freeways may cause commuters to use designated collector streets as alternatives to arterial streets. Traffic calming, diversion or rerouting techniques will be needed to address this problem.

See Figure 9 for a map of collector streets.

Policies:

1. Locate the intersections of collector or minor collector streets with arterial streets at half-mile points where topography and land use allow, even though the street alignment may be curvilinear.

2. Design collectors and minor collectors with straight or curved alignments to meet the intended design speed and, in residential areas, consistent with the safe and peaceful enjoyment of the neighborhood.

3. Allow parking on collector streets except where existing traffic conditions, neighborhood safety or welfare require restrictions.

4. Design residential collector streets to facilitate efficient circulation within the neighborhood while discouraging cut-through or speeding traffic - especially from arterial to arterial.

5. Design new residential collector streets with no more than one lane of vehicular traffic in each direction, plus a turn lane if necessary, unless traffic studies in high-density areas show a need for more lanes.

   As used in this policy, "high density areas" refers to land uses adjacent to the collector street. These include high schools and commercial areas.

6. Design retrofit of existing collector streets to balance the need for traffic capacity and turning movements with the need for safe and peaceful enjoyment of the neighborhood.

7. Design collector streets and adjacent sidewalks or trails to facilitate use by pedestrians, low-speed vehicles and bicycles.

8. Require that traffic mitigation plans which include collector streets gain the approval of the surrounding neighborhood, including those likely to use the street.

9. Install street lighting at intersections and on one side of collector streets where there is a justification (neighborhood security, traffic volume or night time accidents), that shows that continuous lighting may be helpful. Residential areas of less than two dwellings per acre require only intersection lighting.

Recommendations:

A. Review existing research on the feasibility of allowing slow-speed vehicles on collector streets. Where research is lacking, conduct investigations, including test cases, of methods to accommodate slow-speed vehicles crossing or otherwise using collector streets and arterial intersections. Recommend actions supported by the review.

B. Study the design and retrofit of collector streets to ensure adherence to appropriate speeds while maintaining their function of providing access to parks, schools and arterial streets.

GOAL 2D LOCAL STREETS: LOCAL STREETS SHOULD BE DESIGNED TO PROVIDE ACCESS BY RESIDENTS AND EMERGENCY VEHICLES TO NEIGHBORHOOD FACILITIES AND COLLECTOR STREETS, WHILE MAINTAINING SAFETY FOR RESIDENTS,

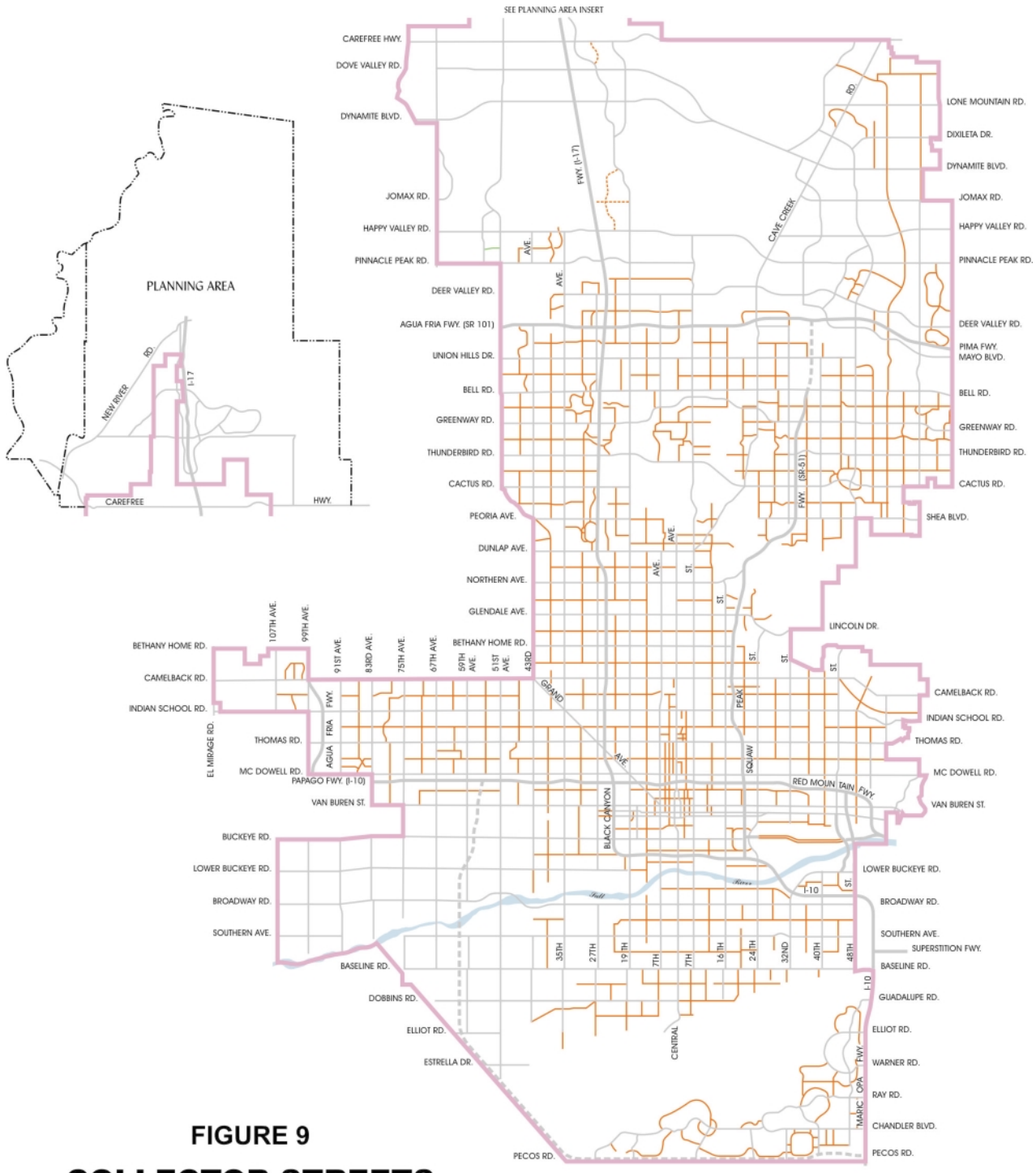


FIGURE 9

COLLECTOR STREETS

EXISTING

PROPOSED

NORTH

PEDESTRIANS AND BICYCLISTS AND ENHANCING THE NEIGHBORHOOD ENVIRONMENT.

Local streets provide for short distance connections within neighborhoods and with collector and arterial streets. They are not intended for through-traffic. Local streets in residential areas are normally designed on a 50-foot right-of-way, with rolled curbs and 32 feet of pavement from back of curb to back of curb. This 32-foot width is often undesirably wide and conflicts with neighborhood design and quality of life issues. Non-linear, curved streets are desirable in residential areas.

Improper design and use of local streets can increase neighborhood deterioration resulting from speeding, nonresident parking, accidents, noise and lack of safe pedestrian areas. When citizens were asked to identify the most important things the city could do to improve their neighborhoods, the two topics suggested most frequently were more police patrols and reducing auto traffic. Reducing neighborhood cut-through traffic was found to be very important by 51 percent of the residents and somewhat important by 31 percent. The Traffic Mitigation Program addresses this issue.

Local streets in new neighborhoods should be designed in a way that they do not provide relief for collector and arterial street congestion. The city recognizes that older neighborhoods, particularly historic neighborhoods in the city's core, were not designed to deter cut-through and speeding traffic. Those neighborhoods may need special attention to deter and calm traffic.

A review of the various forms of physical layout and design of neighborhoods, subdivisions and local communities reveals that some of the newer designs are paying more attention to the amount of connectivity provided residents. Sometimes though, this comes at the expense of other values. For example, local grid streets in neo-traditional developments intersect with a much greater number of vehicle "conflict points" than the modern curvilinear subdivision. This increases opportunities for auto collisions, and thus safety is not necessarily enhanced unless traffic calming is used to reduce speeds and meet the needs of pedestrians and residents. This occurs as a tradeoff between a greater selection of streets and sidewalks to use to get to a specific location, and public safety and expense.

To improve the quality of life in neighborhoods, measures are increasingly being taken to improve the quality of the street environment, reduce through-traffic and reduce traffic speeds. One method used is traffic calming, the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. Traffic calming measures are intended to be self-enforcing. Efforts to improve neighborhoods may also include route modification measures such as diverters, street closures and turn restrictions, and streetscape improvements such as lighting, landscaping and street furniture.

Policies:

1. Continue to design the layout and cross sections of new local streets and retrofit existing local streets to:

   - ❑ Provide a safer environment for residents, pedestrians and children at play
   - ❑ Enhance the appearance and reflect the character of neighborhoods
   - ❑ Reduce cut-through traffic
   - ❑ Reduce truck traffic in residential areas
   - ❑ Reduce excessive speeding
   - ❑ Reduce noise, vibration and air pollution Reduce the severity and frequency of accidents
   - ❑ Accommodate bicycles and slow-speed vehicles
   - ❑ Coordinate their functions with trail systems

2. Modify the design of local streets to support urban or rural character of neighborhoods.

3. Provide for adequate emergency vehicle and refuse collection access in neighborhood circulation systems.

4. Work with neighborhood residents to find ways to deter cut-through traffic, deter non-

residential use and calm speeding traffic on residential local streets.

5. Provide safe, well-maintained and accessible sidewalks on both sides of local streets and design them to be compatible with adjacent neighborhoods. In low-density areas, sidewalks on one side may be replaced with multiuse trails.

6. Require intersection and mid-block streetlights in areas with industrial and commercial zoning.

7. Require intersection and mid-block street lighting in new residential developments with densities of more than two dwellings per acre and only at street intersections in developments with lower densities.

Recommendations:

A. Study additional ways to provide high-quality emergency fire and refuse collection service on local streets designed to limit private vehicle speeds.

B. Consider design standards that would prohibit commercial uses from having driveway access to residential local streets.

C. Consider the results of existing and future research into the effectiveness of traffic calming techniques in the design of new or retrofitting of existing streets.

D. Study a variety of appropriate local street cross sections that could be used in different neighborhoods to promote diversity of design and character.

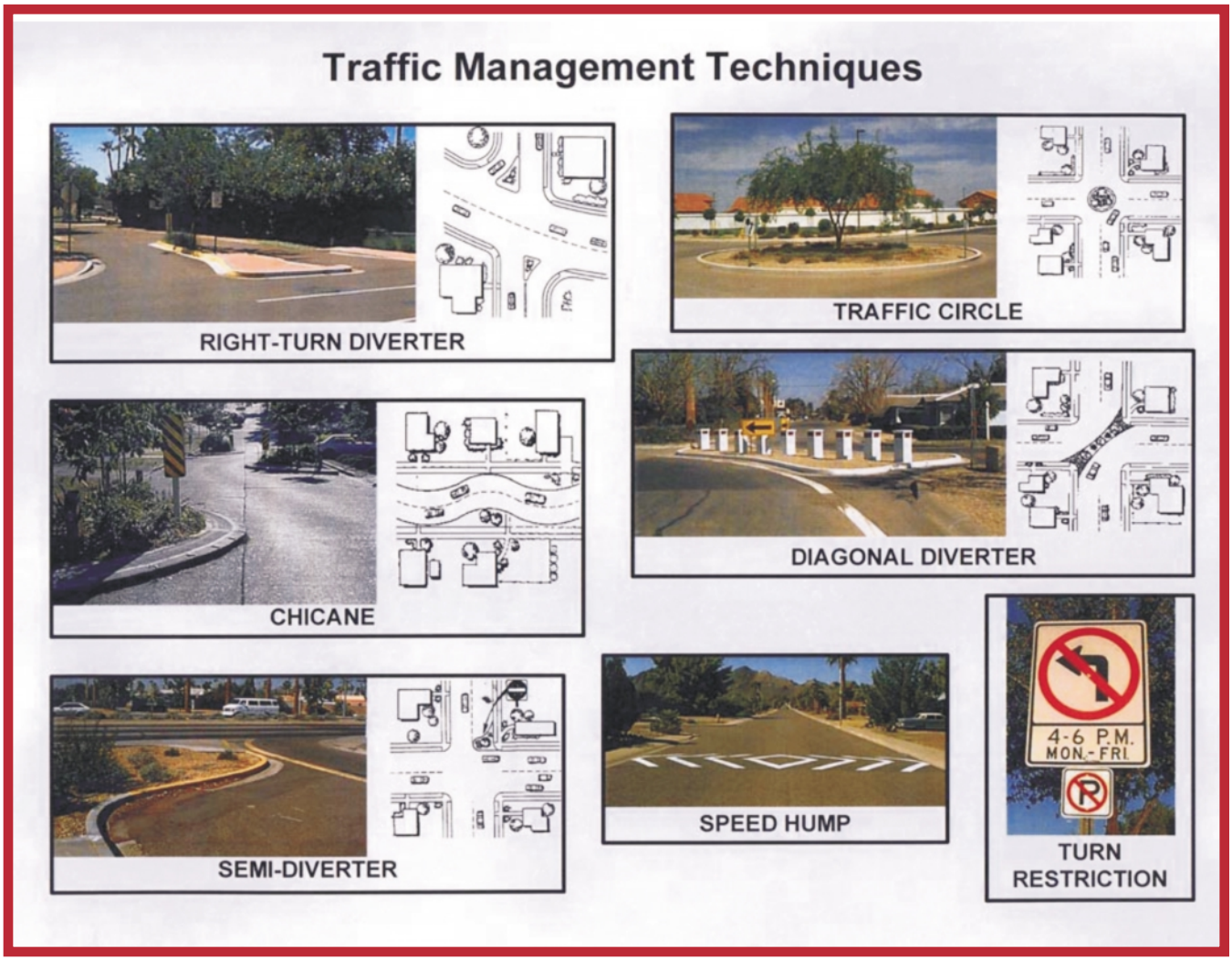


FIGURE 10 - Traffic Management Techniques

GOAL 2E **ALLEYS:** EXISTING ALLEYS IN RESIDENTIAL AREA SHOULD BE SAFE AND WELL-MAINTAINED.

GOAL 2F **PARKING:** STANDARDS SHOULD REQUIRE ADEQUATE PARKING SPACE FOR AUTOMOBILES, MOTORCYCLES AND BICYCLES TO ACCOMMODATE SITE USERS AND TO AVOID NEGATIVE IMPACTS ON SURROUNDING DEVELOPMENT, YET NOT REQUIRE MORE PARKING SPACE THAN IS NEEDED MOST OF THE TIME.

Parking requirements in Phoenix are set out in the Zoning Ordinance by the type and size of use. The Ordinance also has two parking districts, P-1 and P-2, to regulate parking lots and structures. Chapter VI of the ordinance covers off-street parking and loading requirements associated with specific land uses and requires that all parking lots be "dust proofed." This has been an effective way of regulating and providing parking.

Policies:

1. Locate parking in a way that encourages pedestrian and transit use.
2. Include parking for bicycles, motorcycles and slow-speed vehicles in automobile parking lots.

Recommendation:

A. Study the need for electric charging stations in automobile parking lots and implement the results of the study.

3. Encourage design of parking structures to allow conversion to other uses where it appears that parking demand could be reduced.
4. Encourage shared use of parking spaces where the same spaces can be used by different users at different times of the day.
5. Review parking standards as necessary to ensure that parking requirements are adequately met, do not exceed the need, and respond to new types of uses and market conditions.
6. Phase out use of compact parking spaces.
7. Provide shared public parking in urban village cores.

FIGURE 11 - Parking Structure with Non-parking Uses on the Ground Level

8. Promote ground level non-parking uses in parking structures in heavily-traveled pedestrian areas.

9. Encourage providing preferential parking for carpools, and vanpools.

10. Work with neighborhoods to mitigate the negative impacts of nonresident parking.

GOAL 2G TRANSPORTATION SYSTEM MANAGEMENT: THE EFFICIENT USE OF EXISTING FACILITIES AND OPTIMIZATION OF TRANSPORTATION DEMAND AND SUPPLY SHOULD BE PROMOTED THROUGH USE OF TRANSPORTATION SYSTEM MANAGEMENT TECHNIQUES.

Transportation system congestion can be relieved by making the most efficient use of the facilities available. The techniques used are collectively called "Transportation System Management" or TSM. TSM includes:

- Traffic Management - Aimed at improving vehicle movements by increasing the capacity and safety of the existing facilities and systems. Examples are turn lanes, reversible lanes, and bikeways.

- Transit Management - Designed to increase ridership by providing expanded and more efficient public transportation. Bus Rapid Transit, express bus service and special bus lanes exemplify this program.

- Demand Management - Oriented toward reducing trips or the number of vehicles. Ways to do this include ride-sharing programs (carpools and vanpools) and staggered or flexible working hours and telecommuting.

- Restraint Measures - Aimed at discouraging vehicle use mostly through restrictive controls. Some possibilities are reducing or eliminating parking, higher parking fees, and auto-restricted zones.

Recent advances in computer technology, electronics, and telecommunications have reached transportation facilities. The terminology intelligent transportation systems (ITS) refers to integrating technology into transportation infrastructure. In an effort to improve passenger services, increase capacity, and provide better overall system performance, transit systems throughout the nation have begun using ITS.

Advanced technologies include real time traffic signals and ramp meters to smooth traffic flows and maximize capacities. New toll collection technologies are also at hand and can be used to vary toll rates by time of day and level of congestion. Soon vehicles will be equipped with accident-warning devices. In the long term, vehicles could be electronically driven. This could increase road capacity, speeds and safety.

The Phoenix metropolitan area is nationally recognized as a leader in deploying technologies. In 1996, the U.S. Department of Transportation introduced a program called the Model Deployment Initiative (MDI). The Phoenix area was one of four areas selected as a MDI program recipient. The intent of this effort was to encourage the development of ITS that integrates transportation operations into one coordinated system. A portion of this grant funded the implementation of new technology on 11 bus routes. Vehicles that operate on these routes are equipped with automatic vehicle locating devices (AVL), which use global positioning satellites to electronically track the location of the vehicles at all times.

Policies:

1. Develop Intelligent Transportation Systems (ITS) consistent with the Maricopa Association of Governments ITS plan for Arterial Management Systems and Transit Management System.

2. Reduce auto travel by supporting and participating in regional ridesharing programs that offer matching programs, vanpool programs, and favorable parking locations and rates.

   Existing programs include the Regional Public Transportation Authority Rideshare Program, the Maricopa County Trip Reduction, Clean Air, and vanpool programs. These programs require volunteers to

participate and do not mandate changes in travel behavior.

3. Reduce travel by supporting programs facilitating telecommuting, and enhance opportunities for city of Phoenix employees to telecommute.

   In San Diego it is estimated that telecommuting can reduce home to work travel by only 2 percent by 2020. Phoenix should pursue additional measures to achieve a higher reduction.

4. Reduce auto travel by improving service quality of public transportation.

5. Reduce peak-hour travel by supporting both Valleywide and city of Phoenix programs that promote alternative work schedules.

6. Continue expanding the Advanced Transportation Management System to include all traffic signals.

   This is a computer-controlled traffic signal system that dynamically adjusts traffic signal timing. This means that it responds to real-time traffic conditions rather than being pre-programmed to respond to estimates of traffic conditions.

7. Retain the status of the region as a nationally-recognized leader by continuing to research and use advanced transportation technologies.

8. Continue use of reversible lanes on 7th Street and 7th Avenue.

Recommendations:

A. Study opportunities for reducing auto travel by restricting the availability and increasing the price of parking to reflect true cost.

   Participants in the General Plan Survey were asked, "If it cost you $25 or more per month to park your car at work, do you think you would be very likely, somewhat likely or not very likely to consider taking mass transit if the ticket was free?" Very likely was the response of 46 percent while 15 percent said somewhat likely.

   The available information indicates that a fairly high increase in cost is required to achieve a significant reduction in single-occupancy vehicle commuting. In addition, the increase in parking cost must be accompanied by significantly reducing the cost of using transit.

   Efforts restricting the availability of parking must include measures such as residential parking permit programs, which protect surrounding residential neighborhoods.

B. Study opportunities for use of pricing to reduce congestion.

C. Continue to study the use of intelligent transportation systems to improve the routing efficiency of truck traffic through and within Phoenix, and participate on the Maricopa Association of Governments committees addressing this.

D. Continue to study the potential for expanding the use of reversible lanes where favorable factors exist.

   Favorable factors include:

- ❑ Directional split during peak hours of 70/30, i.e., 70 percent of volume in peak direction, 30 percent in off-peak direction.
- ❑ Severe peak-hour congestion - existing and expected to continue for several years into the future.
- ❑ Inability to widen the street or provide congestion relief by widening parallel streets.
- ❑ Ability to prohibit left turns at signalized intersections and to accept the expected increase in left turns made at the intermediate local streets (increase in neighborhood cut-through potential).

Previous studies have shown that no arterial streets, other than the existing portions of 7th Street and 7th Avenue, are satisfactory candidates for reversible lane operation.

GOAL 2H **TRAFFIC SAFETY:** ROAD SAFETY SHOULD BE PROMOTED TO REDUCE THE NUMBER AND SEVERITY OF TRAFFIC ACCIDENTS INVOLVING AUTOMOBILES, MOTORCYCLES, BICYCLES, PEDESTRIANS AND BUILDINGS.

Transportation safety cannot be accomplished through the efforts of one person, group, or government agency. It is a shared responsibility among people who travel, the companies that provide transport, and the government agencies that regulate travel.

The Phoenix Police Department works in partnership with the city's Street Transportation Department, and other local, federal and state agencies, to improve traffic safety through education and enforcement. The city of Phoenix traffic safety coordinator in the Police Department works closely with the Arizona Governor's Office of Highway Safety and the National Highway Traffic Safety Administration to secure grant funding for these endeavors. In 1996, Phoenix began a severe collision reduction plan to reverse the increase in severe and fatal traffic collisions.

The goal of all traffic safety programs is to promote voluntary compliance. Through partnerships with the media, the city of Phoenix has been very successful in carrying traffic safety messages to the community. Unfortunately, education alone is not enough. Enforcement is also an essential component of any traffic safety campaign. The Phoenix Police Department utilizes the latest technologies and innovative techniques to fairly and uniformly enforce traffic laws, ordinances, and regulations.

Policies:

1. Continue and enhance, where feasible, safety programs including:

   - ❑ Physical improvements to the roadways including traffic control devices
   - ❑ educational programs to raise awareness of the public about road safety
   - ❑ Collecting and maintaining collision data
   - ❑ Adjusting speed limits
   - ❑ Enforcing traffic laws.

   More than 196 million registered vehicles and 176 million licensed drivers are on record in the United States. According to the National Highway Traffic Safety Administration (NHTSA), more than 90 percent of fatalities and 99 percent of transportation injuries are from motor vehicle crashes. Annually traffic crashes cost the nation over 40,000 lives; over 3.5 million injuries; and $150 billion in medical costs, lost productivity, and property damage. National Safety Board recommendations for highway safety range from human performance concerns such as driver fatigue, alcohol and drug use to engineering problems such as school bus construction, seatbelt usage, air bag concerns, and highway design.

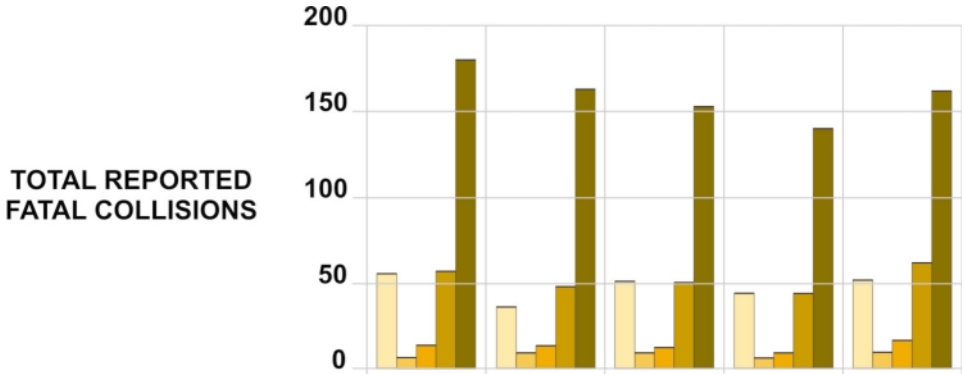
   In 1998, there were 35,621 reported traffic collisions in Phoenix, which represents a 9.8 percent increase from 1997. While injury collisions increased 6.7 percent, fatal collisions decreased 8.6 percent from 1997 to 1998. 1998 marks the third consecutive year of declining traffic fatalities in Phoenix.

   The increase in total collisions largely reflects the increase in population and increase in vehicle miles traveled (VMT) due to a robust economy and fully-employed work force. More people driving on Phoenix streets - and driving longer distances - result in a higher exposure to traffic collisions.

2. Maintain and reinforce partnerships with the Arizona Governor's Office of Highway Safety, educational institutions and local citizen and corporate organizations.

3. Pursue more aggressive enforcement of traffic laws that enhance safety.

4. Maintain pavement markers for both daytime and night time visibility.



YEAR	1995	1996	1997	1998	1999
PEDESTRIAN	56	36	51	44	51
BICYCLIST	7	9	9	6	9
MOTORCYCLIST	14	13	12	9	16
DRINKING/DRIVING	57	48	49	43	61
ALL TYPES	180	162	152	139	161

FIGURE 12

FATAL COLLISIONS

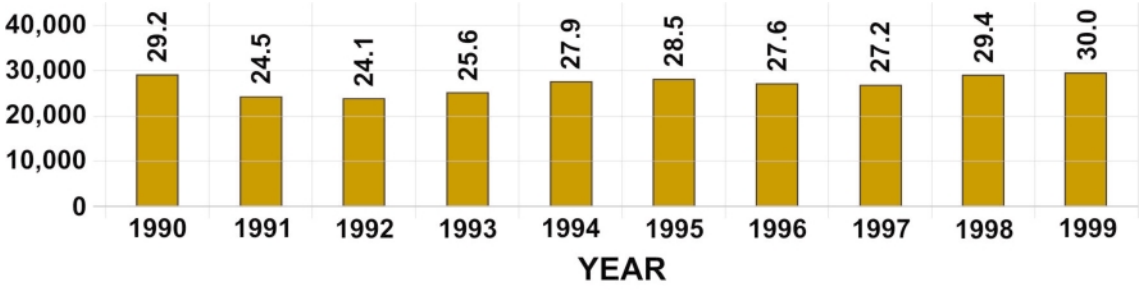


FIGURE 13

COLLISIONS PER 1,000 PHOENIX RESIDENTS

Of the Total Collisions
1.4 percent involved motorcycles (6.5 percent of fatal crashes)
4.1 percent involved pedestrians and bicycles (36 percent of the total fatal)

5. Maintain and improve programs promoting safe driving.

6. Include consideration of the safety of pedestrians and bicyclists in traffic safety programs.

Recommendations:

A. Continue to identify and prioritize the high-risk roadways by monitoring their yearly collision records, and make recommendations to improve safety on these roadways.

B. Continue to identify a set of objectives for any safety recommendations, including improvements and programs that allow evaluation of their effectiveness for several years.

C. Continue to collect more accurate and consistent data, in partnership with the Arizona Department of Transportation, and maintain it in advanced computer systems.

D. Continue to establish means for involved government and community organizations to have easy access to collision records.

E. Increase the visibility of bike lanes and crosswalks at schools and shopping areas.

BENCHMARKS:

1. Annual traffic fatalities per 100,000 people in the city of Phoenix should be reduced to below the average for the United States by 2020.

2. Annual traffic accidents per 100,000 licensed drivers in Phoenix should be reduced to below the average for the United States by 2020.

GOAL 2I STREET NAMING AND NUMBERING: STREET NAMES SHOULD CONTINUE TO BE ASSIGNED IN ACCORD WITH MARICOPA ASSOCIATION OF GOVERNMENTS' POLICY, AND STREET NUMBERS SHOULD BE SET BY ASSIGNING EVEN-NUMBERED ADDRESSES ON THE NORTH AND WEST SIDES OF STREETS AND ODD NUMBERS ON THE SOUTH AND EAST SIDES.

Street naming in metropolitan Phoenix has been standardized and is governed by the MAG Street Name Policy. In general, new streets in line with existing streets are named for the existing street. Addresses are assigned by the city of Phoenix Development Services Department according to a guide adopted by the City Council in 1904. This guide established the practice of giving even-numbered addresses on the north and west sides of streets with odd numbers on the south and east sides.

Policies:

1. Ensure that street numbers in commercial areas are of a size, color and design that allows their rapid identification from vehicles traveling on adjacent streets.

2. Ensure that street name signs are replaced as needed to provide adequate visibility at night.

3. Provide the earliest possible identification of arterial street intersections for approaching vehicles.

   This may include illuminated street signs or signs in advance of the intersection showing the name of the next arterial cross street.

4. Continue street naming in accord with the Maricopa Association of Governments policy.

GOAL 2J BUILDING SETBACK REQUIREMENTS: BUILDING SETBACKS OR BUILD-TO LINES SHOULD CONTINUE TO BE MEASURED FROM THE FUTURE RIGHT-OF-WAY LINES ON THE STREET CLASSIFICATION MAP.

As it relates to streets, a building setback is the minimum distance between the building line and the street side lot line over which most parts of a building may not extend. Minimum building setbacks (also known as build-to lines) are established in the Zoning Ordinance for each zoning district. The ordinance

requires all building setbacks to be measured from the future right-of-way lines shown on the Street Classification Map. This reduces the cost of new street construction, because no new building will have setbacks encroaching into the right-of-way and less compensation will be required.

GOAL 3 **URBAN PUBLIC TRANSIT:** URBAN PUBLIC TRANSIT AND RELATED FACILITIES AND SERVICES SHOULD BE SUPPLEMENTED AND EXPANDED TO ENCOURAGE GREATER USE OF TRANSIT, REDUCE TRAFFIC CONGESTION, INCREASE THE EFFECTIVE PERSON-CARRYING CAPACITY OF THE ROADWAY SYSTEM, IMPROVE AIR QUALITY, CONSERVE ENERGY, AND PROVIDE BETTER TRANSPORTATION OPTIONS FOR THOSE WHO CHOOSE NOT TO OR ARE UNABLE TO DRIVE.

City of Phoenix residents approved Transit 2000, a plan that calls for a balanced transit system with various service elements. The Transit 2000 plan includes local bus, Dial-A-Ride, bus rapid transit, light rail transit, limited stop service, and neighborhood bus service. These are described in the Appendix.

About 70 percent of bus riders do not have access to an automobile. Transit service should allow improved access for both those who can't drive and those who can't afford to drive. A critical component of improving transportation service is also to increase transit use by those that choose not to drive.

As noted under the multi-modal goal, avoiding a continuing deterioration of the level of service on arterials and freeways will require that 15 to 25 percent of projected peak-hour trips in automobiles must be shifted to mass transit, without increased street and freeway capacity. This proportion of trips is much higher than can be accommodated on planned transit systems.

Policies:

1. Expand all forms of mass transit service to significantly increase the proportion of all trips using transit and reduce the proportion of trips in automobiles.

2. Provide transit route frequencies appropriate to the convenience and volume of riders.

3. Promote efficient and convenient connections between transit modes.

4. Promote the use of public transit.

5. Give priority to village cores when locating transit centers that provide connection of transit or people movers within cores to regional transit routes.

6. Facilitate bicycle use of transit facilities.

7. Consider private taxi service to be a part of the public transit system and facilitate transfers between mass transit facilities and taxis.

Recommendations:

A. Continually monitor new and existing transit services to ensure that services such as local bus and neighborhood circulators provide convenient connections to and from other existing and future services such as bus rapid transit and light rail transit.

BENCHMARKS:

1. Transit usage in the metropolitan area should increase from 37.5 million transit boardings annually (30.8 million on the city of Phoenix Transit System) to 76.2 million boardings by 2020.

2. Transit productivity, measured in total passenger boardings per mile, should increase to between 2.5 to 2.7 by 2020.

GOAL 3A **BUS AND DIAL-A-RIDE SYSTEM:** THE BUS AND DIAL-A-RIDE SYSTEM SHOULD MEET THE DEMAND FOR THE RANGE OF SERVICES NEEDED FROM DOOR-TO-DOOR TO NEIGHBORHOOD CIRCULATORS, AND TO LOCAL BUS ROUTES, AND SHOULD PROVIDE CONNECTIONS TO BUS RAPID TRANSIT AND FIXED GUIDEWAY TRANSIT SYSTEMS.

Local bus service is the primary mode of public transportation in the city of Phoenix. Current local bus routes vary in frequency and hours of operation.

As a result of the grid pattern of the street infrastructure, most of the routes are aligned to provide traditional grid travel between most origins and destinations. Figure 14 shows the location of current local bus service.

Transit 2000 will result in local bus service on all major streets in the city. Local buses will run from 5 a.m. to midnight Monday through Saturday, and from 6 a.m. to 10 p.m. on Sundays and holidays. Weekday service will operate every 15 minutes during the peak hours (5 to 9 a.m. and from 3 to 7 p.m.), and at least every 30 minutes the rest of the day.

Limited-stop bus service is an additional level of bus service designed to serve the longer distance, suburb-to-suburb commute trips. Limited-stop routes are in addition to the regular local bus routes, and run during peak periods only. Limited-stop routes are different from local routes because they only stop about once every mile, while local routes typically stop every quarter-mile or less. By overlaying limited stop-service on the same corridor as local bus service, passenger travel times can be reduced by as much as 25 percent.

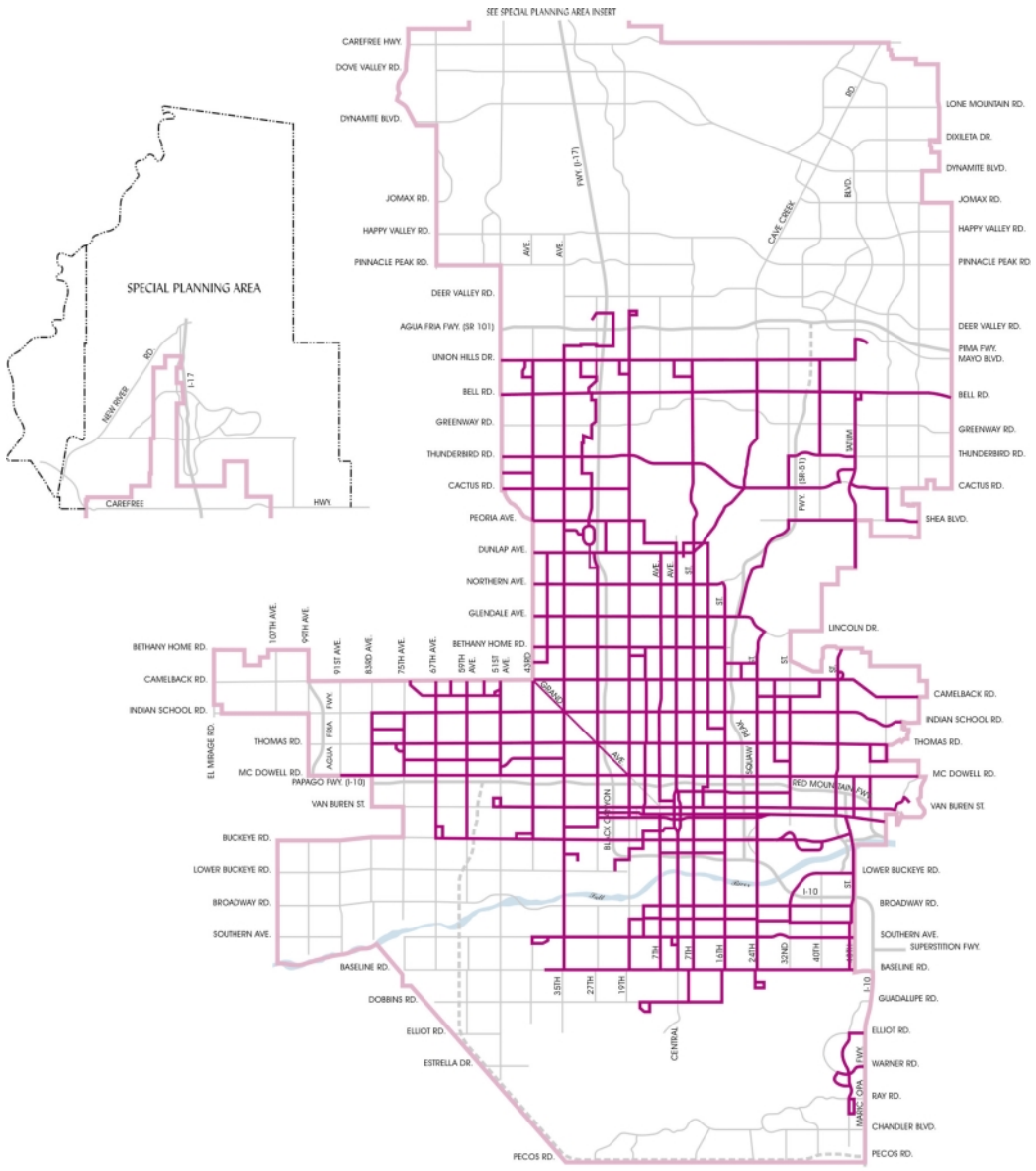


FIGURE 14

LOCAL BUS SERVICE

— BUS ROUTES

Bus rapid transit service, along with a supporting network of Park-and-Ride lots and high-occupancy vehicle (HOV) facilities, helps to reduce traffic congestion within heavily traveled corridors, providing a more balanced transportation system. Bus rapid transit service is designed to provide an alternative mode for persons traveling to and from work, and thus helps to replace peak-period automobile trips and reduce auto emissions. Bus rapid transit replaces express bus service. Figure 15 shows planned bus rapid transit routes.

Neighborhood bus service is an integral element in a comprehensive public transportation system that also includes regional fixed-route bus and bus rapid transit services. Conventional bus routes operate with large vehicles along arterial thoroughfares to maximize access to large numbers of riders. There are some neighborhoods isolated from these conventional services by geographic elements that break up the standard grid pattern of routes. Neighborhood circulators typically use smaller buses that provide greater flexibility and routing within a small geographic area. Such service has two functions. One is to connect passengers to regional bus routes and rapid transit services from within residential neighborhoods or other locations not served by the regional system. The second is to operate neighborhood routes that serve a number of trip origins and destinations lying close to each other.

The neighborhood bus concept also provides an effective way of serving the public transportation requirements of many seniors for whom conventional bus service is inappropriate and Dial-a-Ride unnecessarily expensive to supply. Transit 2000 will provide two demonstration neighborhood bus routes, one in the Ahwatukee area and one in the Desert Foothills area.

Dial-a-Ride provides same-day, door-to-door demand response service to seniors age 65 and over and persons with disabilities. Dial-a-Ride also provides complementary paratransit service that is fully compliant with the Americans with Disabilities Act. This ADA Dial-a-Ride service provides mobility to city residents and visitors that are unable to access or utilize the fixed-route transit service. The Phoenix reserve-a-ride system also provides mobility for seniors focused on trips to senior centers and other similar specified destinations.

Policies:

1. Continue implementing the transit improvements detailed in Transit 2000.

   - ❑ Expand frequency of service on bus routes
   - ❑ Expand hours of service on bus routes
   - ❑ Expand area served by bus service

2. Significantly expand the public bus system to provide service over more of the day and to a larger area.

   When residents were asked how tax money should be spent, 64 percent thought expansion of bus service was very important and 24 percent thought it was somewhat important. Seventy-eight percent of Black respondents and 72 percent of Hispanic respondents said expanding bus service was very important.

3. Serve existing and future land use and development patterns through converting meandering bus routes to a grid pattern.

   Grid-based bus routes more accurately reflect the city's street pattern.

4. Incorporate the recommendations of long-range transit plans, when they are adopted, into the General Plan.

5. Support the development of transit services within the city of Phoenix which are part of a broader regional transit system.

6. Expand the size and number of Park and Ride lots, and enhance them to accommodate a wide range of travel modes including buses, carpools, vanpools, low-speed vehicles, bicycles and pedestrians.

7. Provide direct high-occupancy vehicle access to Park-and-Ride lots.

8. Include the public in the design of new transit services to ensure that new and existing services will meet or are meeting the needs of the community.

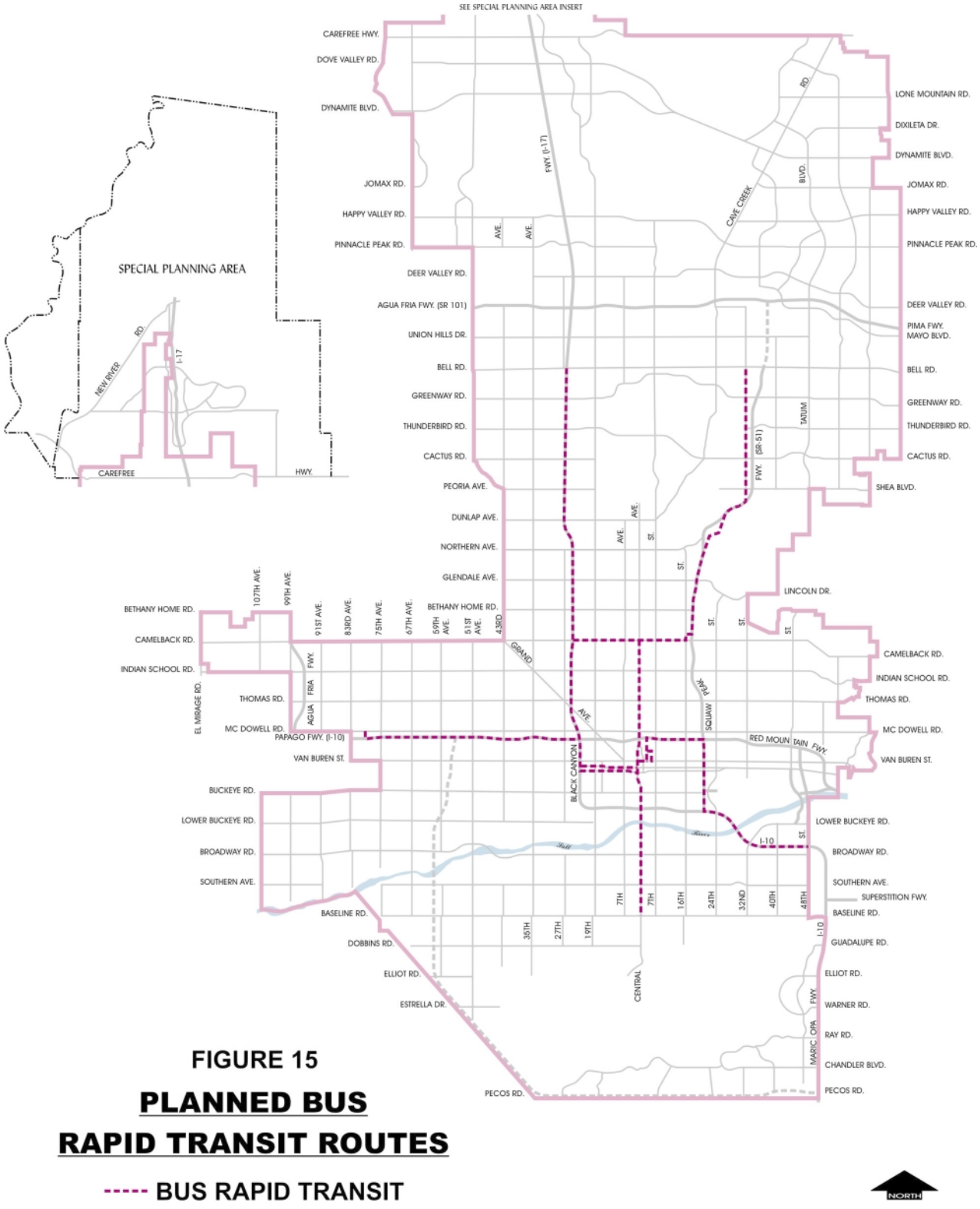


FIGURE 15

PLANNED BUS RAPID TRANSIT ROUTES

----- BUS RAPID TRANSIT

9. Continue to provide bicycle racks on all buses.

FIGURE 16 - Photo of Bus with Bicycle Rack

10. Provide enhanced services for the passenger encumbered with such things as baby carriages and small shopping carts.

11. Expand the use of shade structures and safety features at bus stops.

Recommendations:

A. Complete construction of the bus terminal in the I-10 median under Hance Park.

When the inner loop tunnel of I-10 was constructed, provisions were made for a bus terminal in the median. Funds have not been available to complete construction of the terminal. In addition, its full benefit can only be achieved after high-occupancy vehicle lanes are added to the intersections of I-10 and the Squaw Peak and Black Canyon freeways.

B. Explore options to increase the availability of low-maintenance public restrooms and other passenger conveniences for transit riders, such as water fountains, public phones, and shade structures. The design of these facilities should deter crime, graffiti and vandalism.

C. Consider new cooperative services and operational and financial arrangements to complement transit and Dial-a-Ride services by using a special class of taxi services.

Transit users have potential safety and security problems and some delay situations that auto travelers do not encounter as a rule. Going to and from the bus stop, and being left standing when buses are delayed, are examples. The personal time and anxiety associated with these conditions are especially onerous if you are, for example, a low-income temporary worker with young children in day care. Or, coming home late at night in a high-crime neighborhood with two or three blocks between the bus stop and home. Using taxis in new ways might be a solution to such situations.

D. Evaluate the benefits of adding phones, or transit stop hardware and software, to transit stops to assist transit customers in determining bus routes and arrival times.

BENCHMARKS:

1. A total of 50 percent of all housing units should be within one-quarter mile of a bus stop and 80 percent within one-half mile.

GOAL 3B **RAIL TRANSIT SYSTEMS:** LIGHT RAIL TRANSIT SERVICE SHOULD BE PROVIDED IN CORRIDORS WHERE DEMAND FOR TRANSIT SERVICE EXCEEDS THAT WHICH CAN REASONABLY BE PROVIDED WITH BUSES.

Light rail transit offers high-speed, high-capacity transit service in corridors where the demand for transit ridership is beyond what can reasonably be provided with buses. Light rail stops about every mile and can carry up to 450 people per train during peak periods of the day. Light rail attracts both peak-hour work trips and all-day general purpose trips, because it connects major activity centers throughout the region.

FIGURE 17–Simulation of Light Rail on Central Avenue

The "Transit 2000" plan proposes a total of 24 miles of light rail transit. A 17-mile line would operate from Metrocenter through downtown Phoenix, to the north side of Sky Harbor Airport and continuing to Tempe. With current funding, an additional seven miles would be built along one of the freeway corridors yet to be determined, where travel demand warrants.

Figure 18 shows the selected light rail routes and the corridors identified for additional routes.

Policies:

1. Facilitate the timely construction of the light rail transit system approved in the Transit 2000 Plan.

   - ❑ By 2006 from the airport through downtown Phoenix to Chris-Town Mall
   - ❑ By 2010 to Metrocenter
   - ❑ By 2016 add an additional 7 to 10 miles of rail line

2. Expand the funded light rail system to serve northeast, northwest, west, south and southeast Phoenix, eventually including the Desert Ridge and North Gateway cores.

   MAG's Valley Vision 2025 suggests that these additions could include light rail on dedicated right-of-way, which may provide faster and more flexible services over long distances. In the very long-term, the planned light rail system may need to be grade-separated to avoid conflicts with traffic.

   When residents were asked how tax money should be spent, 50 percent said adding light rail transit was very important and 29 percent said it was somewhat important. Sixty-six percent of Black respondents said adding light rail was very important.

3. Reserve exclusive transit rights of way along the Central Avenue corridor, in primary and secondary cores, and in other locations targeted for fixed-guideway transit.

4. Acquire development rights as appropriate, in corridors and locations targeted for fixed-guideway transit.

5. Accommodate bicycles on light rail vehicles.

6. Design light rail routes to facilitate synchronized transfers with other transit service.

Recommendations:

A. Complete the development process for the light rail transit project and begin constructing the rail line in 2003.

B. Initiate the process for extending the light rail system to Metrocenter.

C. Initiate major investment studies for future light rail corridors.

D. Find funding to connect the light rail system to other nearby cities that approve and build light rail systems.

GOAL 3C ACCESSIBILITY TO TRANSIT FACILITIES: THE USE OF PUBLIC TRANSIT SHOULD BE FACILITATED BY IMPROVING PEDESTRIAN AND BICYCLE ACCESS TO TRANSIT FACILITIES AND ACCOMMODATING BICYCLES AND PEDESTRIANS AT TRANSIT FACILITIES.

Ensuring the best accessibility to public transportation in the planning and design of new developments, requires a shift in the single focus which has been placed on the automobile in site

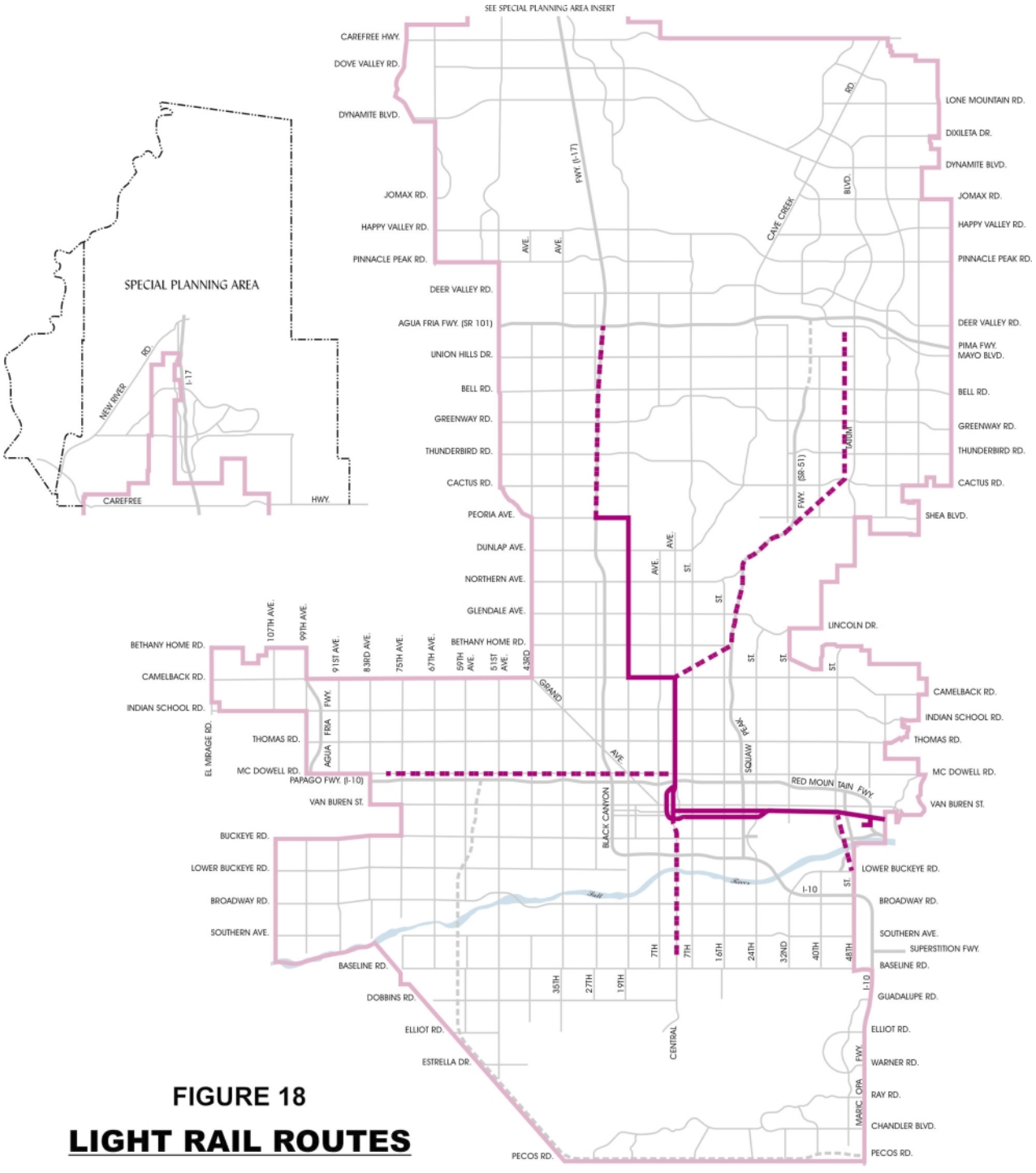


FIGURE 18

LIGHT RAIL ROUTES

FUNDED

POTENTIAL
(Alignment to be determined)

NORTH

planning and design. A transit-oriented development pattern places increased emphasis on the pedestrian and transit rider by providing improved access in an environment that is more hospitable to both. The importance of the automobile is not reduced; however, it is reoriented so that pedestrian and transit riders have a level of access and convenience that is comparable to that afforded to automobile passengers.

The city should develop a set of transit-oriented development guidelines to assist both the public and private sectors in understanding the purpose and need for transit-friendly development in our region. Also see Goal 7 on transit-oriented development in the Land Use element.

Policies:

1. Provide safe and interesting pedestrian and bicycle paths to transit facilities from residences and commercial development.

2. Visually connect streets and byways to transit stops.

3. Provide pedestrian access between residential areas and commercial areas near transit stops in new neighborhoods, and pursue addition of pedestrian access in existing neighborhoods.

   Many of the neighborhoods constructed since 1950 have a street pattern based on curvilinear streets, cul-de-sacs and perimeter walls. This often requires a long walk or bicycle ride to get from houses that are a short distance from a bus stop. New neighborhood designs should avoid this condition, and existing neighborhoods should be studied for opportunities to reduce the length of pedestrian, bicycle and automobile trips to bus stops and commercial areas. See Figure 19.

4. Connect local streets to allow convenient auto, pedestrian and bicycle circulation within neighborhoods and to adjacent activities, while discouraging cut-through traffic in the neighborhood.

   Many of the neighborhoods constructed since 1950 have a street pattern based on curvilinear streets, cul-de-sacs and perimeter walls. This often requires a long walk or bicycle ride to get from houses that are a short distance from a park school, bus stop or shopping. New neighborhood designs should avoid this condition, and existing neighborhoods should be studied for opportunities to reduce the length of pedestrian trips to bus stops. See Figure 20.

5. Include in new neighborhood design direct pedestrian access to bus stops from neighborhoods.

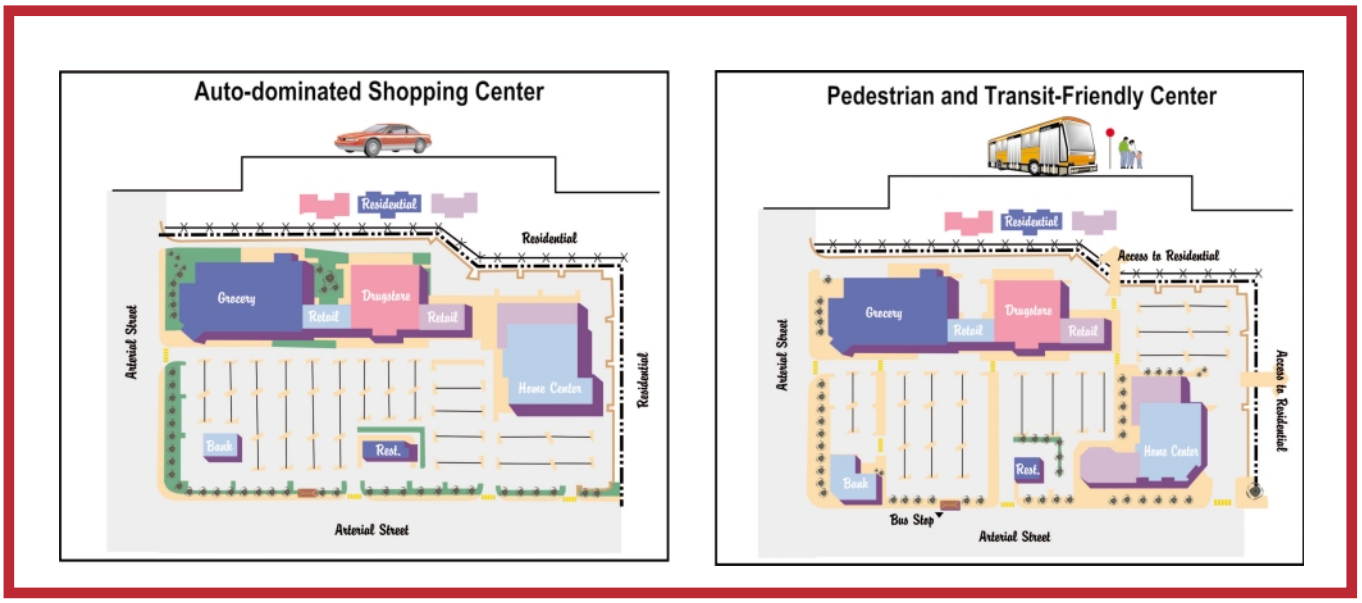


FIGURE 19 - Auto Vs. Transit-friendly Development

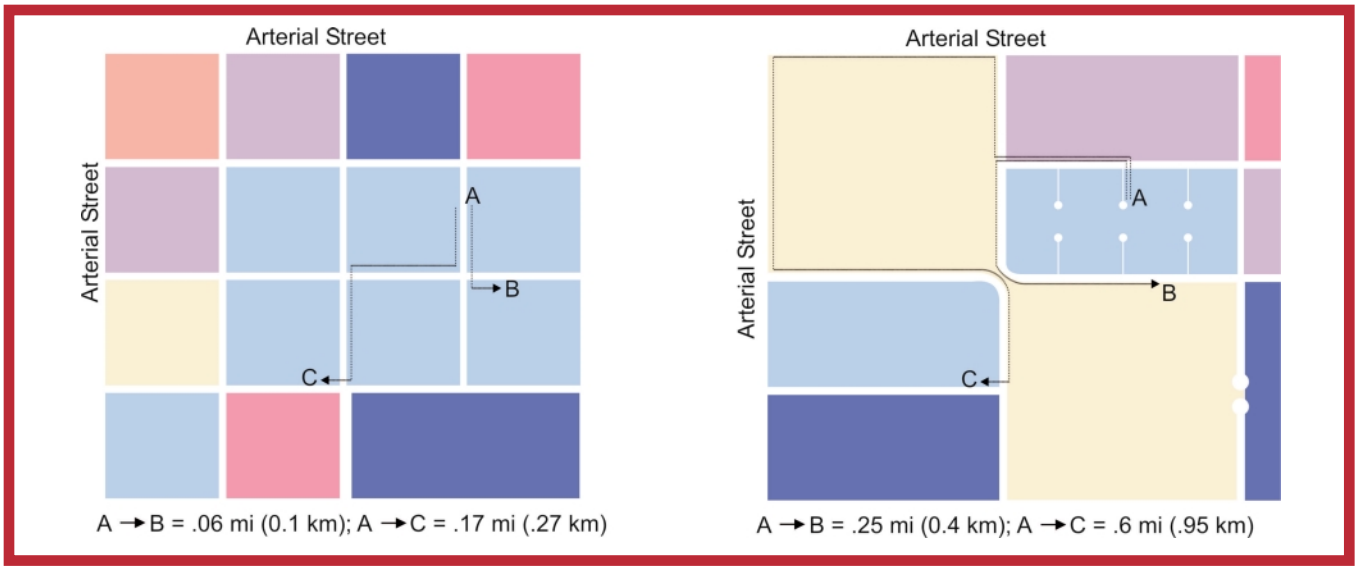


FIGURE 20 - Street Patterns

Bus stops are normally located every one-quarter mile along a local bus route. Many of the neighborhoods constructed since 1950 have a street pattern based on curvilinear streets, cul-de-sacs and perimeter walls. This often requires a long walk to get from houses that are a short distance from a bus stop. New neighborhood designs should avoid this condition. Often a short pedestrian path from a cul de sac to an arterial street can provide the connection.

6. Coordinate the location of transit stops and access to gated communities. See Figure 21.

7. Ensure that security measures incorporated into developments do not preclude access to transit facilities and that the security is not breached.

   Perimeter walls and gates often make access to transit facilities difficult or inconvenient. Neighborhood residents should be able pass through gates on pedestrian and bicycle pathways to access transit facilities.

8. Create exclusive bike lanes along appropriate arterial and connector streets to supplement the use of local streets for access to transit.

9. Establish bicycle routes to and from transit stops and from the transit stops to major destinations, giving priority to major transit passenger facilities.

   A bicycle-friendly environment leading to the station or stop is a major factor in bicycle-transit use. Bicycle lockers and racks add to this environment.

10. Pursue opportunities for developing accessways at mid-block or one-quarter mile locations on transit routes in developed portions of the city, to provide more direct access from neighborhoods to transit facilities.

    Many of the neighborhoods constructed since 1950 have a street pattern based on curvilinear streets, cul-de-sacs and perimeter walls. This often requires a long walk or bicycle ride to get from houses that are a short distance from a bus stop. Existing neighborhoods should be studied for opportunities to reduce the length of pedestrian and bicycle trips to transit stops, such as using bicycle and pedestrian pathways.

11. Provide bicycle racks and lockers at transit centers.

GOAL 3D TRANSIT SYSTEM SAFETY AND SECURITY: TRANSIT CUSTOMERS AND OPERATORS SHOULD BE PROVIDED A LEVEL OF SAFETY AND SECURITY THAT PROMOTES THE DEMAND FOR TRANSIT AND THE WILLINGNESS OF TRANSIT EMPLOYEES TO PROVIDE TRANSIT SERVICE.

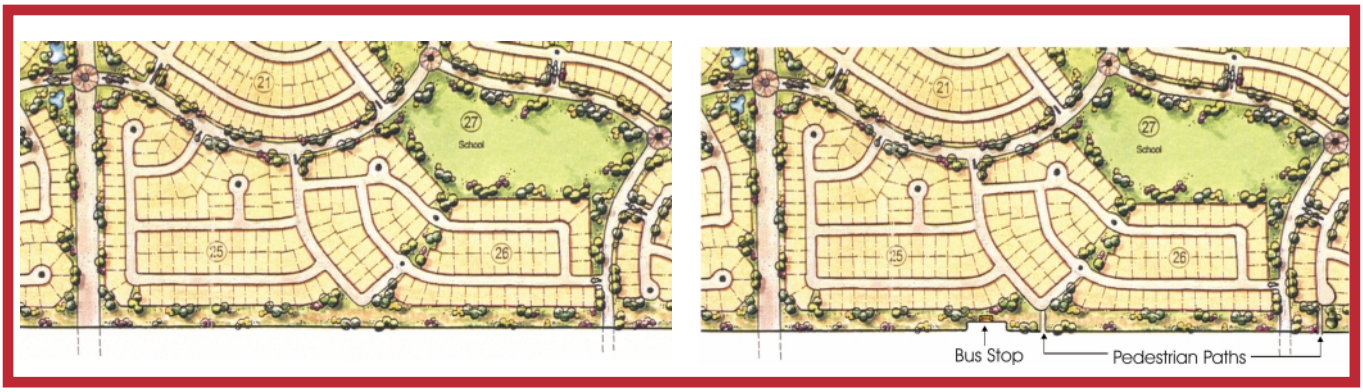


FIGURE 21 - Existing and Proposed Design with New Policy

Policies:

1. Provide transit customers and operators with a safe and secure environment at transit stations and on transit vehicles.

2. Expand transit security presence and continue to provide accommodations for police at transit passenger facilities.

3. Utilize Crime Prevention Through Environmental Design (CEPTED) guidelines in developing all transit facilities.

Recommendation:

A. Provide secure extensions of transit service in locations where potential transit riders choose not to ride transit or not to make trips because of unsafe environments at one end of the trip.

GOAL 4 **PEDESTRIAN AND BICYCLE CIRCULATION:** FACILITIES FOR THE BICYCLE RIDER AND PEDESTRIAN SHOULD BE DEVELOPED AND DESIGNED IN A MANNER THAT INCREASES THE PROPORTION OF SHORT TRIPS AND SOCIAL AND RECREATIONAL TRIPS TAKEN BY RIDERS AND PEDESTRIANS.

Since approximately 40 percent of all trips are less than two miles in length, bicycling and walking can help relieve roadway congestion if people choose to walk and bike instead of driving for short trips. Bicycling and walking can be practical for all types of trips, such as to the grocery store, the video rental store and school. These trips can be made either on roads or off roads on separate paths. In a 1995 poll conducted by Rodale Press (a publisher specializing in health and fitness topics), over one-third of non-cyclists said they would start riding to work if they had access to safe bike lanes on roads and highways.

In addition to being cost-effective, providing an on-road system for bicyclists and pedestrians is also important to help bridge major obstacles such as rivers, freeways and railroad tracks. Since these features can pose significant barriers to human-powered transportation, incorporating design features into roadway systems specifically for bicyclists and pedestrians, such as dedicated rights-of-way or controlled access crossings, further meets goals of increasing bicycle and pedestrian travel. A well-designed system of interconnected paths and trails can create additional non-motorized travel opportunities for those who feel uncomfortable riding their bicycles or walking along busy roadways.

The MAG Regional Off-Street System (ROSS) Plan includes a vision statement that residents should have safe, convenient access to an attractive, shared-use, non-motorized transportation system that provides a viable alternative to driving for local trips such as those to work, school, shopping and leisure activities. The following policies are identified as goals in the ROSS Plan.

Policies:

1. Provide sufficient, convenient access to the non-motorized off-street transportation system that is highly visible to existing and potential users.

2. Develop an off-street system of paths and trails that is safe for a variety of users.

3. Connect origins and destinations with paths and trails, and link paths and trails to the

existing on-street transportation system and other transportation modes.

4. Develop a system of paths and trails that considers the needs of users and potential users.

5. Use the MAG Regional Off-Street System Design Guidelines for designing off-street pedestrian and bicycle paths.

   These guidelines are based on factors that affect path and trail use by pedestrians, bicyclists, equestrians and special populations such as children and the elderly. These include distance traveled, perception of safety, convenience, access and linkage.

GOAL 4A PEDESTRIAN CIRCULATION: PEDESTRIAN WALKWAYS SHOULD BE DESIGNED AND DEVELOPED TO INCREASE PEDESTRIAN USE BY PROVIDING AND MAINTAINING A SAFE, CONVENIENT AND ENJOYABLE WALKING ENVIRONMENT.

Walking is the most basic form of transportation, and often the quickest way to make short trips in urban areas. To encourage greater pedestrian activity, more facilities must be provided. Without safe and convenient walkways and paths, few people will walk. People can be encouraged to bike and walk through the use of promotional campaigns that portray a positive image of walkers, emphasize the benefits of walking, and provide information about the drawbacks associated with reliance on the automobile. (From MAG Valley Vision 2025)

When possible, Phoenix will follow the MAG Pedestrian Area Policies and Design Guidelines and the Pedestrian Plan 2000, to assure appropriate design. The MAG Pedestrian Plan 2000 has flexible performance standards to assure the design of roadways meets the needs of pedestrians and motorists.

See the pedestrian-oriented development goal 6 in the Land Use element for additional goals and policies on the land use aspects of this subject.

Policies:

1. Improve motorists' understanding of the need to share the roadway with non-motorized travelers, especially at intersections and crosswalks.

2. Continue and enhance pedestrian safety education programs to improve observance of traffic laws, and to promote safety for pedestrians of all ages.

3. Provide amenities such as shade on at least 50 percent of the walking surface, plus lighting, seating, drinking fountains, trash receptacles, adjacent green spaces and emergency telephones in areas with a high-density of pedestrian activities.

4. Provide pedestrian passageways at the ends of cul-de-sacs, allowing access to transit stops and to schools, parks and commercial centers when street connections are not feasible, giving due consideration to neighborhood security.

5. Provide lighting on approved trails through parks and other off-street areas, to achieve safe routes after dark. In developing areas appropriate lighting will be a requirement for development approval. In existing areas and public parks, the city will provide the lighting on approved trails.

6. Design pedestrian facilities to provide access for children, the elderly and persons with disabilities.

7. Consider the feasibility of grade-separated crossings of freeways and arterials for pedestrian and bicycle travel, at locations where pedestrian and bicycle travel is significant and the freeway or arterial provides a barrier to safe movement.

8. Set signal timing at street intersections and street-trail intersections to allow safe crossing by all classes of pedestrians, including the elderly.

9. Provide transportation facilities such as people movers and low-speed trams to encourage pedestrian travel in urban village cores.

Recommendations:

A. Require pedestrian circulation plans to be submitted along with vehicular circulation plans as a part of reviewing new development proposals.

B. Investigate the feasibility of using the Roadside Pedestrian Conditions Model to determine the appropriate lateral separation between pedestrians and motor vehicle traffic, including adjustments for the width of buffers between sidewalks and roadways, on-street parking, and using trees or other protective barriers in the buffer, and implement the results of the investigation.

   The Roadside Pedestrian Conditions Model is a reliable scientific method that reflects the pedestrians' sense of comfort while walking along a given roadway. The model was developed in 1998 and has been adopted by several metropolitan areas and state departments of transportation across the United States. See the Appendix for more information on the model.

GOAL 4B **BICYCLE CIRCULATION:** INCREASE BICYCLE ACCESS, RIDERSHIP AND SAFETY IN ACCORD WITH THE BICYCLING ELEMENT.

GOAL 5 **AVIATION**

GOAL 5A **AIRPORTS:** A SAFE, WELL-PLANNED, AND FISCALLY SOUND AIRPORT SYSTEM SHOULD BE DEVELOPED, OPERATED AND MAINTAINED IN A WAY THAT MEETS THE NEEDS OF THE TRAVELING PUBLIC, ITS TENANTS AND ITS VARIOUS AVIATION USERS.

The city of Phoenix Aviation Department owns and operates Phoenix Sky Harbor International Airport, Phoenix Deer Valley Airport and Phoenix Goodyear Airport. Together this system of airports provides modern, convenient aviation facilities for everyone to use from the largest commercial or military transport, to the smallest, lightest general aviation aircraft. Through these airports, Phoenix is conveniently connected to the entire world and serves as the Gateway to the Southwest. Figure 23 shows the locations of city of Phoenix airports.

Phoenix Sky Harbor International Airport, 4.5 miles east of downtown, is the state's major airport. It is located on approximately 3,175 acres of land. Primary access to the airport is via Interstate 10 from the west and south, and via State Route 202 from the east. Three passenger terminals are occupied by 20 airlines, which provide non-stop service to 98 cities in the United States and around the world. Four cargo terminals provide approximately 363,600 square feet of covered space, occupied by approximately 20 tenants. Phoenix Sky Harbor International Airport is the 11th-busiest airport in the world in terms of passengers, and the 5th-busiest in terms of aircraft landings and takeoffs. In 1999, Phoenix Sky Harbor handled 33,554,347 passengers and 331,584 tons of freight.

Phoenix Deer Valley Airport, located 17 miles north of downtown Phoenix, is classified as a general aviation reliever airport for Phoenix Sky Harbor International Airport.

Phoenix Deer Valley Airport has been experiencing recent steady growth. Aircraft take-offs and landings have increased to over 300,000 in the last 12-month period, making Deer Valley the 45th busiest airport in the United States. Current averages are

FIGURE 22
EXISTING AND FORECAST ANNUAL OPERATIONS SKY HARBOR AIRPORT

Operation Type	2000	2005	2015
Total Aircraft Operations	580,000	671,000	671,000
Total Passenger Traffic	36 Million	42 Million	42 Million
Total Air Cargo (Tons)	375,000	750,000	750,000

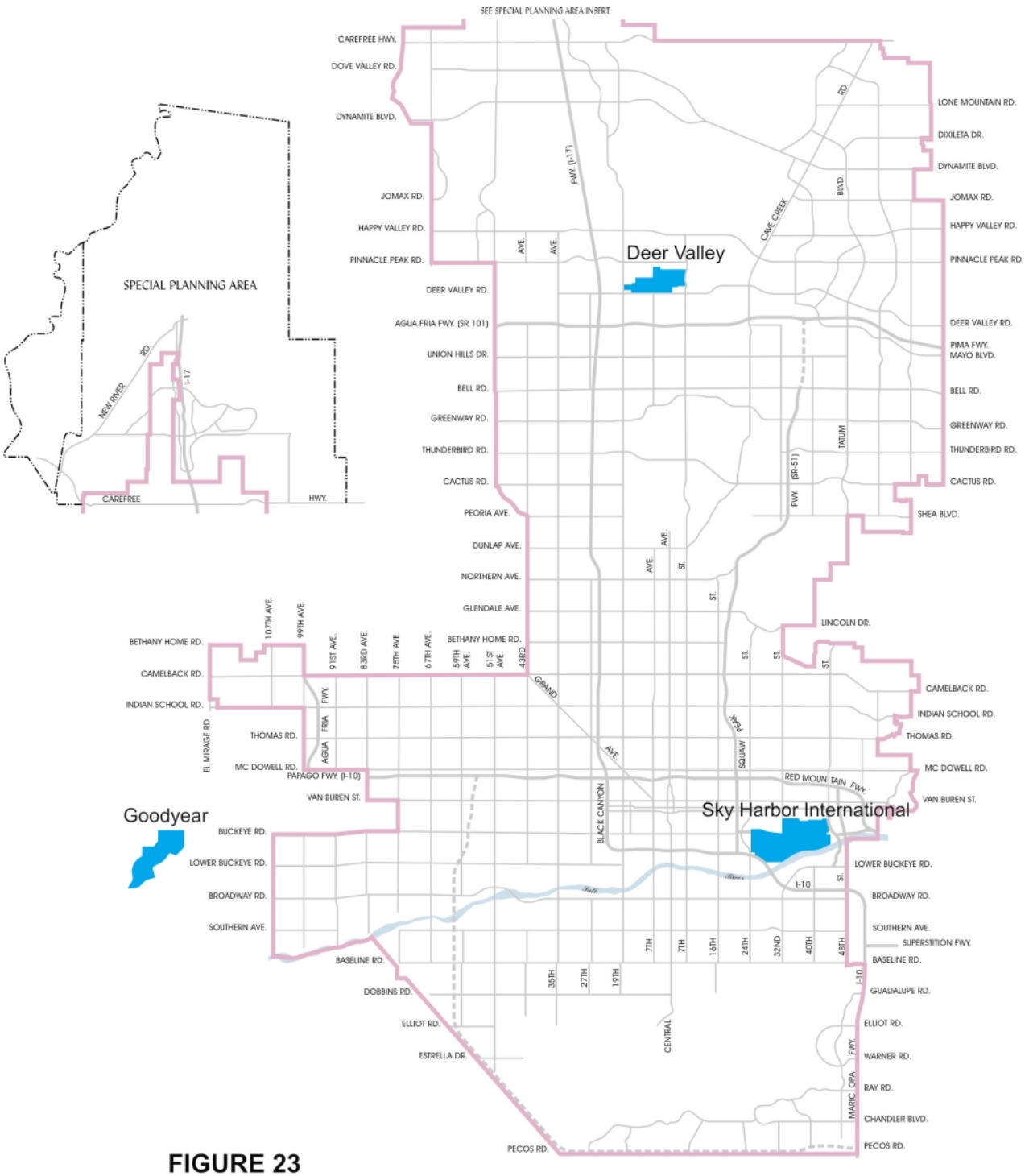


FIGURE 23

PHOENIX AIRPORTS

1,000 operations per day. These are the highest figures since the boom year of 1979. The average growth in aircraft operations over the last five years has averaged 7 percent per year. Deer Valley recently acquired an additional 120 acres. Some of this land will be used for developing additional corporate hangars. Deer Valley has installed an additional 234 T-hangars, which gives the airport the ability to have over 1,000 aircraft based there.

Phoenix Goodyear Airport, located outside the city of Phoenix boundaries in the west Valley, is also classified as a general aviation reliever airport for Phoenix Sky Harbor Airport. Phoenix Goodyear Airport has also been experiencing rapid growth. Total aircraft operations from 1997 to 2000 increased 16 percent from 116,187 to 142,458. Fuel sales increased 29 percent over one year selling 628,252 gallons of aviation fuel. Goodyear is home to 197 aircraft. Improvements in 1999 included the construction of new terminal building and 78 new T-hangars.

The Phoenix Airport System, including Sky Harbor, Deer Valley and Goodyear airports, contributes an enormous amount to the greater Phoenix economy annually, at no cost to taxpayers:

- Contributes $16.3 billion to greater Phoenix annually
- Maintains 24,600 jobs with a payroll of $763 million
- Generates 14,000 aviation-related jobs off the airports with a payroll of $456 million
- Expected economic impact by the year 2005 is $22 billion

Arizona's 1996 exports of cargo by air totaled $7.4 billion (in value), the 7th-largest in the United States. The value of Phoenix exports is growing by more than $1 billion annually. Phoenix freight forwarders export more than one million pounds of cargo per month each to Asia and Europe. Some of Phoenix's largest exporters include Intel, Motorola, Honeywell, McDonnell Douglas and Allied Signal.

Policies:

1. Develop the terminals and facilities at the city's three airports to meet future aviation needs and to further the economic development of the Phoenix metropolitan area consistent with state, regional, and local economic development policies.

2. Identify locations for additional airports and secure sufficient land to provide for expansion of capacity when the current three airports reach capacity.

3. Maintain and enhance the attractiveness of Phoenix Sky Harbor International Airport as an airline hub while providing facilities to meet the needs of domestic, regional and international air carriers.

4. Develop the airports and terminal buildings using concepts that are flexible and adaptable to changing conditions in the airline and transportation industry.

5. Enhance the ability of the city's three airports to reduce environmental impacts on the community and handle future demand through careful land use planning and zoning. Locate improvements to the airport in a manner that will minimize the adverse effects of land acquisition, noise, and air pollution on the community. Encourage airport development in cooperation with interactive community plans and development policies.

   See the Land Use element for a discussion of policies and recommendations related to aircraft noise on noise-sensitive land uses.

6. Continue fostering the use of reduced emissions vehicles and refueling stations for vehicles and vehicle fleets serving airport operations, tenants, employees and passengers.

7. Encourage the wider use of alternative-fuel vehicles by commuting airport and tenant employees. Consider financially collaborating with others to support the location of refueling stations; for example, at strategically located Park-and-Ride lots about the region.

Recommendations:

A. Provide delay-free access to the airport from the regional highway system, and support the provision of a people mover system connecting the Sky Harbor terminals with remote parking facilities and the consolidated rental car facility. Connect the people mover system to the planned light rail system with access to downtown Phoenix and neighboring cities.

   Seventy-one percent of respondents to the General Plan Survey said that direct transit access to Sky Harbor airport was very important, and 23 percent said it was somewhat important.

B. Foster the design and use of a method of positively identifying, reporting, and citing excessive noise-producing aircraft departing, arriving or operating in the vicinity of Sky Harbor, Deer Valley, and Goodyear airports.

C. Increase international airline service.

D. Plan for a fourth runway north of the existing runways at Sky Harbor to permit the airport to continue its current role and function as the principal air carrier airport in Arizona.

E. Build a consolidated car rental facility.

F. Replace surface parking lots with parking structures.

   When asked which improvements to Sky Harbor are most important, 50 percent of the respondents said more short-term parking was very important, and 31 percent said it was somewhat important.

G. Connect the terminals with the car rental structure, parking structures and light rail transit system, by a people mover.

GOAL 5B HELIPORTS AND HELISTOPS: HELICOPTER LANDINGS SHOULD BE RESTRICTED TO DESIGNATED HELIPORTS OR HELISTOPS APPROVED THROUGH THE SPECIAL PERMIT PROCEDURES OF THE PHOENIX ZONING ORDINANCE.

Helicopters play a small but conspicuous role in the transportation scene. They are widely used by public safety, health care and news organizations. Because they can land almost anywhere and depart quickly, many unauthorized landings occur in Phoenix. Authorized landings are permitted at helistops and heliports. A helistop is a designated landing area used for the landing and taking off of helicopters for the purpose of picking up or discharging passengers or cargo. No fueling or service facilities are permitted. A heliport is any helistop that also includes all necessary passenger and cargo facilities, fueling service, helicopter maintenance and other service facilities.

The Sky Harbor International Airport Terminal III - Helistop, located on top of the six-story auto parking structure (adjacent to passenger terminal 3), is among four public use facilities used by the 100 helicopters that operate within Maricopa County. The helicopter landing site, a 60 x 60 foot pad, was opened in 1994. The T-3 Helistop is considered the hub of the Valley of the Sun Heliport Network, consisting of public use heliports in Mesa, Glendale and Chandler plus 98 other private-use heliports located within the county. Users of the T-3 Helistop include private, commercial, aerial ambulance and police helicopter operators, who find the location convenient and vital to their mission and intermodal transportation.

The Helicopter Association International urges sponsors of helicopter facilities to use professional heliport planners and also requests an airspace evaluation that is routinely processed by the FAA. If an airspace evaluation is complete, the heliport is listed as an aerodrome.

Policies:

1. Promote well-planned helicopter transport as a supplement to the community's multimodal transportation system in a way that avoids adverse impacts to residential neighborhoods.

   Recommendations:

   A. Support a detailed heliport study for the Phoenix area.

B. The Maricopa Association of Governments sponsored a heliport study in 1998. This document needs to be updated.

C. Study the possible development of a full-service heliport with a small passenger lobby at Sky Harbor International Airport.

Sky Harbor currently has a heliport on Terminal 3.

GOAL 6 INTERMETROPOLITAN RAIL SYSTEM: INTERMETROPOLITAN RAIL CONNECTIONS SHOULD BE PROMOTED.

Phoenix is served by the Burlington Northern Santa Fe by a connection to the Los Angeles to Chicago main east-west line at Williams, Arizona. The Union Pacific Railroad also provides service to Phoenix with a branch off the main line from Los Angeles to Tucson and El Paso. The Union Pacific's principal terminal in Arizona is in Tucson with a rail yard, and mechanical and locomotive maintenance facilities. There is also a branch off the Union Pacific main line to Nogales, permitting Phoenix to Nogales rail service. Amtrak service is provided on the Union Pacific and Burlington main lines, but does not come into Phoenix.

Figure 24 shows the locations of railroads in Phoenix.

Policies:

1. Maintain and enhance the capacity of railroads to provide freight service to Phoenix.

2. Provide the citizens of Phoenix with the choice of accessible railroad passenger service as well as interstate highways for their intermetropolitan journeys.

3. Support the extension of Amtrack or other passenger rail service to Phoenix.

4. Support study of high-speed rail connections between Tucson and Phoenix, including service to Phoenix Sky Harbor International and Tucson airports.

5. Support the study of a high-speed rail connection between Phoenix and Yuma, with connecting service to Los Angeles.

6. Encourage coordination of rail service and street signals.

GOAL 7 TRANSPORTATION SYSTEMS AND THE ENVIRONMENT: THE ADVERSE IMPACTS OF TRANSPORTATION SYSTEM CONSTRUCTION AND OPERATION ON AIR AND WATER QUALITY, NOISE AND THE URBAN HEAT ISLAND SHOULD BE MINIMIZED.

The impact of transportation systems on the environment is discussed in Goals 1, 7 and 8 in the Environmental Planning element.

GOAL 8 FINANCING TRANSPORTATION SYSTEMS: SUPPLEMENTAL FUNDING SHOULD BE SUPPORTED FOR PLANNING, BUILDING, ACQUIRING, MAINTAINING AND OPERATING ARTERIAL STREETS; EXPRESSWAYS; COLLECTORS AND LOCAL STREETS, PUBLIC TRANSIT SERVICE, FACILITIES, AND EQUIPMENT; AND AIRPORTS.

Transportation funding needs to be adequate to support transportation services, infrastructure and maintenance. These funds need to be raised in an equitable manner. The public makes a large financial commitment to build and maintain transportation infrastructure. The funding and administration of various transportation systems occur at different levels of government. For example, most of the older freeways were funded with the federal gas tax, while most of the new freeways are regionally funded with a one-half cent sales tax approved by Maricopa County voters in 1985 for 20 years.

While the construction of local streets is usually funded by private developers, the city through its Development Services, Planning, and Street Transportation departments, approves the design and requires adherence to its standards and specifications. The city contributes even more significantly to the arterial street system. Traffic operations, street maintenance and improvements, public transit and aviation (Sky Harbor, Deer Valley and Goodyear airports) are also important transportation functions of the city. Funding for

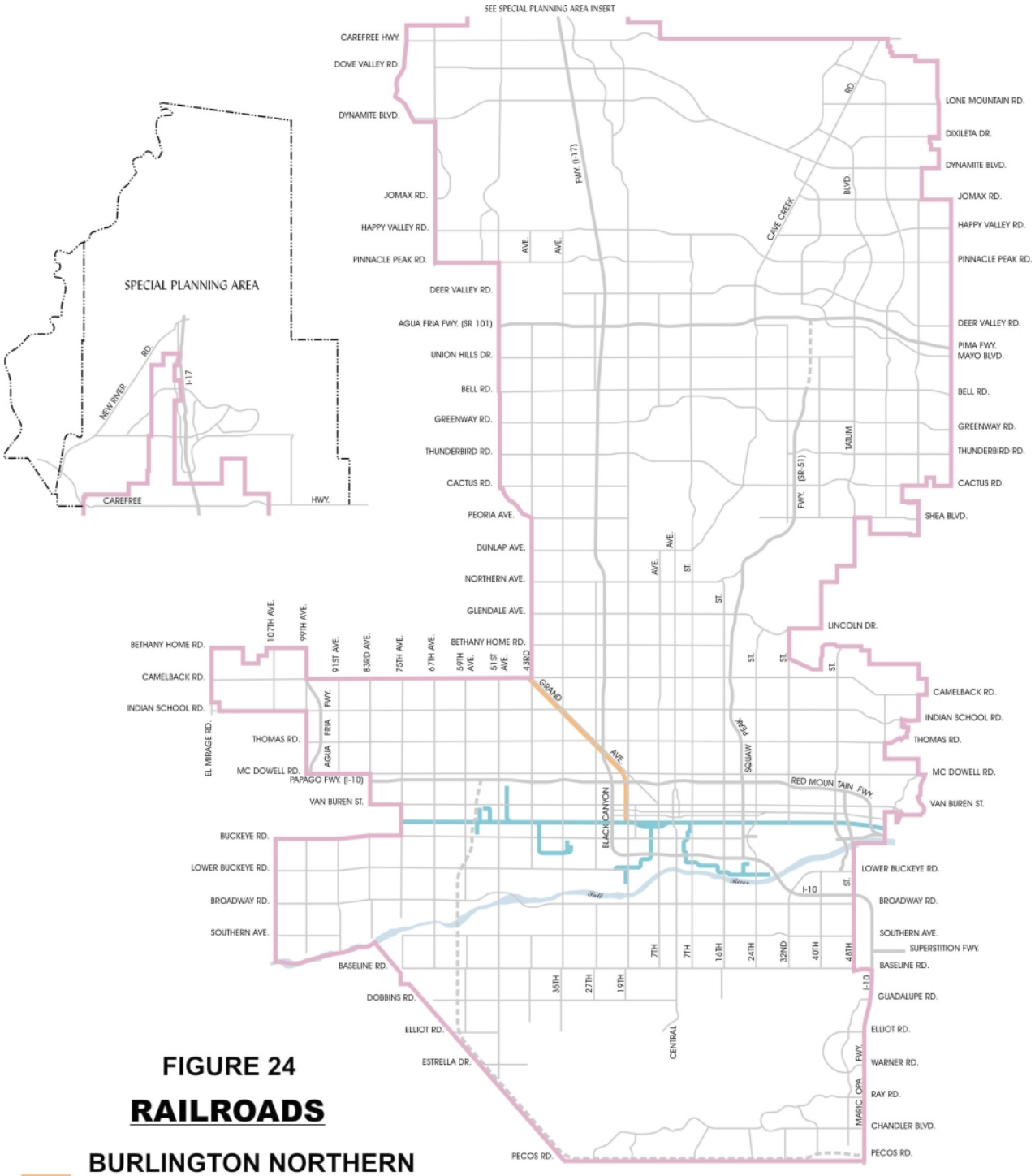


FIGURE 24

RAILROADS

BURLINGTON NORTHERN SANTA FE RAILROAD

UNION PACIFIC-SOUTHERN PACIFIC RAILROAD

these functions comes from a number of sources including fares (transit), the gas tax (federal and state), vehicle fees, impact fees, improvement districts, developer contributions and exactions, the city's General Fund, and sales taxes. The Arizona Lottery and other sources also support the transit system.

Each year the Street Transportation Department prepares a five-year Arterial Street and Storm Drain Program. This requires an extensive annual review of projects and scheduling to determine priorities. Adjustments are often necessary to accommodate changing growth rates, increased demands and available funding. The program strives to complement and support other transportation programs, and continues to implement MAG's comprehensive Long Range Transportation Plan.

The 2000 Arterial Street and Storm Drain Program provides for construction of 36.0 miles of arterial streets. An average of 7.2 miles per year will be built during the five years of the program, using a combination of Arizona Highway User Revenue, Federal Aid Funds and contributions from other government agencies. This program also includes the construction of bridges over the Grand Canal at 59th Avenue and over the Western Canal at 7th Avenue. Also programmed are arterial street retrofit projects, bridge rehabilitation projects, lane-continuity restriction removals, and railroad improvement projects. Included in the program are the interest payments for a Grant Anticipation Note (GAN) and the State Infrastructure Bank (SIB) loan. The GAN allows construction of the I-10 and Pecos Road interchange to be advanced by three years. The SIB loan will advance the construction of the Squaw Peak Highway, from Bell Road to the Pima Freeway by 18 months. The storm drain program includes the construction of several storm drain trunk lines and several miscellaneous local drainage improvements.

The 2000 Arterial Street Program requires total funding of $178,217,200. Funding will be derived from Arizona Highway User Revenue (AHUR) funds ($156.61 million), Federal Aid ($8.20 million), and contributions from other governmental agencies and other sources ($13.41 million). The 2000 Storm Drain Program requires total funding of $22,883,750. Funding will be derived from the 1988 Storm Drain Bonds ($20.68 million) and contributions from the Flood Control District of Maricopa County ($2.20 million). These Storm Drain Bonds will be depleted at the end of fiscal year 2001-02. Critical arterial street projects with large trunk storm drains cannot be programmed during the last three years of the program because of lack of bonds. If a new storm drain bonding capacity is not approved, high priority arterial street projects with trunk storm drains will continue to be deferred until a source of funding can be identified.

Among the findings of the state Vision 21 task force is the recognition that there are undoubtedly insufficient existing revenues to complete existing transportation programs.

Policies:

1. Advocate for and support a 20-year extension of the half-cent sales tax in Maricopa County for funding of freeway, street and transit construction and maintenance in Maricopa County.

2. Support increases in state gasoline taxes for constructing and maintaining transportation facilities.

3. Advocate fair distribution of state and regional revenues to Phoenix based on population and traffic congestion.

4. Provide adequate funding to maintain and rehabilitate city of Phoenix streets and transit facilities.

5. Advocate for federal funding for new light rail construction.

6. Provide dedicated and ongoing funding sources to construct pedestrian areas and facilities.

7. Continue to support and expand authorization of bonds for street and related storm drainage construction projects.

8. Proactively pursue federal Airport Improvement Program funds for airport capital improvement program projects.

Recommendations:

A. Study use of impact fees for transit facilities necessitated by new development (also included in the Cost of Development element).

B. Lobby to maximize the use of federal funding earmarked for bicycle projects.

   Federal Highway Administration funding exists to enhance bicycle facilities. The State of Arizona does not maximize its use of federal funding for bicycle projects. Phoenix should encourage the state to obtain the maximum, rather than the minimum, in federal funds.

C. Study the use of impact fees as an additional source of funds for regional transportation facilities, including freeways.