MAG Regional Transportation Plan

Phase 1

Status of Regional Transportation

Draft Task Report

February 2003

MARICOPA ASSOCIATION of GOVERNMENTS

MAG Regional Transportation Plan – Phase I

STATUS OF REGIONAL TRANSPORTATION

February 1, 2003

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PREFACE

This document is one of a series of reports and documents that have been prepared for the MAG Regional Transportation Plan – Phase 1 project. There are five published documents that were produced as final products of specific tasks. These five documents form the basis of the Final Report. The five task reports are:

Status of Regional Transportation
Values, Goals and Objectives
Alternative Growth Concepts
Analysis of Alternative Growth Concepts
Transportation Policies and Strategies

In addition to the above documents, there are several other products from RTP Phase 1 that are available in the project files. These products provide documentation of the several major steps taken in the project and provide input to the five documents listed above and the final report.

Issue Papers:

- Demographics and Social Change
- New Economy
- Environment and Resources
- Land Use and Urban Development
- Transportation Modes and Technology

Five forums were held in February and March 2001 and presentations were made by nationally recognized experts in the five categories addressed in the issue papers. Videos were made of most of the forums and a presentation was prepared identifying their major themes.

Sixteen focus group meetings were held in May and June 2001. The groups included various geographic, ethnic and agency orientations. The results are documented in a task paper dated August 2001.

Interviews were held with 21 resource and agency stakeholders throughout the metropolitan area. The findings from these interviews were documented in a task paper dated October, 2001.

An issue paper dated September 19, 2001 was prepared for population projections to be used in the "horizon" analyses for this RTP.

A paper entitled Summary of Research and Transportation Model Adjustments for Vehicle Trip Reductions and dated March 27, 2002 was also prepared to assist in determining potential traffic impacts of trip reduction actions.

1.0 INTRODUCTION

The Status of Regional Transportation Report represents a significant element of the MAG Regional Transportation Plan (RTP) update by providing a critical perspective on current land use, demographic and transportation conditions and the projected future of Maricopa County. This report also provides a key database of relevant information that will serve as the basis for subsequent steps of the RTP update process.

All of the information presented in this document is based on currently available databases developed by MAG. The report documents the analysis of these existing forecasts and does not represent a final prediction for future development or system performance. Therefore, the information documented in this Status of Regional Transportation Report will serve as a benchmark for subsequent analyses to be conducted during the remainder of the RTP development process.

1.1 Purpose and Objectives

The purpose of the Status of Regional Transportation Report is to provide policy makers and others with a critical overview of current and projected conditions in the county, with a focus specifically on those factors which will influence the region's transportation future. The report provides an overview of current issues and trends in land use and demographics, economic conditions, travel demand, and transportation modes and technologies.

More specifically, the Status of Regional Transportation Report was prepared with the following key objectives:

1. Provide an overview of the key issues and trends as identified by the Expert Forums and establish their relevance and implications for the Maricopa County;
2. Provide an overview of current and projected future year land use and socioeconomic conditions in the county;
3. Provide an overview of current travel demand and existing transportation facilities in the county, including an assessment of the performance of the transportation system in serving travel demand;
4. Document future year travel demand for the years 2010, 2025 and 2040, along with currently planned transportation system improvements;
5. Provide an assessment of the performance of the planned transportation system in serving future year travel demand;
6. Assess current and future funding sources for implementing transportation system improvements; and
7. Establish relevant information in a database to support subsequent steps of the transportation planning process.

1.2 Report Organization

Following this Introduction, this report is organized in the following seven chapters:

- Chapter 2.0: Current Issues and Trends – Summarizes key findings from the Issue Papers and Expert Forums.
- Chapter 3.0: Existing Land Use and Socioeconomic Conditions – Summarizes existing land use, population, employment and Title VI population groups in Maricopa County.
- Chapter 4.0: Future Land Use and Socioeconomic Conditions – Summarizes projected land use, population, dwelling units, and employment for the years 2010, 2025 and 2040.
- Chapter 5.0: Existing Transportation Facilities – Provides an overview of existing transportation systems, current travel demands and system performance.
- Chapter 6.0: Planned Transportation Systems – Summarizes projected travel demands, planned transportation system improvements and system performance for the 2010, 2025 and 2040 forecast years.
- Chapter 7.0: Funding – Summarizes current and projected transportation system funding sources and revenue projections.
- Chapter 8.0: Summary – Provides a summary presentation of key findings and important issues related to the Status of Regional Transportation.

2.0 CURRENT ISSUES AND TRENDS

This chapter provides an overview of the key issues and trends facing Maricopa County as it moves into the twenty-first century. Effective long-range transportation planning at the regional level requires an understanding of these issues and trends, and of their potential effects on existing and planned transportation systems. There are five broad categories of pertinent issues:

- Demographics and Social Change
- The New Economy (i.e., the increasing dominance of high-tech and information-based industries)
- Land Use and Urban Development
- Environmental and Resource Issues
- Transportation Modes and Technologies

The following sections have been distilled from a series of research papers prepared especially for the MAG Regional Transportation Plan in the spring of 2001. These papers, available on the MAG website, are based on an extensive literature review and include citation of the original sources. In addition, the papers reflect input from five MAG-sponsored public forums held during February and March 2001. At each forum, a panel of national and regional experts discussed various aspects of the five major topics noted above. The format of the forums also provided an opportunity for dialogue between the panelists and questions from the audience.

2.1 Demographics and Social Change

Strong population growth in Maricopa County is expected to continue in the future. This rapid growth will continue to pose challenges for the entire region, including the urban core as well as the developing fringes. From 1990 to 2000, the population of Maricopa County increased 45%, from 2,122,000 to 3,072,000. *(Source: U.S. Bureau of the Census.)* This rapid growth is challenging the region's ability to provide adequate infrastructure, especially at the fringe where the fastest-growing cities are located.

The total population of Maricopa County is projected to be 6.3 million in 2040, an increase of approximately 3.2 million, or more than 100%, over the year 2000 population of 3.1 million. The number of cities with a population greater than 250,000 is expected to rise from two today to nine in 2040. Projections for "buildout" show Maricopa County with a population of approximately 13 million, which is equivalent to the third largest metropolitan area in the United States today (Chicago). *(MAG, 12/2000-2/2001.)*

Maricopa County is one of a few large U.S. metropolitan areas whose population density increased from 1960 to 1990, due largely to increased construction of multi-family housing, decreases in average lot sizes, infill development and urban revitalization. This trend is thought to have continued in the 1990s. *(Morrison Institute for Public Policy, "Hits and Misses: Fast Growth in Metropolitan Phoenix," September 2000.)* It remains to be determined whether Maricopa County residents want further increases in residential density.

Previous forecasts have tended to underestimate the growth in population, the number of vehicles and the number of vehicle miles traveled. Actual growth has historically outstripped the forecasts for many reasons, including: more women entering the labor force, declining household size, growing real income and wealth, baby boomers coming of age, increasing life expectancy, increased children's safety concerns, and neighborhood design/configuration. *(Eric Anderson, Mobility for the New Millennium Expert Forum, 2/23/01.)*

The current primary and secondary employment cores are expected to maintain their positions as centers of employment in Maricopa County. The primary core consists of downtown Phoenix and the Central Avenue Corridor, with the secondary core generally focused on Phoenix Sky Harbor International Airport, downtown Tempe and Arizona State University in Tempe. However, a spatial mismatch may exist between less-skilled workers living in the center, where skilled professional positions are concentrated, and entry-level and skilled positions in the growing high-tech manufacturing industry outside the employment cores. These high-tech companies are generally located outside both the primary and secondary cores, especially in the northwest and southeast. *(Morrison Institute, op. cit.)*

The high rate of increase in Maricopa County's foreign-born population, particularly from Latin America, is expected to continue in the future. Since recent immigrants have historically settled in central city locations and may initially have had higher than average poverty rates, the central cities may face growing pressure in terms of housing, social services, education and transportation for recent arrivals.

The number of both seniors and youths in Maricopa County is expected to rise substantially, fueling a need for facilities (e.g., health care and schools) to serve both groups, as well as increasing demands for transportation services. Persons aged 55 or older represent nearly one-third of new residents in the urban fringe areas of Maricopa County. These residents often move directly to the urban fringe from places outside the region and congregate in age-segregated retirement communities. The percentage of persons aged 60+ in the Phoenix Metropolitan Area is forecast to increase from 16.5% in 2000 to 26.2% in 2040. This group will increasingly choose to remain in the workforce and stay active in other ways, such as continuing to drive. In contrast, young people are projected to decline as a percentage of the population, while continuing to increase in absolute numbers. *(Morrison Institute op. cit. and MAG Management Committee Retreat 2000.)*

Regardless of age group, women today travel less than men. Younger women travel more than older women, however, and in the future, older women (today's young women) are expected to make as many vehicle trips as men of the same age. The number of trips women make varies by the age of their children, while men's trip numbers tend not to vary by age of children. Women also have higher numbers of linked trips, resulting in more complicated travel patterns. Lower-income women with young children and cars are relatively unlikely to use transit because of their distance from work and complex trip requirements. *(Sandra Rosenbloom, Mobility for the New Millennium Expert Panel Forum, 2/23/01.)*

2.2 The New Economy

The New Economy and globalization are having profound effects on the growth of U.S. cities and their suburbs. Underlying the New Economy is a digital revolution accelerating the speed at which information is processed and removing geographic limits to production. Increasing international trade, investment, communications and business alliances are driving globalization. Increasingly, the New Economy involves new sources of competitive advantage for all industries via increasing speed, quality, flexibility, knowledge and networks.

In Maricopa County, New Economy activities are concentrated in a small number of industries that focus mainly on manufacturing, as opposed to services. Despite increasing globalization, exports appear to be declining in the county.

Phoenix has historically been dependent on real estate and tourism. Phoenix has never gone through an economic crisis of the kind seen in many other cities, and real estate development has always "bounced back." But the majority of the population remains concentrated in a few vulnerable sectors of the economy. For example, Maricopa County has a large number of service jobs, which tend to be low-paying, and many industrial jobs, which can be moved easily. *(Jon Talton, Mobility for the New Millennium Expert Panel Forum, 3/2/01.)*

Despite the large number of higher learning institutions in the greater Phoenix area, low educational attainment may hinder growth of the New Economy in the region. In 1999-2000, Arizona spent $4,754 per K-12 pupil, 49th in the nation and far below the national average expenditure of $6,585. The percentage of students graduating from high school was 77%, again 49th nationally and well below the national average of 86%. Maricopa County and the state of Arizona must focus on educational policy and attainment in order to attract and retain a skilled workforce. *(Arizona Partnership for the New Economy,* An Economy that Works for Everyone, *January 2001.)*

The largest concentration of professional positions in Maricopa County remains in downtown and midtown Phoenix, with smaller concentrations in and around Sky Harbor International Airport, Tempe, Scottsdale and Metrocenter. Out of 13 sub-county areas analyzed in 1997, the Central Phoenix Village ranked first in geographic concentration of three of the five industry clusters identified in Maricopa County (high technology, transportation and health/biomedical), second in one (business services) and fourth in the remaining (tourism). On the other hand, software and information industries have a strong presence in Tempe and Scottsdale. Many high-tech manufacturing companies in the region are located farther to the southeast and northwest. *(Morrison Institute, op. cit.)*

Arizona has undertaken considerable efforts to understand and remedy its weaknesses with regard to the New Economy. The Greater Phoenix Economic Council (GPEC) is well positioned to assist economic development efforts in Maricopa County. The region's short-term economic outlook is excellent, in large part because of the abundance and variety of reasonably-priced housing. However, state and local leaders, like those in other regions, remain challenged by the following issues:

- Improving the performance of the public schools
- Nurturing and exploiting knowledge assets
- Expanding access to technology
- Providing an attractive quality of life for "knowledge workers"

(Marshall Vest, "2000/2001 Outlook for the 'New Economy,'" in Arizona's Economy, *University of Arizona College of Business & Public Administration, January 2001.)*

2.3 Land Use and Urban Development

"Smart Growth" seeks to accommodate population increases in ways that preserve the integrity of the community, protect the environment and enhance economic vitality. Its goal is sensible growth that balances the need for jobs and economic development with the desire to save our natural environment and preserve quality of life.

Widely accepted Smart Growth principles include:

- Anticipating growth and planning needs
- Establishing a long-term comprehensive plan with adequate land supply
- Compact development
- Protection of natural resources
- Substantial public open space
- Infill development where economically feasible
- Variety of housing
- Mixed-use, walkable neighborhoods
- Balanced multimodal transportation
- Timely provision and fair funding of infrastructure
- Reasonable, predictable plan review
- Supportive fiscal policies
- Integration of land use, transportation, infrastructure and public facilities in all planning decisions

Various forms of growth management are practiced in Maricopa County. While no regional or state-level regime exerts strong management across the urban area, many local governments employ an array of growth management approaches. Large tracts of desert are being protected as open space around metro Phoenix communities (for example, by the City of Scottsdale), downtown cores are undergoing revitalization (e.g., in Glendale and Chandler), infill development incentives are in place in many of the larger cities (e.g., Scottsdale and Tempe), and financial exactions are partially offsetting the costs to cities of new development. (*Morrison Institute, "Transit in the Valley: Where Do We Go from Here?", February 1996*.)

In a recent survey by the Morrison Institute, Maricopa County and 18 local jurisdictions

responded that they use the following approaches to growth management

- Strategies to discourage sprawl and encourage compact urban development, infill and revitalization of blighted or troubled areas (7 of 19 respondents)
- Requiring infrastructure to be financially secured at the time of development, either through impact fees or by ordinance requiring adequate public facilities (15 of 19)
- Urban design requirements that aim at aesthetically pleasing urban areas, mixed uses and environmentally friendly places (14 of 19)
- Policies and programs to protect sensitive lands, rural areas and open space (8 of 19 respondents provide funding for open space preservation)
- Policies and programs to assure affordable housing as a major component of new development

In general, urban fringe communities tend to lag behind older cities in open space protection and the use of growth management tools. This has important implications for regional development, as 18 less populous cities on the urban fringe now control nearly as much land as the six largest cites combined. (*Morrison Institute, op. cit*.)

The recently enacted growth management legislation known as "Growing Smarter Plus" gives cities and counties expanded tools to manage growth. However, it lacks the mandatory regional oversight and intercity coordination that some other growth management programs employ. Growing Smarter Plus does include reforms to the local planning processes, such as public involvement plans and limits on annexations.

Successful transportation planning requires coordination with land use planning. Transportation planning must be tied to regional growth and land use decisions, and must support economic development. Regional growth management is not capable of producing rapid change, however. If the most desirable land use and transportation plans were ready for implementation tomorrow, we would see no short-term changes in urban form, because currently entitled development will accommodate more than a decade's worth of growth.

On October 1, 2000, the Arizona Republic published a special report on growth management issues. A map in the article highlighted almost 60 large-scale planned unit development projects in the Phoenix Metropolitan Area. These approved projects, when built out, will add over 500,000 units to the region's housing stock. Many of the projects are in cities at the edge of the current urbanized area, such as Buckeye. These 500,000 units represent approximately a 15-year supply of housing. Thus, effecting regional change will require a long-range perspective and a long-term commitment.

The Phoenix area's grid street network, coupled with the lack of highway building in the 1960s to 1980s, supported growth in the region's central area. The present round of suburb-to-suburb freeway extensions is making jobs and homes away from the regional center more accessible, however. Thus, these freeways could intensify land development on the fringe. Phoenix and other cities are working to create mixed-use clusters of housing and employment in recently developed areas.

Maricopa County's urban land area doubled between 1975 and 1995, when 40% of agricultural land and 32% of undeveloped desert were used for development. The region's heaviest homebuilding is now occurring in a ring 18 to 21 miles from downtown Phoenix. A recent Arizona State University study found that development is claiming 9,000 acres of land per year. (*Morrison Institute, op. cit*.)

State and federal lands affect the region's open space and desert landscape. The City of Phoenix estimates that State Trust land encompasses 70% of the undeveloped land on its north side. Large tracts of state-owned Trust land near the urban fringe constitute a potential major asset for the region's quality of life. However, the state constitution requires management of these lands to maximize revenues for Arizona's educational needs. This mandate precludes wholesale conservation of the lands and increases the likelihood of future land sales and long-term leases for urban development.

2.4 Environmental and Resource Issues

Air pollution is a public health concern in major cities across the United States. While per-vehicle emissions of pollutants have steadily declined owing to advances in technology and stricter regulations, vehicle miles of travel (VMT) continues to grow rapidly. Efforts to restrain VMT, along with continued progress in emission controls, are necessary to significantly improve air quality. Air pollution associated with motor vehicles is the most widely recognized and studied environmental impact of transportation. *(U.S. Environmental Protection Agency, "Indicators of the Environmental Impacts of Transportation" (2nd edition), October 1999.)*

Portions of Maricopa County are currently designated as nonattainment for the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), ozone, and particulate mater under ten microns in diameter (PM-10). A summary of the attainment status for each pollutant is provided below.

The MAG 1999 Serious Area Plan for Carbon Monoxide was submitted to the Environmental Protection Agency (EPA) in July 1999. A Revised MAG Serious Area Carbon Monoxide Plan, reflecting the repeal of the remote sensing program by the Arizona Legislature in 2000, was submitted to the EPA in March 2001. No CO violations have occurred in the past four calendar years (1997, 1998, 1999, and 2000). The state, in a July 23, 1999 letter, requested a carbon monoxide attainment determination from the EPA.

The EPA approved and promulgated a Revised 1998 15 Percent Rate of Progress Plan for Ozone (Revised ROP FIP) for the Maricopa County nonattainment area, effective August 5, 1999. No violations of the one-hour ozone standard have occurred in the past four calendar years (1997, 1998, 1999, and 2000). The state, in a February 21, 2000 letter, requested an ozone attainment determination. On May 19, 2000, the Environmental Protection Agency published a proposed rulemaking for the determination of attainment of the 1-hour ozone standard. On May 30, 2001, EPA published a final determination of attainment of the one-hour ozone standard for the Maricopa County nonattainment area in the Federal Register.

The Revised MAG 1999 Serious Area Particulate Plan for PM-10 was submitted to EPA in February 2000. Under Section 107(d)(4) of the 1990 Clean Air Act Amendments, the region was initially classified as a "Moderate" area for PM-10, with an attainment deadline of December 31, 1994. The standard was not achieved by the attainment deadline. EPA reclassified the region to "Serious" in May 1996, with an effective date of June 10, 1996 (EPA, 1996a). The Clean Air Act attainment date is December 31, 2001 for Serious PM-10 areas; however, the Revised MAG 1999 Serious Area Particulate Plan for PM-10 contains a request to extend the attainment date to December 31, 2006, as allowed in the Clean Air Act Amendments.

Potential water quality deterioration affects both surface water and groundwater. Impervious urban surfaces such as roads and parking lots increase both the volume and rate of surface runoff and act as a conduit for a wide variety of toxic pollutants. In the MAG region, overdraft of the groundwater may cause deterioration in water quality, either through surface water contamination via earth fissures or through pumping of water from deeper in the aquifers that are less pure. *(EPA, op. cit.; AZ Department of Water Resources, "Third Management Plan 2000-2010: Phoenix Active Management Area," December 1999.)*

Subsidence and fissures have occurred in areas of the MAG region. Damage to sewer systems, building foundations and structures, dams and flood control channels has been documented. Overdraft also forces water to be pumped from greater depths. This water tends to be less pure, as it contains more salts and minerals. *(AZ Department of Water Resources, op. cit. and "Overview of Arizona's Groundwater Management Code," 2001.)*

Stormwater controls associated with road construction can significantly impact downstream natural drainage features, riparian vegetation and wildlife habitat. Federal and state regulations are in place to mitigate construction impacts on stormwater.

Water is ultimately a finite resource, although the current supply is ample. The "safe-yield goal" established by the Groundwater Management Act specifies that by 2025 no more groundwater can be taken out than replaced. *(AZ Department of Water Resources, "Third Management Plan.")*

Water management and strategic planning will become increasingly important, since no large-scale public works projects (like the Central Arizona Project) to increase the future water supply are on the horizon. An increasing connection between water management and land use planning, which will ultimately relate closely to transportation planning, is necessary.

Water availability is not equally dispersed throughout the region. Not all parcels of land have uniform access to water sources. The geographical mismatch between water demands and supplies may be a future concern to water resource management.

Urbanization plays a central role in changes in biodiversity due to habitat fragmentation. In the MAG region, the impacts of urbanization on the ecological conditions of the cities

and surrounding environment are being studied by the federally funded Central Arizona-Phoenix Long Term Ecological Research (CAP LTER) Project at Arizona State University. The ongoing monitoring and research activities of CAP LTER will provide valuable ecological insight on the impacts of the region's growth. *(Central Arizona—Phoenix LTER, "CAP LTER 1997-2000: Land Use Change and Ecological Processes in an Urban Ecosystem of the Sonoran Desert," January 2001.)*

The "heat island" effect of urban development has pushed nighttime low temperatures in the urban area eight degrees Fahrenheit higher than 50 years ago. Because of this effect, the urban fringe now represents a boundary of well-defined discontinuity in microclimate. *(CAP LTER 1997-2000; Morrison Institute, "Hits and Misses: Fast Growth in Metropolitan Phoenix," September 2000.)*

2.5 Transportation Modes and Technologies

In recent years, automobiles and other light-duty vehicles have continued to dominate urban passenger travel, and driving alone has remained the predominant mode of travel to work. The number of trips per person has increased, although the average trip length has not. Suburb-to-suburb commuting has risen much faster than commuting from suburbs to the central core. During the last three decades, the most dramatic increase in VMT has occurred among personal vehicles (pick-up trucks, vans, sport utility vehicles) other than passenger cars. (*Robert E. Skinner, Jr., "Transportation in the 21st Century," 6/9/2000; William L. Ball, "Commuting Alternatives in the United States: Recent Trends and a Look to the Future," December 1994; U.S. Bureau of Transportation Statistics, "Pocket Guide to Transportation," December 1999*.)

The 1998 MAG Regional Congestion Study summarizes changes in traffic volumes and congestion over the preceding decade. From 1989 to 1998, VMT in the urbanized study area increased 42%, outstripping population and employment growth of 20% and 36%. Daily capacity miles of roadway increased 29% (95% for freeways and 11% for arterials) during the same period. The percentage of congested (level of service E or F) intersections in the PM peak hour rose from 23% to 39%, while the percent of congested freeway miles rose from 21% to 31%. Large-scale freeway construction moderated the increase in congested freeway miles.

Vehicle trips in the MAG region are projected to increase by 140% and VMT by 160% over the next 40 years. Substantial construction of new roads and improvements to existing facilities are planned to help meet the demand, but a large gap exists between available transportation funds and projected costs to build and maintain the transportation system. This shortfall will grow over time unless new revenue sources can be secured and existing sources indexed to inflation. Expiration of the countywide half-cent sales tax, currently scheduled for the end of calendar year 2005, would leave the Valley without dedicated regional revenue for construction of controlled-access highways, although strategies for replacement funding are currently under discussion. Only Glendale, Phoenix, Scottsdale and Tempe currently have a dedicated local tax for public transit or other transportation purposes. (*MAG, "Regional Path We're On," 1/11/2001*.)

As opportunities for new roadway construction in the region become more limited because of funding, right-of-way and environmental constraints, more emphasis will need to be placed on multimodal planning and design, transportation system management, grade separation of intersections and Intelligent Transportation Systems (ITS). ITS shows particular promise as a way to manage and limit non-recurring delays due to incidents. In the longer term, vehicle automation technologies may improve highway safety long before full automation brings substantial improvements in highway capacity. (*MAG, "Transportation Subcommittee Report," Valley Vision 2025, February 2000*.)

Congestion pricing has been advocated as an economically efficient solution to peak period congestion, and high occupancy/toll lanes in congested corridors appear to hold promise. The telecommunications revolution may or may not provide a large-scale substitute for transportation. The growth of the mobile workplace could increase rather than decrease overall travel. (*Skinner, op. cit.; Patricia L. Mokhtarian, "Telecommunications and Travel," Transportation Research Board Millennium Papers*.)

Transportation accounts for roughly two-thirds of U.S. petroleum consumption, and U.S. transportation relies on petroleum for 97% of its energy supply. The principal danger facing us in the twenty-first century is not running out of fuel, but rather an overdependence on imported oil, leading to potential price shocks and economic instability. A variety of alternative fuels are available or exploitable in the near future. However, strong incentives and policies will be needed in the short term to reduce American dependence on imported oil. Similarly, technologies that greatly improve vehicle fuel economy are available, but their widespread adoption will require appropriate public policy or economic incentives. (*Institute of Transportation Engineers, Transportation Planning Handbook, 1999; David L. Greene and John M. DeCicco, "Energy and Transportation Beyond 2000," TRB Millennium Papers; John D. Maples et. al., "Alternative Fuels for U.S. Transportation," TRB Millennium Papers*.)

Public transit's percentage of work trips has falling nationwide, although total ridership has increased in some cities. Transit systems increasingly recognize the need to serve commuting patterns other than suburb to central city, but these multiple patterns are often difficult to serve effectively with conventional fixed routes. Light rail is in service or under development in numerous cities, and technological innovations are improving system performance and user convenience. Because of its inherent flexibility, moderate cost, and ability to take advantage of many of the same technological opportunities as light rail, bus rapid transit may play a greater role in urban transit than it does today. (*Skinner, op. cit*.)

Locally, mass transit has progressed rapidly with voter approval of dedicated funding sources in Tempe, Phoenix and Glendale, and with design and impending construction of the Valley's first light rail transit line. However, expansion of these improvements outside a few of the largest cities will probably not occur until a regional funding source for transit becomes available.

Deregulation of freight transportation has generally succeeded in stimulating competition, despite substantial consolidation, especially in the railroad industry. ITS and advanced

telecommunications are playing an increasing role in truck transport, especially in the rapidly growing markets for overnight and small-shipment delivery. The North American Free Trade Agreement is expected to have substantial impacts on the transportation system, especially in Arizona and other border states. (*Skinner op. cit.; Robert J. Czerniak et. al., "Urban Freight Movement," TRB Millennium Papers*.)

In commercial (air carrier) aviation, escalating flight delays have caused rising customer dissatisfaction. With passenger traffic expected to double in the next 10 to 15 years, flight delays are likely to worsen, especially given the lack of large systemwide investments in aviation infrastructure during the last 20 years. Several technological innovations do, however, hold out hope of improving operational safety and efficiency, and somewhat mitigating the delay problem. Advances in air traffic control may increase the capacity of existing airports.

Traffic at Phoenix Sky Harbor International Airport has been forecast to grow dramatically, with air cargo projected to experience the highest growth rate. Although Sky Harbor has ambitious expansion plans, increased use of reliever airports in outlying areas may eventually prove necessary. It is too early to say what effect the recent terrorist attacks and resulting intensification of security will have on future growth in air travel demand. (*MAG, "Regional Path We're On," 1/11/01*.)

3.0 EXISTING LAND USE AND SOCIOECONOMIC CONDITIONS

This chapter describes existing land use and socioeconomic conditions in Maricopa County. Socioeconomic (population, housing and employment) data for the year 2000 are based on the MAG socioeconomic projections published in June, 1997 and the 2000 U.S. Census. Population and employment data are reported by jurisdiction and municipal planning area, and for each of five subregions: Southeast, Northeast, Central (Phoenix), Northwest and Southwest. Chapter 3.0 also covers Title VI Environmental Justice issues, such as ethnic and racial minority populations, the elderly and persons with disabilities, low-income residents and households without vehicles.

3.1 Generalized Land Use

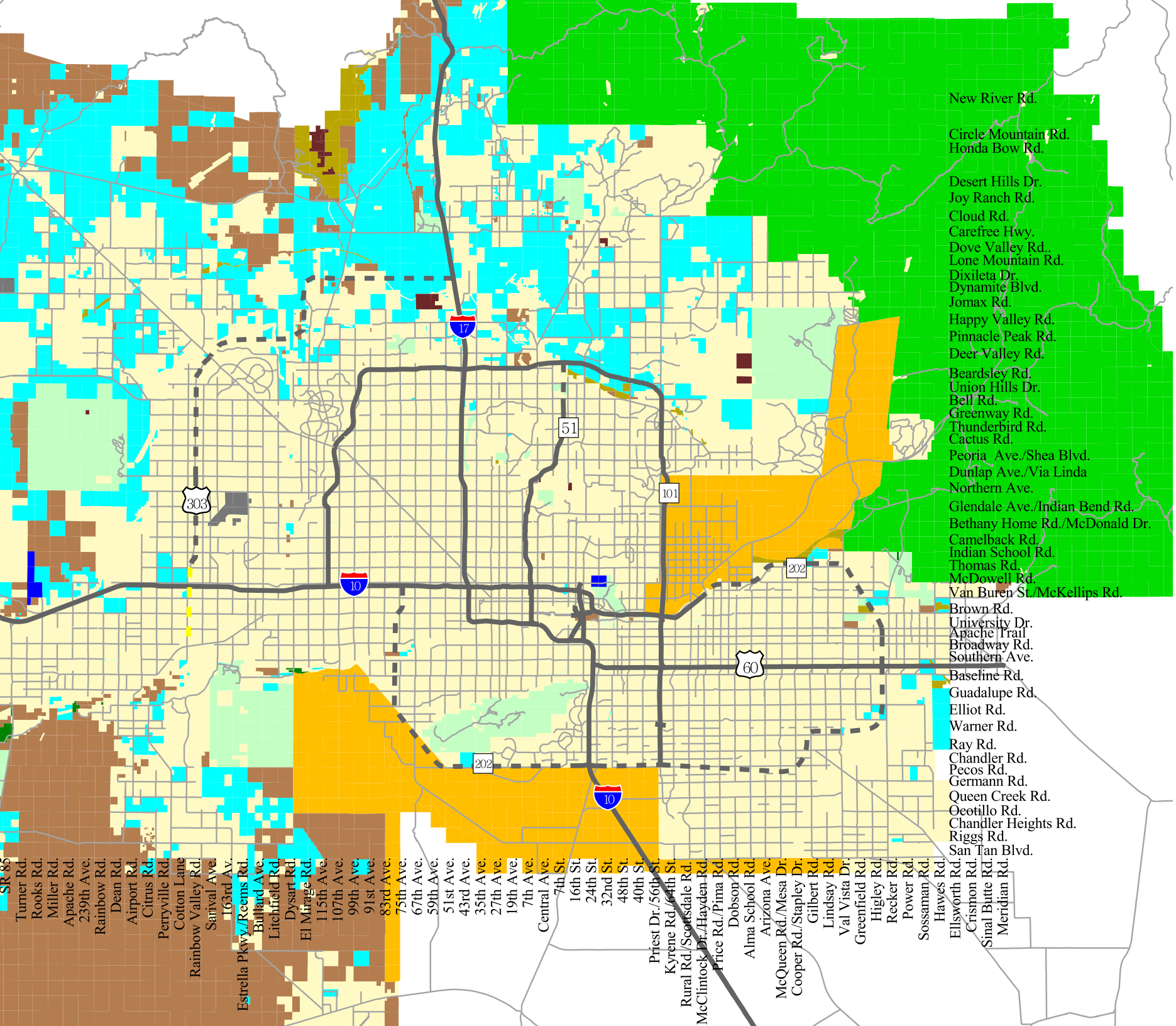
Figure 3-1 illustrates existing land ownership in the MAG area. The vast majority of land is under private ownership. Public entities that own large land areas include federal agencies, such as the Bureau of Land Management (Interior Department), Bureau of Reclamation (Interior Department), U.S. Forest Service (Department of Agriculture), and U.S Air Force; the State of Arizona (chiefly state trust lands administered by the State Land Department); Maricopa County (primarily county parks included in the "Parks and Recreation" category); and cities (primarily parks and open space). Maricopa County also includes the Salt River Pima-Maricopa Indian Community, the Fort McDowell Mohave-Apache Indian Community, and a portion of the Gila River Indian Community.

Figure 3-2 illustrates the locations of major development areas, defined as areas with active, planned or proposed land development projects for residential or commercial use. These areas are generally scattered around the periphery of the existing urbanized area. Jurisdictions with extensive development areas include Phoenix, Mesa, Chandler, Gilbert, Scottsdale, Fountain Hills, Avondale, Goodyear, Buckeye, Peoria, Surprise and unincorporated Maricopa County.

Figure 3-3 depicts existing generalized land use, divided into ten categories. While vacant land is the largest single category, most developed areas are used for residential purposes. Agricultural holdings form a partial buffer between urbanized uses and undeveloped desert. As Figure 3-4 shows, in Maricopa County as a whole, vacant land accounts for 51% of the area, and residential and agricultural land for another 13%. The remaining 36% consists of open space (33%) and five smaller categories (3%) .

3.2 Population, Households and Employment

Existing year 2000 population density by Regional Analysis Zone (RAZ) appears in Figure 3-5. Population density is generally highest along a northwest to southeast axis extending from the Arrowhead area of Peoria and Glendale through north, west and central Phoenix into Tempe, Mesa and Chandler. This relatively dense urban core is surrounded by a lower-density developed area, which in turn is surrounded by largely vacant land in the remainder of Maricopa County, with densities of 1,500 or fewer residents per square mile. The highest density RAZs are in the Maryvale section of Phoenix, the historic core of Mesa and Guadalupe.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Beardsley Rd.
Union Hills Dr.
Bell Rd.
Greenway Rd.
Thunderbird Rd.
Cactus Rd.
Peoria Ave./Shea Blvd.
Dunlap Ave./Via Linda
Northern Ave.
Glendale Ave./Indian Bend Rd.
Bethany Home Rd./McDonald Dr.
Camelback Rd.
Indian School Rd.
Thomas Rd.
McDowell Rd.
Van Buren St./McKellips Rd.
Brown Rd.
University Dr.
Apache Trail
Broadway Rd.
Southern Ave.
Baseline Rd.
Guadalupe Rd.
Elliot Rd.
Warner Rd.
Ray Rd.
Chandler Rd.
Pecos Rd.
Germann Rd.
Queen Creek Rd.
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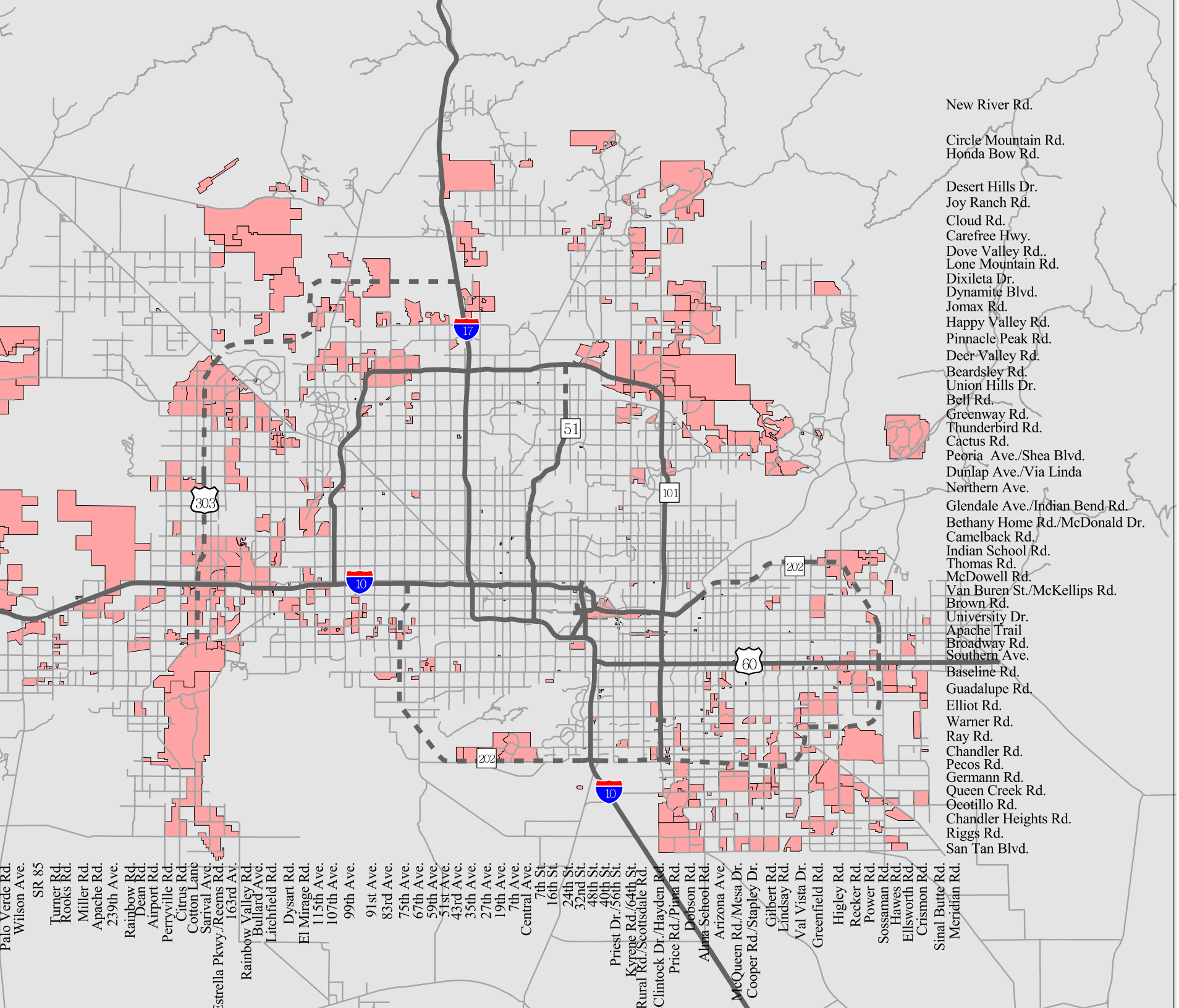
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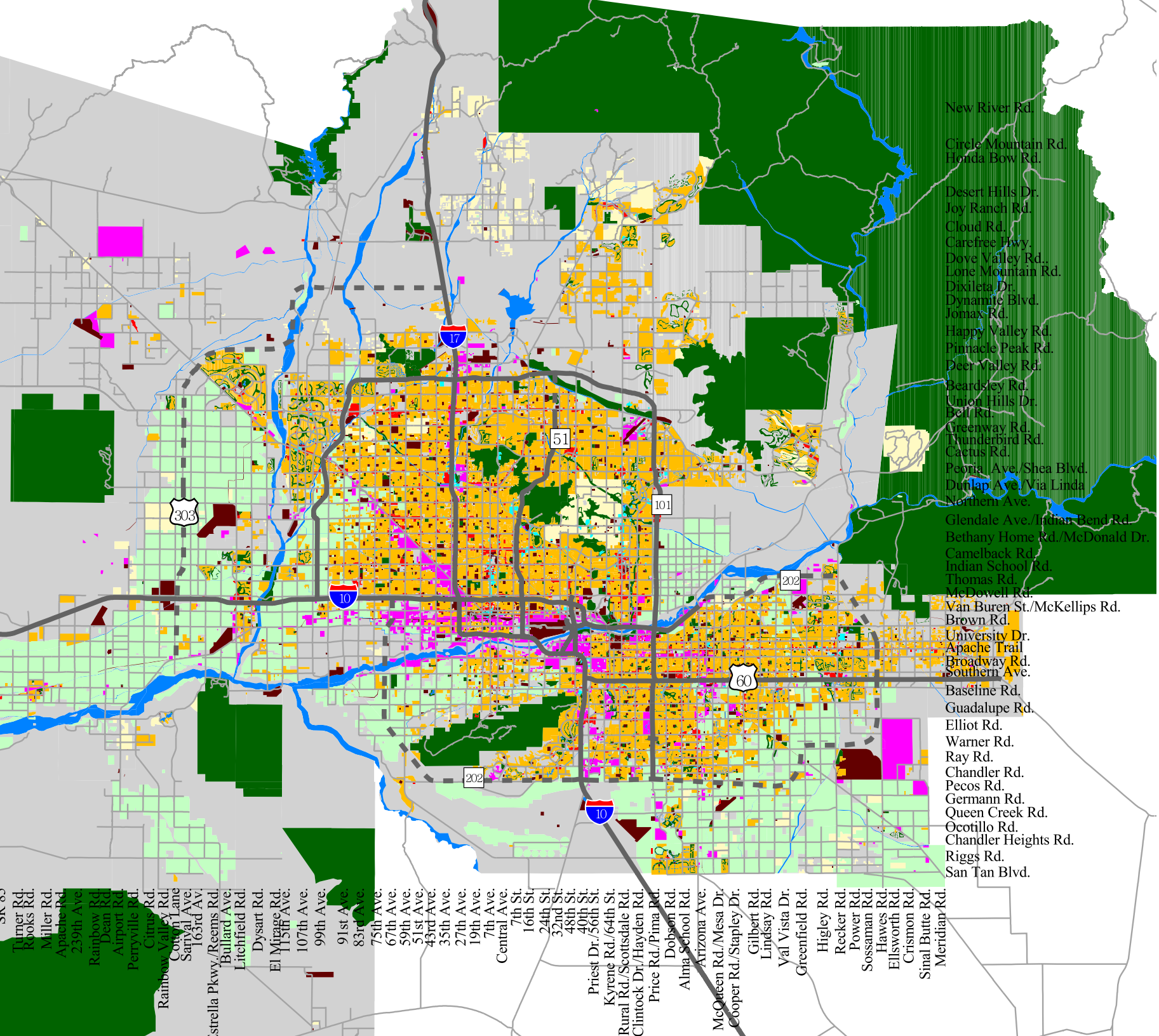

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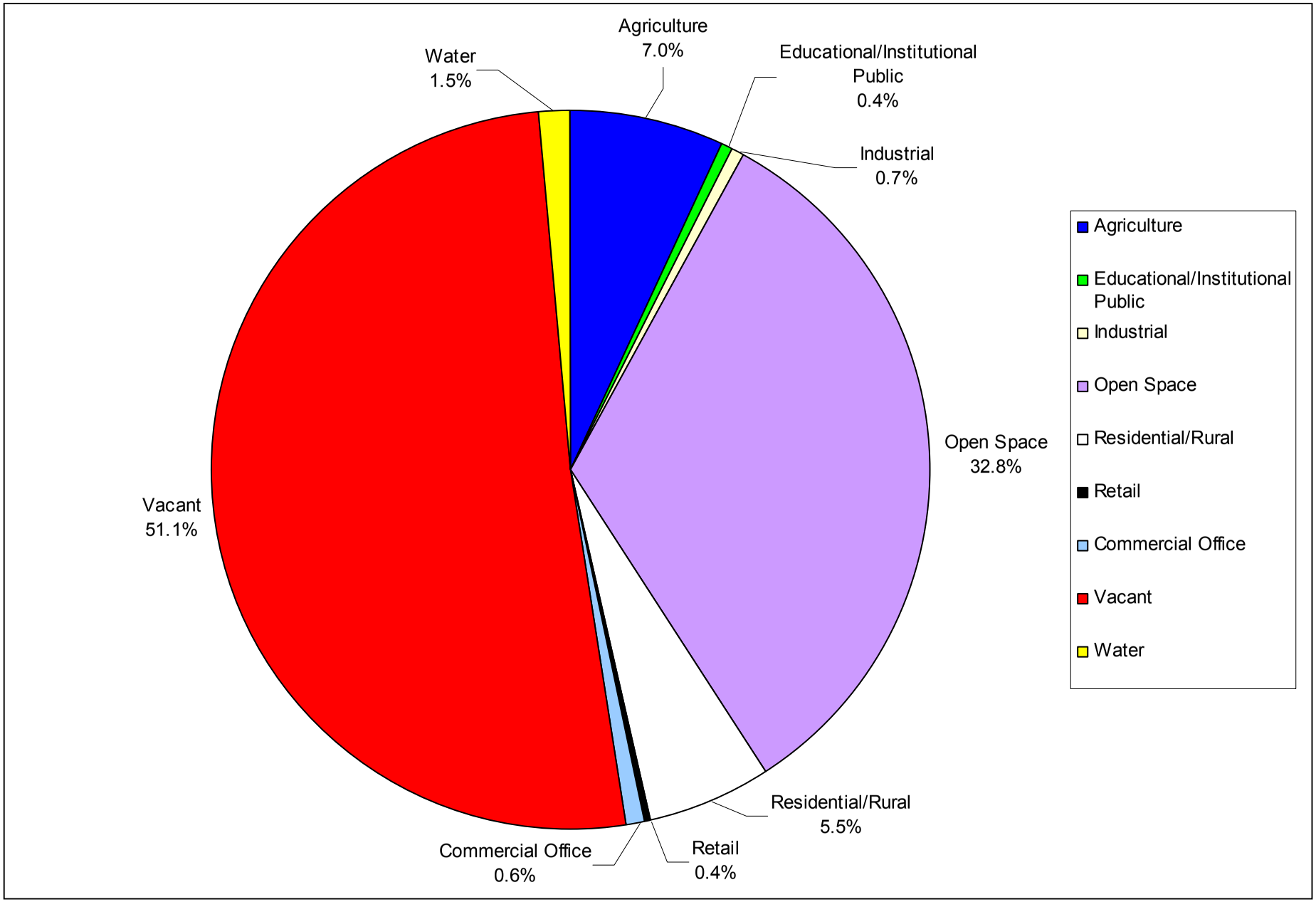

Figure 3-4

Existing Land Distribution in Maricopa County by Use

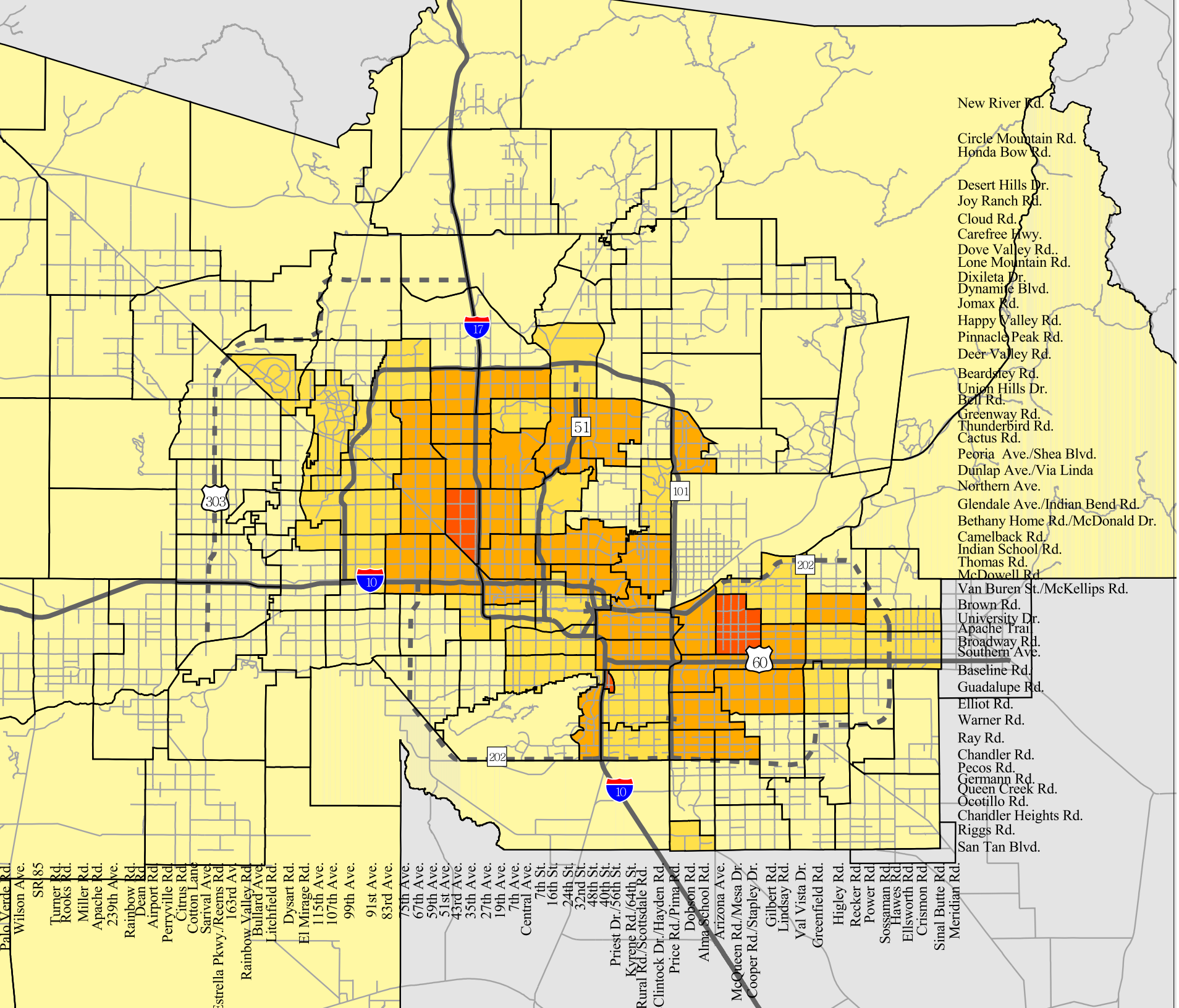
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Figure 3-6 provides similar information on existing year 2000 employment density at the RAZ level. High employment densities (over 1,000 jobs per square mile) exist in an area that encompasses much of Phoenix, Glendale, south Scottsdale, Tempe and west Mesa, with isolated RAZs of high density around Luke Air Force Base and Williams Gateway Airport. Densities of over 5,000 jobs per square mile exist in central Phoenix and north Tempe. The Town of Paradise Valley, with its exceptionally low employment density, constitutes a "hole" in the urban fabric of the region.

Tables 3.1 and 3.2 provide year 2000 population, household and employment data for Maricopa County cities, towns, Indian communities and unincorporated areas, based on municipal boundaries and municipal planning areas. These areas have been grouped into the following subregions: Southeast, Northeast, Central, Northwest, Southwest, and "Balance of County" (Gila Bend, Wickenburg and unincorporated areas outside the subregions). Population density, number of households and population per household are based on the census counts. Figure 3-7 shows that most of the county's population and employment are currently in the central subregion (i.e., Phoenix) and the southeast subregion (primarily Mesa, Chandler, Tempe and Gilbert).

Population density (Table 3.1) is highest in Guadalupe, Glendale, Tempe, Gilbert and Mesa, each with more than 3,000 residents per square mile. Chandler, Phoenix and Youngtown have population densities of 2,000 to 3,000 per square mile. Tempe has by far the highest employment density in the region, followed by Guadalupe, Tolleson, Youngtown, Phoenix and Chandler with over 1,000 employees per square mile (Table 3.2). The cities with the greatest total employment are Phoenix, Mesa, Tempe and Scottsdale, with over 100,000 jobs each. All employment data presented in Table 3.2 are based on the 1997 MAG projections for 2000 grouped by municipal planning areas.

Table 3.1 also provides U.S. Census 2000 data on total households and the population to household ratio, by subregion and municipal planning area. Only Guadalupe and the Gila River Indian Community have a population to household ratio greater than four. The predominantly retirement communities of Sun City, Sun City West, Sun Lakes, Youngtown and Rio Verde have fewer than two persons per household. Maricopa County, as a whole, has just under 2.7 inhabitants per household, and a population density of 333 persons per square mile.

3.3 Title VI Analysis

In recent years there has been increased attention and focus on ensuring equity and environmental justice in the delivery of government programs and projects. Recipients of federal assistance for transportation-related projects are now required to assure compliance with all civil rights standards applicable to the specified transportation-related projects, as they relate to Title VI of the Civil Rights Act of 1964, as amended. Title VI of the 1964 Civil Rights Act, Section 601, states: "No person in the United States shall, on the grounds of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Executive Order 12898 on Environmental Justice prohibits federally funded programs, policies and activities from having a disproportionately large, adverse human health and environmental effect on minority and low-income populations.

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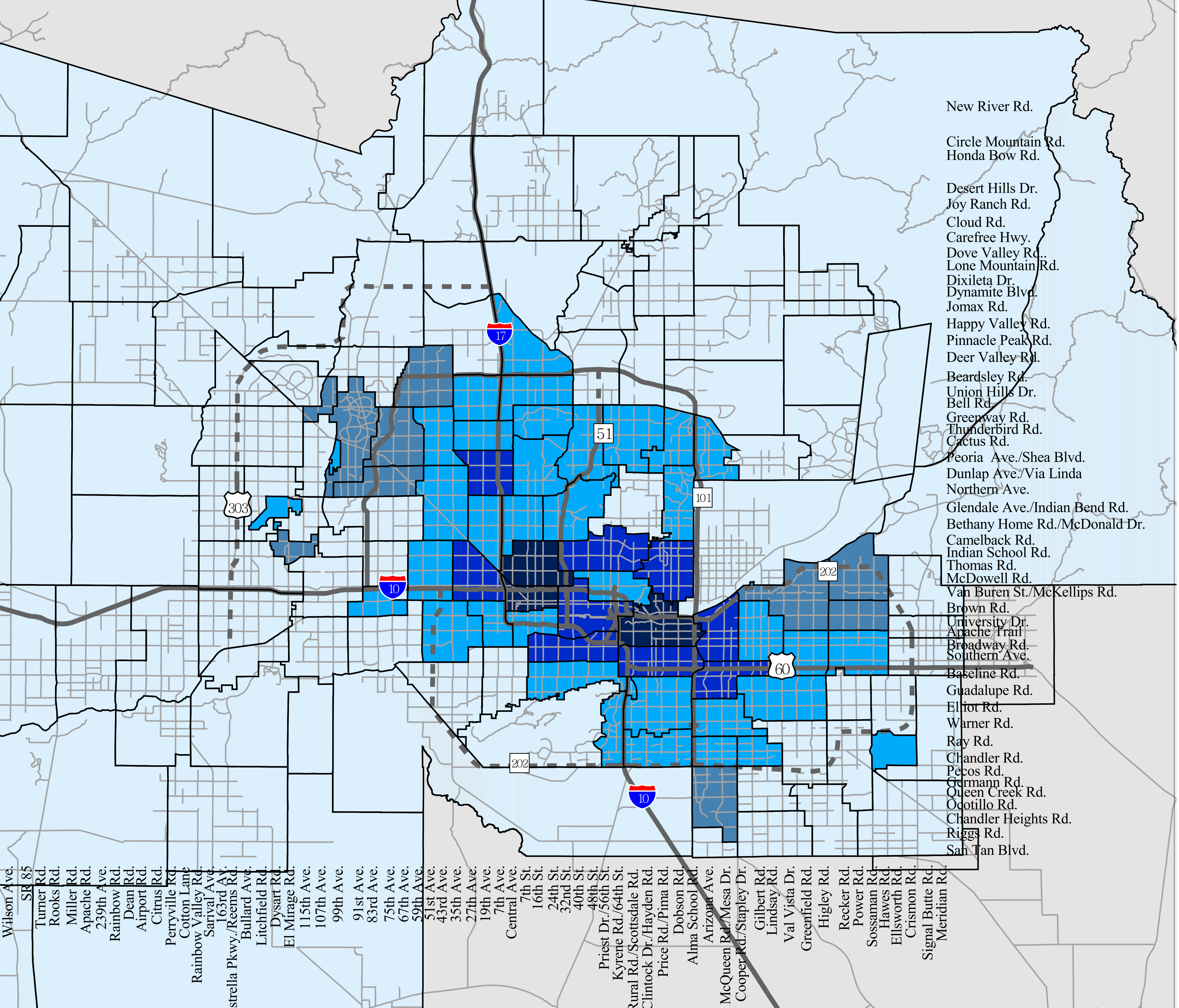


Table 3.1: Year 2000 Population, Population Density and Average Household Size by Jurisdiction

Jurisdiction	Municipality Population (Census 2000)	Municipality Household Pop. (Census 2000)	Municipality Households (Census 2000)	Population Density (Per Sq. Mile)	Population per Household	MPA Population (Census 2000)	MPA Households (Census 2000)
Chandler	176,581	175,799	62,377	2,977	2.82	183,293	65,297
Gila River Indian Community	2,699	2,654	629	N/A	4.22	2,699	629
Gilbert	109,697	109,631	35,405	3,108	3.10	117,268	37,570
Guadalupe	5,228	5,220	1,110	6,376	4.70	5,228	1,110
Mesa	396,375	392,426	146,643	3,094	2.68	436,558	164,140
Queen Creek	4,197	4,197	1,172	163	3.58	7,238	2,061
Tempe	158,625	153,383	63,602	3,955	2.41	158,672	63,620
Sun Lakes	11,936	11,936	6,683	N/A	1.79	8,333	4,715
Total Southeast Subregion	**865,338**	**855,246**	**317,621**	**2,939**	**2.69**	**919,289**	**339,142**
Carefree	2,927	2,927	1,389	332	2.11	2,927	1,389
Cave Creek	3,728	3,728	1,571	134	2.37	3,820	1,612
Fountain Hills	20,235	20,228	8,653	1,110	2.34	20,235	8,653
Paradise Valley	13,664	13,652	5,034	887	2.71	14,001	5,184
Salt River Pima – Maricopa Indian Community	6,405	6,355	1,959	N/A	3.24	6,451	1,979
Scottsdale	202,705	201,028	90,669	1,106	2.22	202,754	90,689
Rio Verde	1,419	1,419	761	N/A	1.86	1,385	743
Total Northeast Subregion	**251,083**	**249,337**	**110,036**	**959**	**2.27**	**251,573**	**110,249**

Table 3.1 (continued)

Jurisdiction	Municipality Population (Census 2000)	Municipality Household Pop. (Census 2000)	Municipality Households (Census 2000)	Population Density (Per Sq. Mile)	Population per Household	MPA Population (Census 2000)	MPA Households (Census 2000)
Phoenix	1,321,045	1,298,577	465,834	2,817	2.79	1,344,951	474,459
Total Central Subregion	**1,321,045**	**1,298,577**	**465,834**	**2,817**	**2.79**	**1,344,951**	**474,459**
El Mirage	7,609	7,608	2,121	767	3.59	7,609	2,121
Glendale	218,812	215,955	75,700	4,008	2.85	229,366	79,150
Peoria	108,363	106,849	39,183	708	2.73	112,330	40,406
Surprise	30,848	30,724	12,484	430	2.46	36,009	14,269
Youngtown	3,010	2,857	1,641	2,315	1.74	3,013	1,643
Sun City	38,309	37,641	23,490	N/A	1.60	38,364	23,520
Sun City West	26,344	26,083	14,997	N/A	1.74	26,344	14,997
Total Northwest Subregion	**433,295**	**427,717**	**169,616**	**1,269**	**2.52**	**453,035**	**176,106**
Avondale	35,883	35,737	10,640	878	3.36	37,384	11,092
Buckeye	6,537	6,528	2,158	44	3.03	16,661	4,709
Goodyear	18,911	16,541	6,179	163	2.68	20,505	6,682
Litchfield Park	3,810	3,780	1,508	1,217	2.51	3,813	1,509
Tolleson	4,974	4,974	1,432	1,013	3.47	4,977	1,433
Total Southwest Subregion	**70,115**	**67,560**	**21,917**	**224**	**3.08**	**83,340**	**25,425**

Table 3.1 (continued)

Jurisdiction	Municipality Population (Census 2000)	Municipality Household Pop. (Census 2000)	Municipality Households (Census 2000)	Population Density (Per Sq. Mile)	Population per Household	MPA Population (Census 2000)	MPA Households (Census 2000)
Gila Bend	1,980	1,980	659	67	3.00	2,082	696
Wickenburg	5,082	5,039	2,341	444	2.15	7,406	3,361
Unincorporated	124,211	121,910	44,862	N/A	2.72	10,473	3,448
Total Balance of County	**131,273**	**128,929**	**47,862**	**N/A**	**2.69**	**19,961**	**7,505**
TOTAL MARICOPA COUNTY	**3,072,149**	**3,027,366**	**1,132,886**	**333**	**2.67**	**3,072,149**	**1,132,886**

Source: U.S. Bureau of the Census, April 2000 and MAG allocation of Census data to Municipal Planning Areas (MPA).

Table 3.2: Estimated Year 2000 Employment and Employment Density by Jurisdiction (Metropolitan Planning Area)

Jurisdiction (Metropolitan Planning Area)	Total Employment	Employment Density (per square mile)
Chandler	74,291	1,056
Gila River Indian Community	4,373	29
Gilbert	21,230	295
Guadalupe	904	1,215
Mesa	164,772	967
Queen Creek	2,015	48
Tempe	153,984	3,816
Sun Lakes	2,149	N/A
Total Southeast Subregion	**423,718**	**772**
Carefree	1,730	146
Cave Creek	1,605	38
Fountain Hills	4,191	206
Paradise Valley	6,070	381
Salt River Pima-Maricopa Indian Community	3,721	46
Scottsdale	136,665	707
Rio Verde	227	N/A
Total Northeast Subregion	**154,209**	**422**
Phoenix	734,773	1,139
Total Central Subregion	**734,773**	**1,139**
El Mirage	1,844	180
Glendale	76,289	828
Peoria	19,283	97

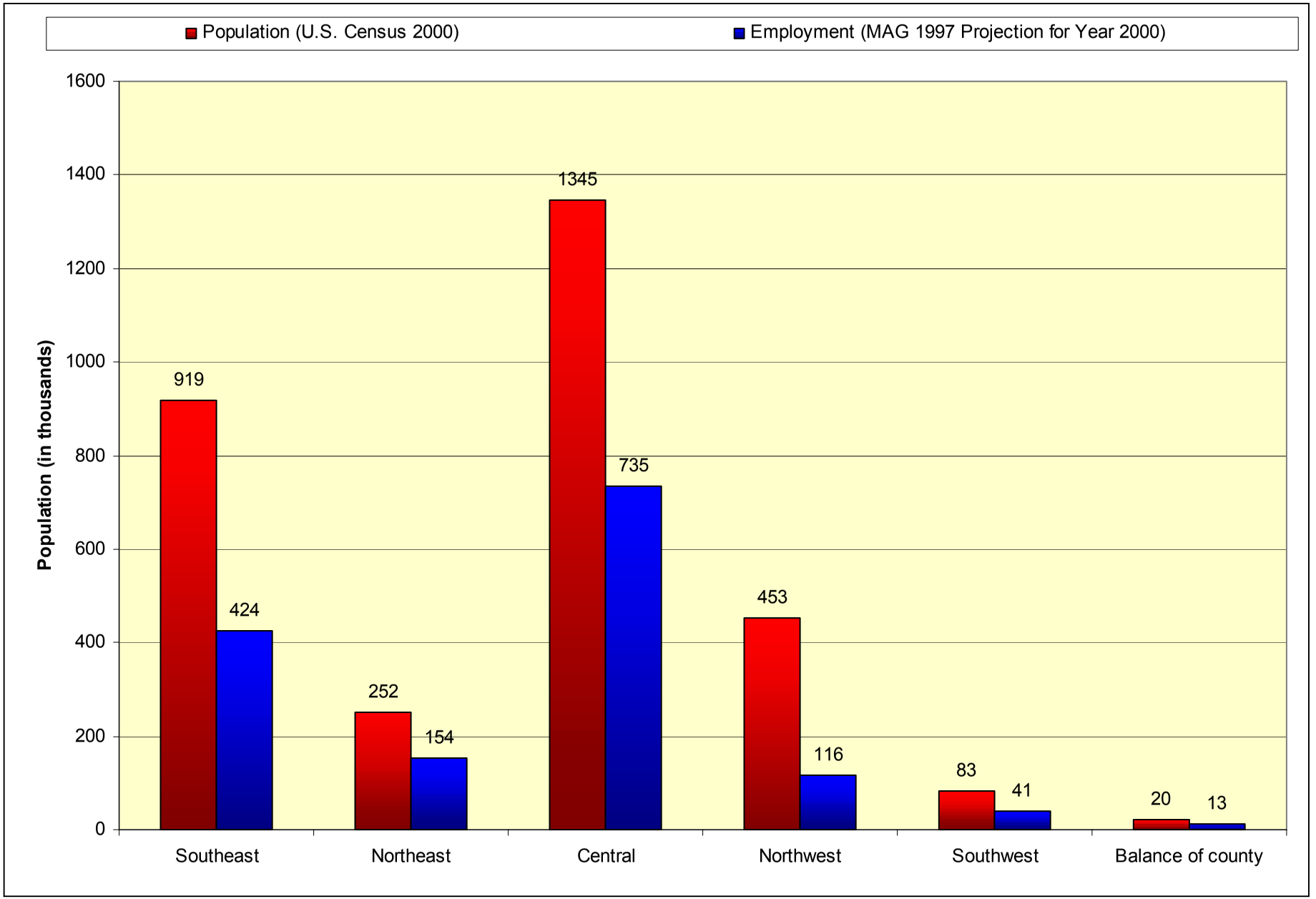
Table 3.2 (continued)

Jurisdiction (Metropolitan Planning Area)	Total Employment	Employment Density (per square mile)
Surprise	4,700	17
Youngtown	1,336	1,178
Sun City	9,911	N/A
Sun City West	2,882	N/A
Total Northwest Subregion	**116,245**	**180**
Avondale	8,563	168
Buckeye	7,221	14
Goodyear	16,296	108
Litchfield Park	2,163	531
Tolleson	7,141	1,200
Total Southwest Subregion	**41,439**	**43**
Gila Bend	1,023	49
Wickenburg	3,891	297
Unincorporated	7,685	N/A
Total Balance of County	**12,599**	**N/A**
TOTAL MARICOPA COUNTY	***1,482,983***	***161***

Source: MAG Socioeconomic Projections Interim Report, June 1997.

To help meet the requirements of Title VI and environmental justice, the demographic characteristics of the Maricopa County population were mapped to help determine whether specified populations would be disproportionately affected by or discriminated against by elements of the MAG Regional Transportation Plan (RTP). The following variables were considered:

- Race (non-Whites as percent of population)
- Percent of population of Hispanic origin
- Age (percent age 55 and older)
- Disability (percent of population with mobility or self-care limitations)



Source: U.S. Census 2000 and MAG Adopted Socioeconomic Projections 1997

Figure 3-7

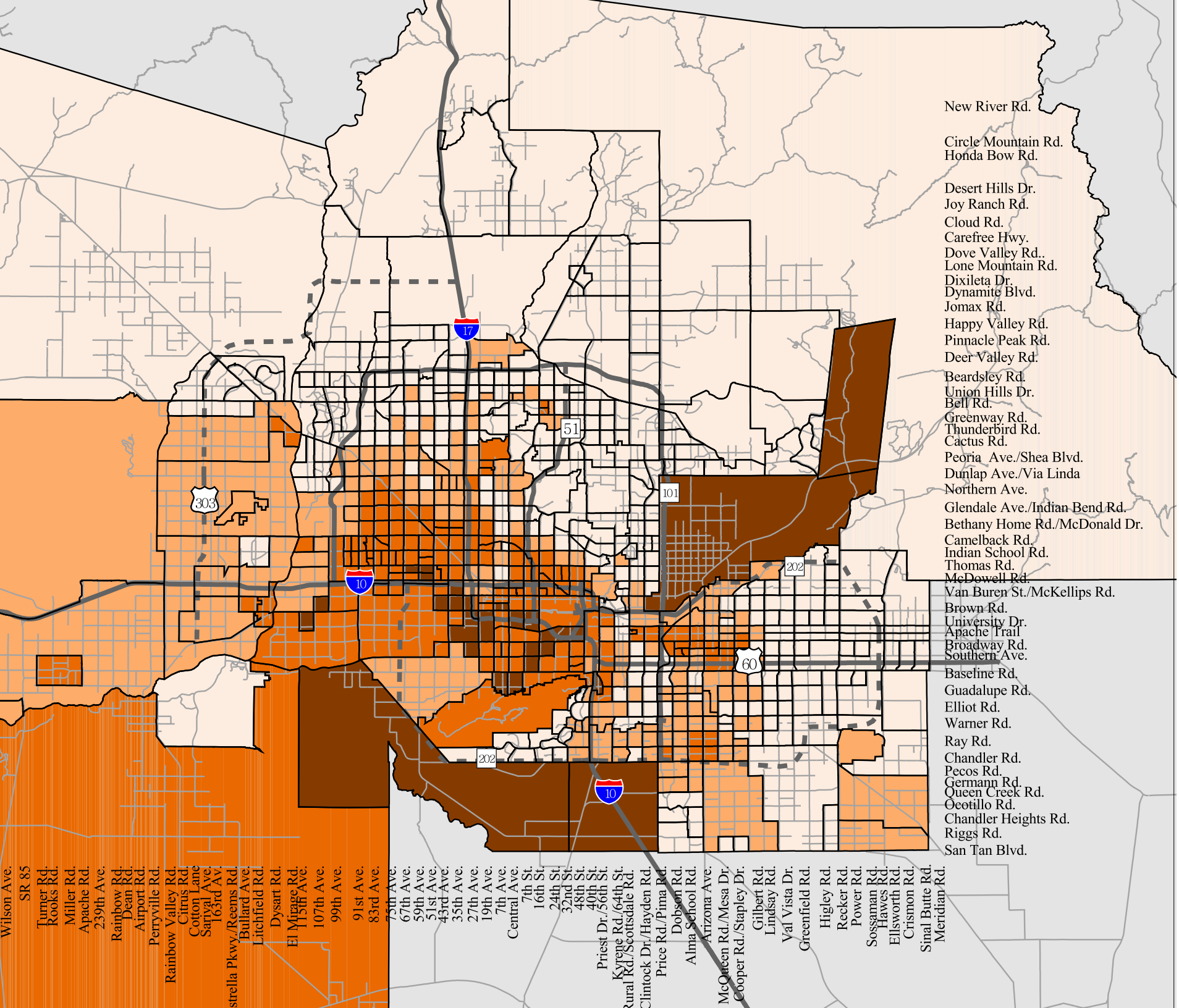
Year 2000 Maricopa County Population and Employment by Subregion

- Percent of population with low income (as defined by federal poverty guidelines)
- Percent of households with no vehicles

Figures 3-8 through 3-13 map the proportion of the population within the Title VI groups by census tract. The maps are based on the latest available U.S. Census data: 2000 for race and ethnicity; 1995 Special Census for age, income and zero-vehicle households; and 1990 for disability. It is recognized that recommended facilities and actions in the RTP will be implemented at various future dates, when demographics of individual census tracts will have changed. However, no tract-level population projections are available for specific segments of the population, so it is difficult to predict how their distribution may change. Therefore, existing conditions have been used as a first approximation for an overview of Title VI characteristics at this stage of the planning process.

The percentage of non-Whites (Figure 3-8) is generally highest within the Gila River, Salt River Pima-Maricopa and Fort McDowell Indian communities, and in portions of central, south and west Phoenix. High percentages of Hispanics (Figure 3-9) exist in central Phoenix, in the El Mirage area, in Guadalupe and in pockets of Chandler and Mesa. High proportions of older residents (Figure 3-10) characterize the retirement-oriented areas of the northwest and southeast (e.g., the Sun Cities, Sun Lakes, Leisure World). A comparison of Figures 3-10 and 3-11 shows that the percent of disabled residents is associated with older populations. The percent of persons with disabilities is exceptionally high in the Indian communities and rural areas to the southwest and northwest, however.

Areas with a high percentage of low-income residents (Figure 3-12) include much of the Phoenix urban core, the Indian communities (especially Gila River), El Mirage and Guadalupe. Figures 3-12 and 3-13 demonstrate the strong correlation between low-income residents and lower auto ownership rates. The Indian communities, portions of the Phoenix inner city and El Mirage stand out as areas with a low level of auto ownership.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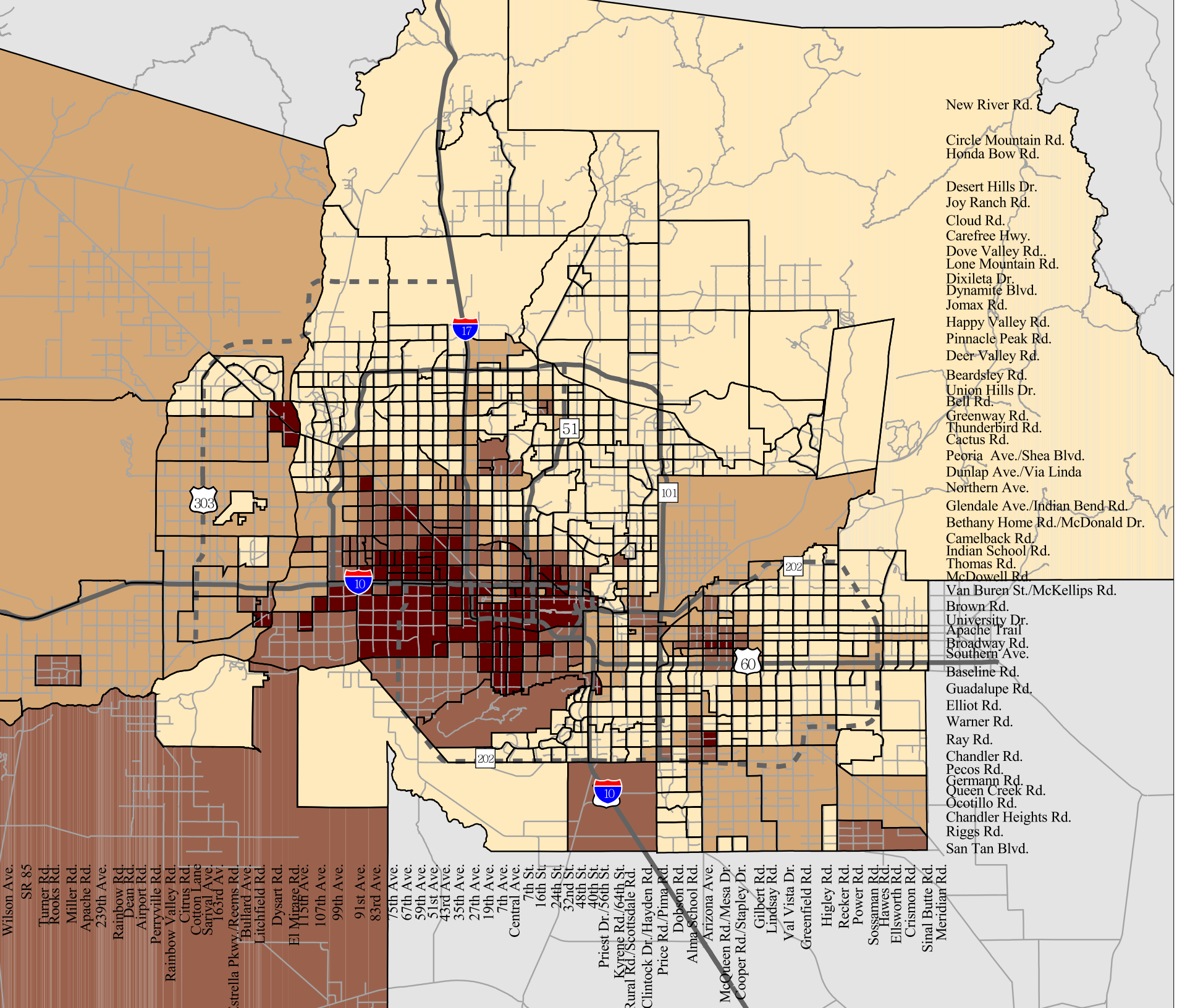
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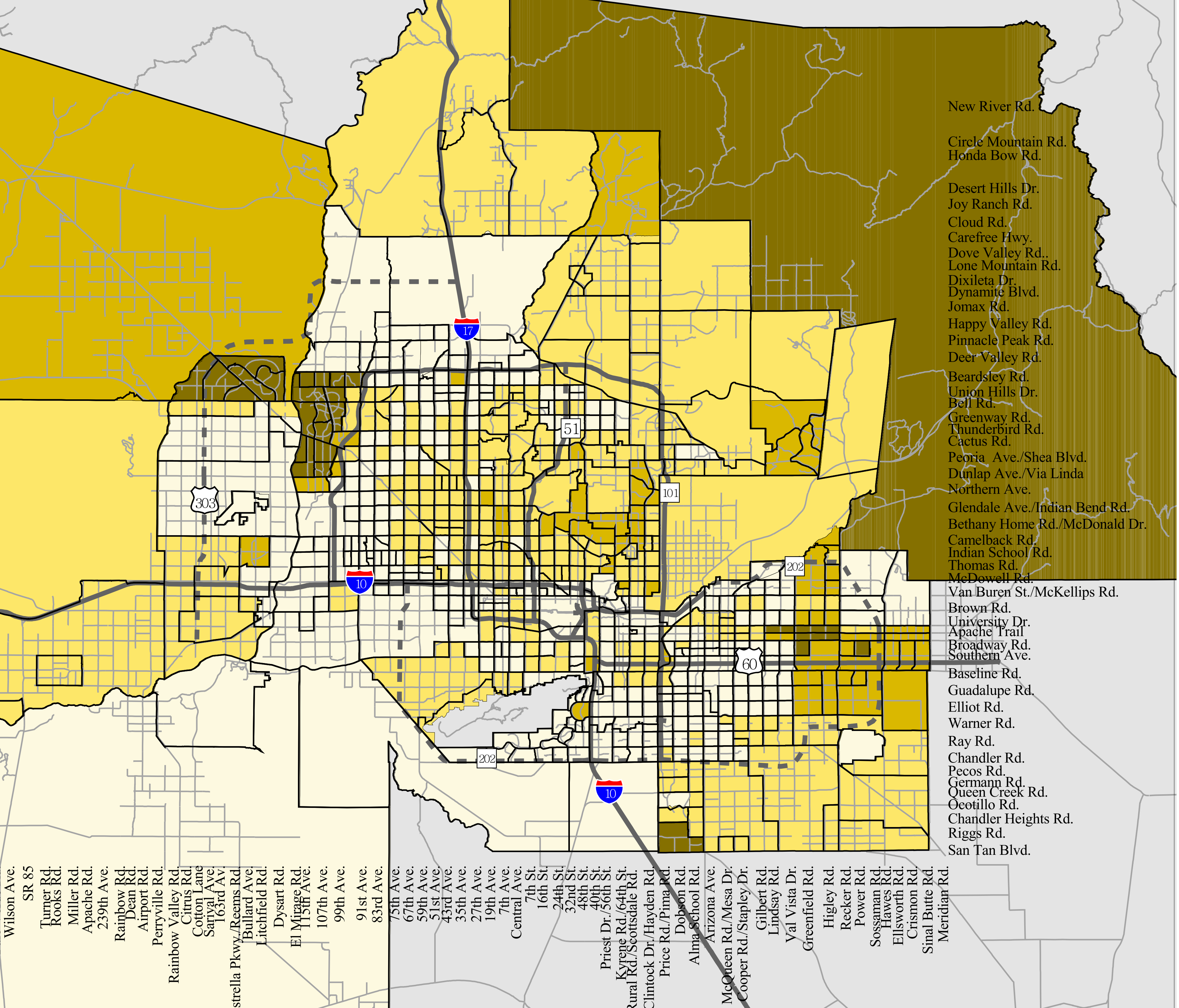
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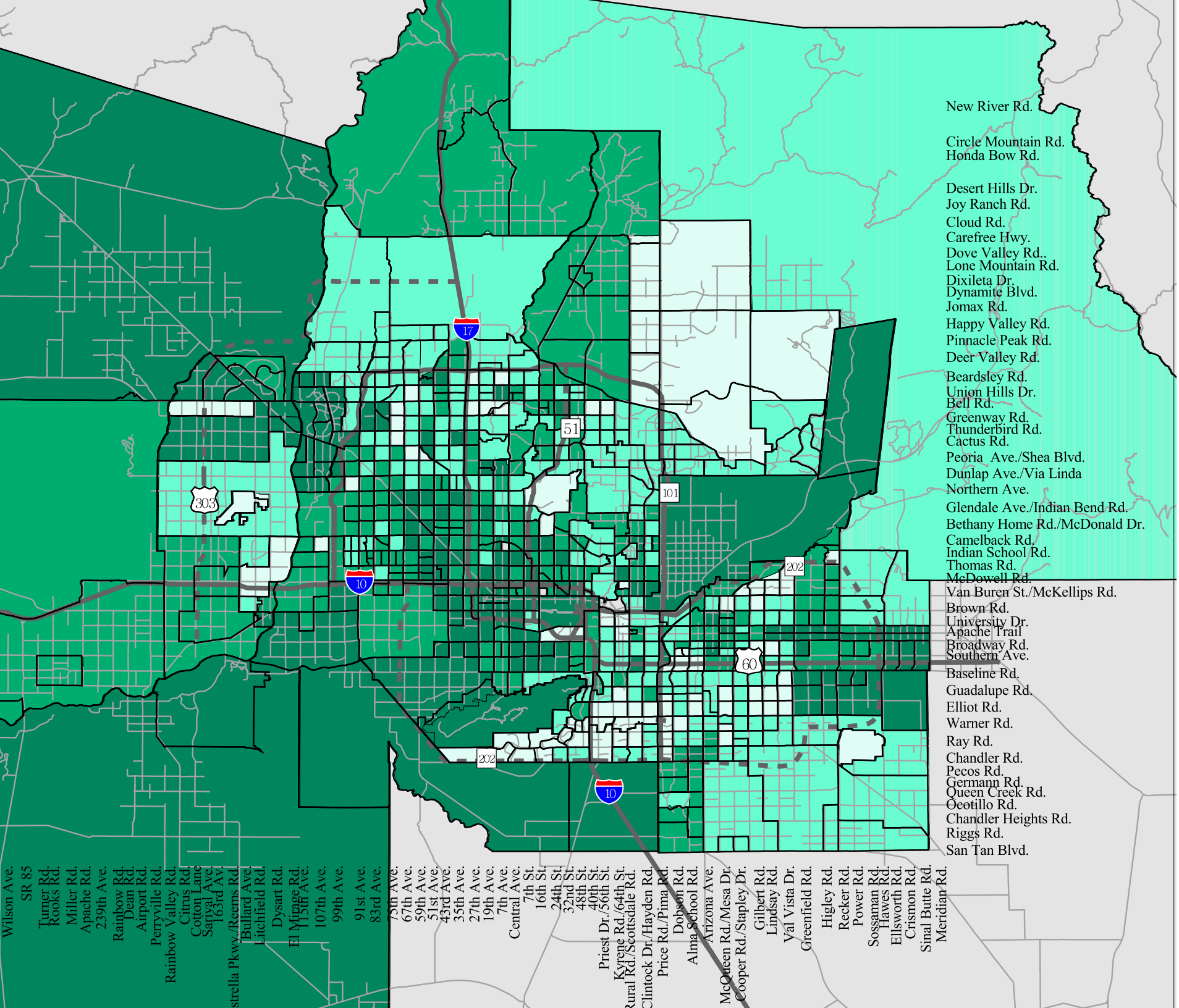
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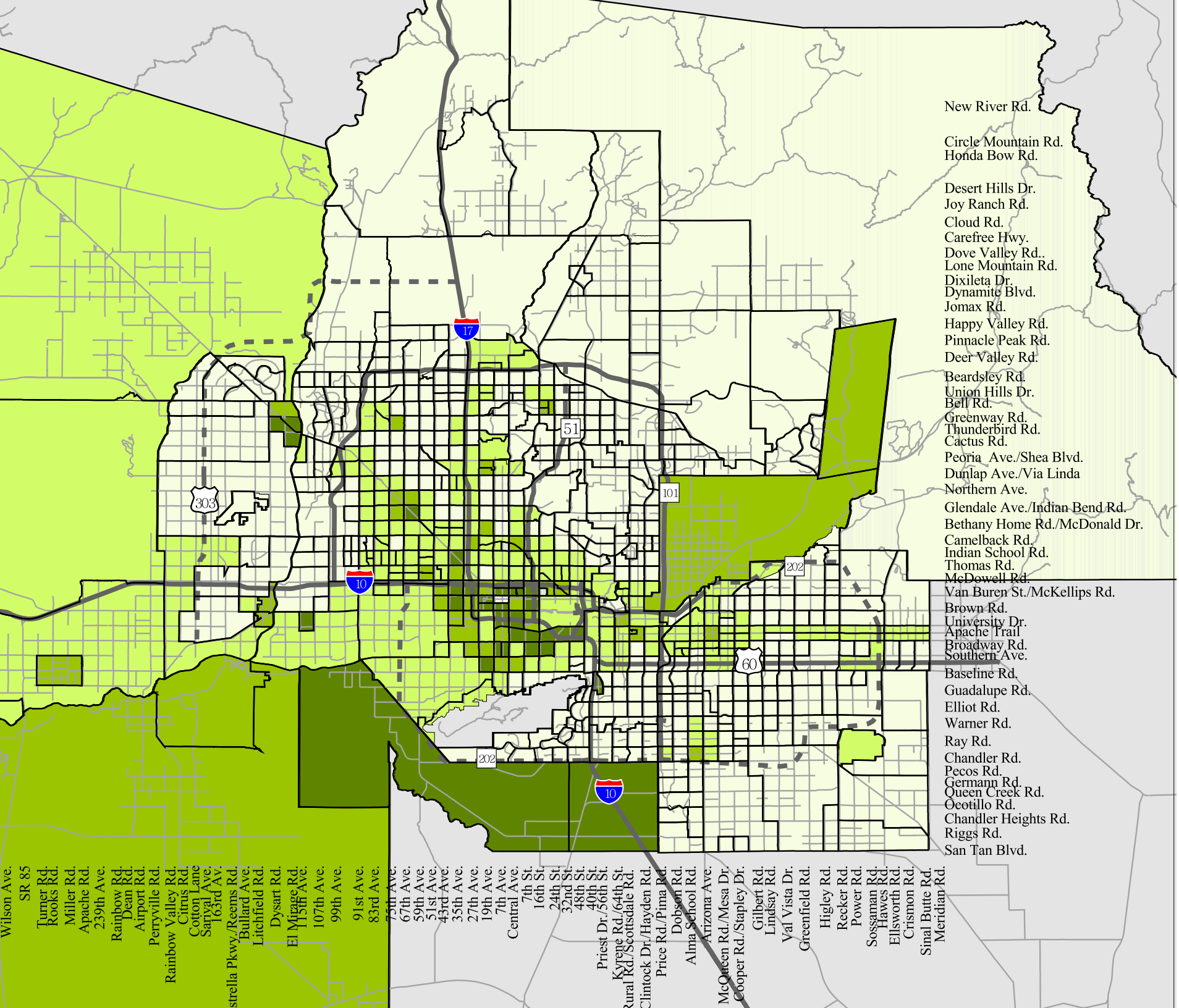
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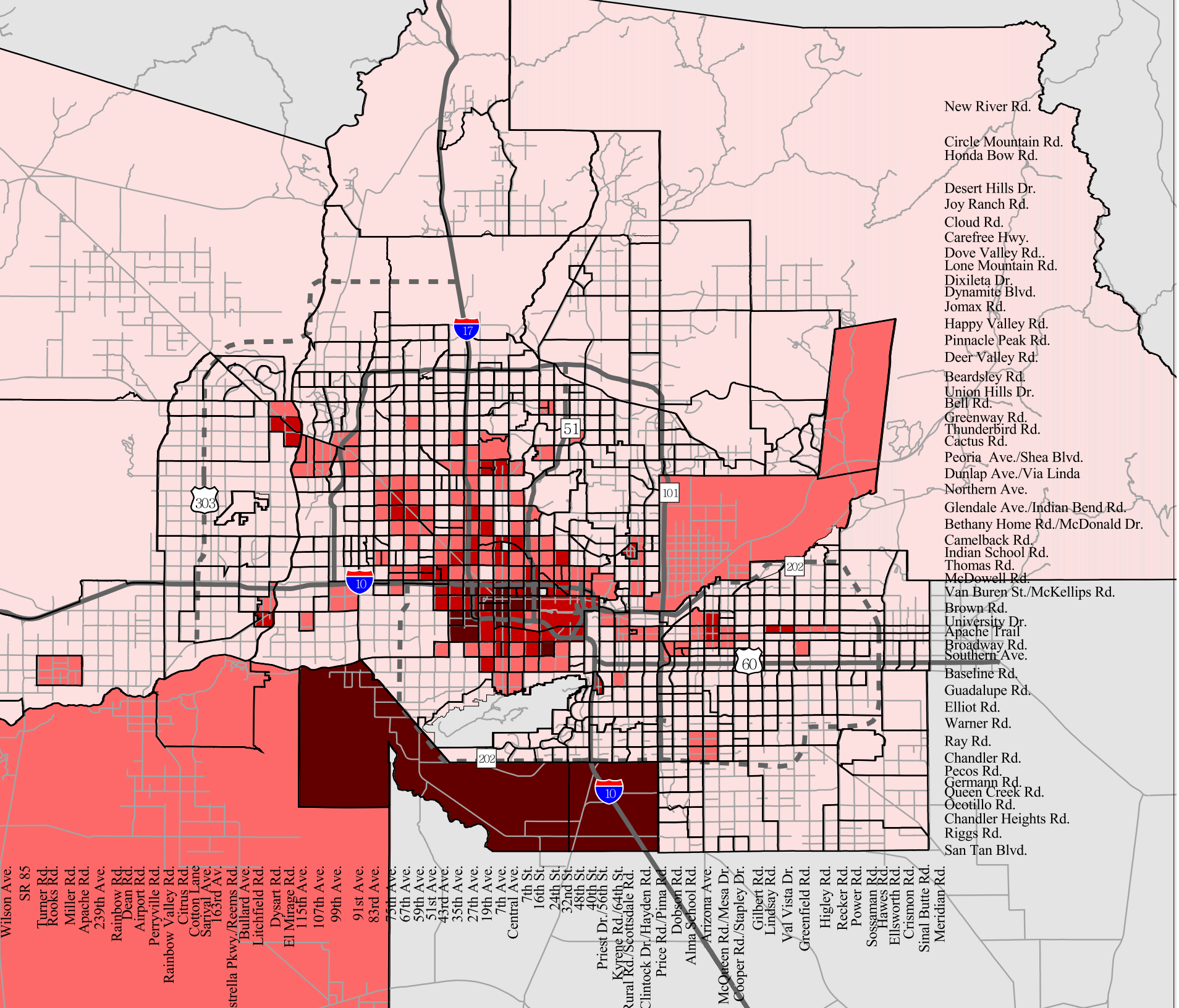
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4.0 FUTURE LAND USE AND SOCIOECONOMIC CONDITIONS

This chapter describes projected land use and socioeconomic (population, housing and employment) conditions for the years 2010, 2025 and 2040. Future data on population, employment and the number of households are based on the latest adopted MAG socioeconomic forecasts. Again, results are presented by subregion, with an emphasis on trends and growth rates over the 2000-2040 timeframe. The jobs/housing balance by subregion over the 40-year study period is also reported.

4.1 Generalized Land Use, 2010-2040

Figure 4-1 illustrates the generalized land use vision for the MAG area, derived from the General Plans of local jurisdictions. The vacant land category does not appear in this graphic because all land is envisioned as either developed, rural (i.e., sparsely developed) or open space. A new category, Mixed Use, has been added, consisting of urban development projects that combine retail, office, entertainment, recreational and tourist-oriented activities.

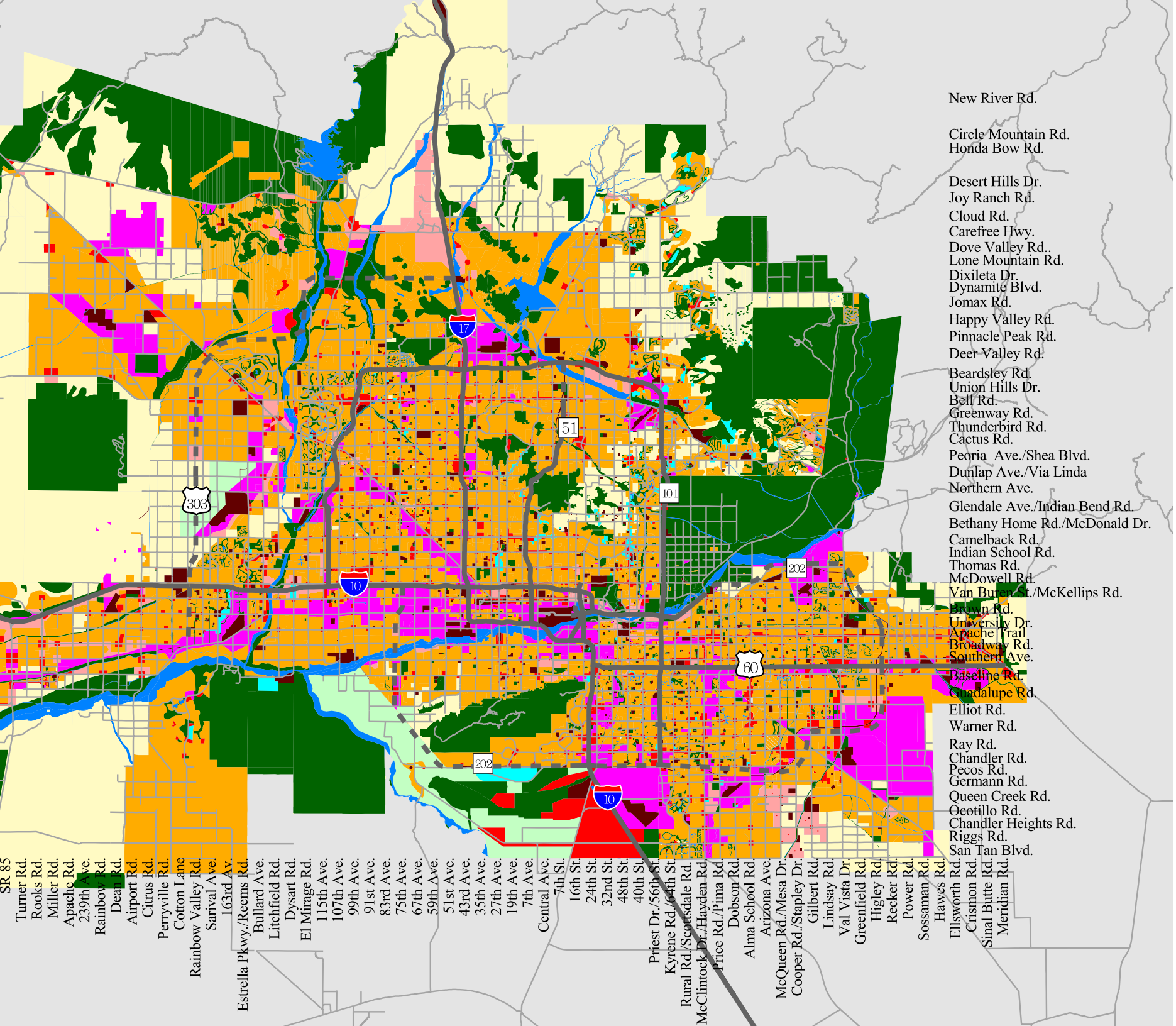
According to Figure 4-2, 45% of the region's land is projected to remain open space and 47% will ultimately be devoted to residential uses, including low-density rural development. The remaining 8% will be industrial, retail, mixed-use and agriculture. Agricultural uses will decline from 7% in 2000 to 1% in 2040.

4.2 Population, Households and Employment

Table 4.1 lists 2010, 2025 and 2040 population projections, and percent growth from the year 2000, by subregion. Figure 4-3 summarizes this information in a bar chart. Within the Phoenix metro area, the southwest subregion is projected to have by far the highest 40-year growth rate, at over 600% according to the MAG adopted projections. The lowest growth rates are projected for the southeast area and Phoenix.

In absolute numbers, 40-year growth is expected to be greatest in Phoenix (over 1,100,000), the southeast subregion (over 700,000) and the southwest (roughly 550,000). However, Phoenix's share of the regional population will decline from 43% today to 39% in 2040, while the percentage of the county's population living in the southwest region will rise from less than 3% to about 10%. The total population of Maricopa County will slightly more than double (105% growth, based on the latest U.S. Census data and MAG projections for future years) from 2000 to 2040. The population of neighboring Pinal County, including the city of Apache Junction just east of Mesa, is projected to increase by 69%, from 162,000 to 273,000, during the same period.

Figures 4-4 through 4-6 present projected population density by RAZ for the years 2010, 2025 and 2040. Higher densities are projected to expand outward as low-density communities build out, but many peripheral areas of the region will maintain densities under 1,500 per square mile. Figure 4-7 illustrates the projected change in population density by RAZ from 2000 to 2040. Much of Phoenix, Glendale and Tempe, as well as portions of Scottsdale, Mesa, Chandler and the Sun Cities, are expected to roughly double their density between 2000 and 2040.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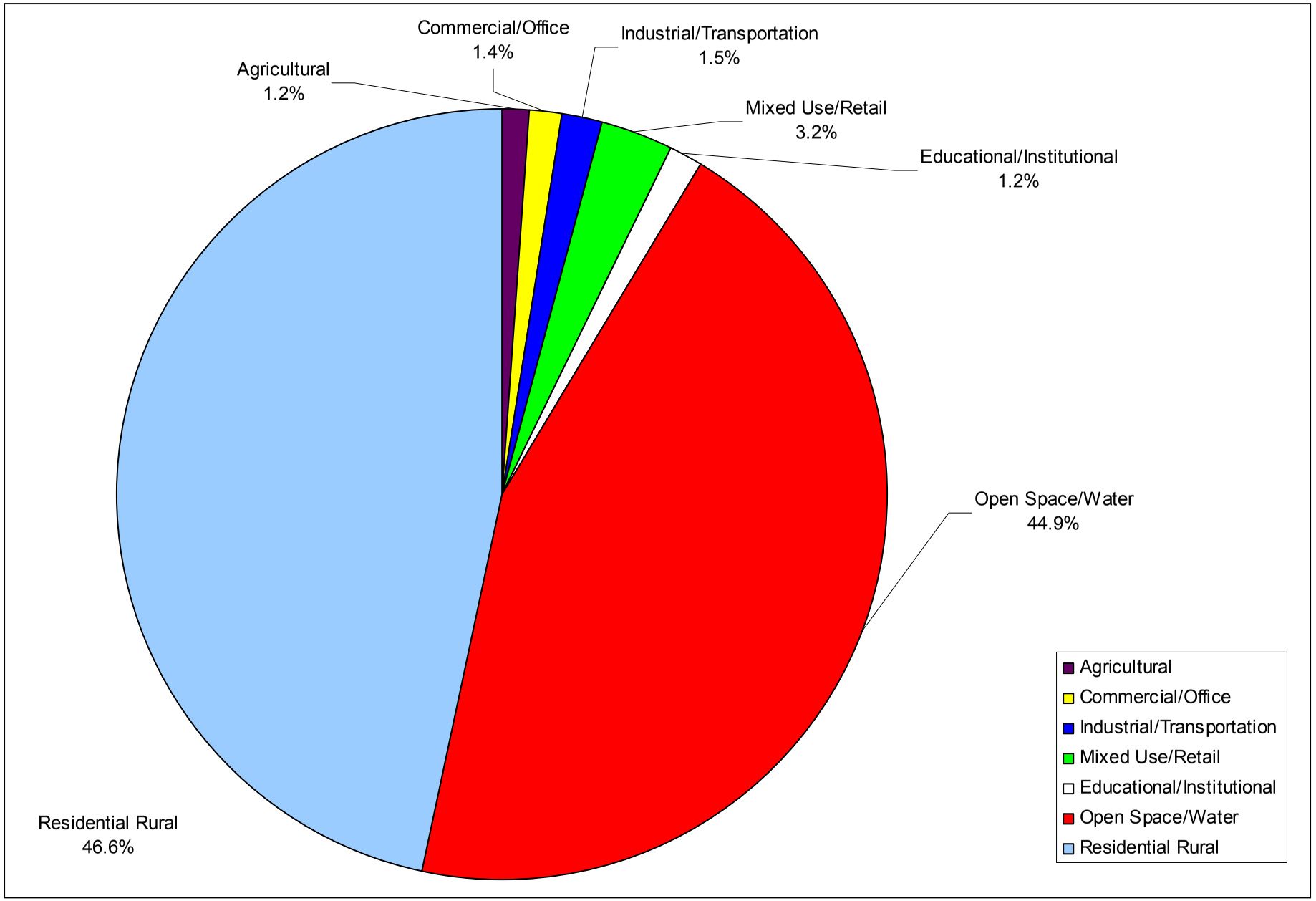
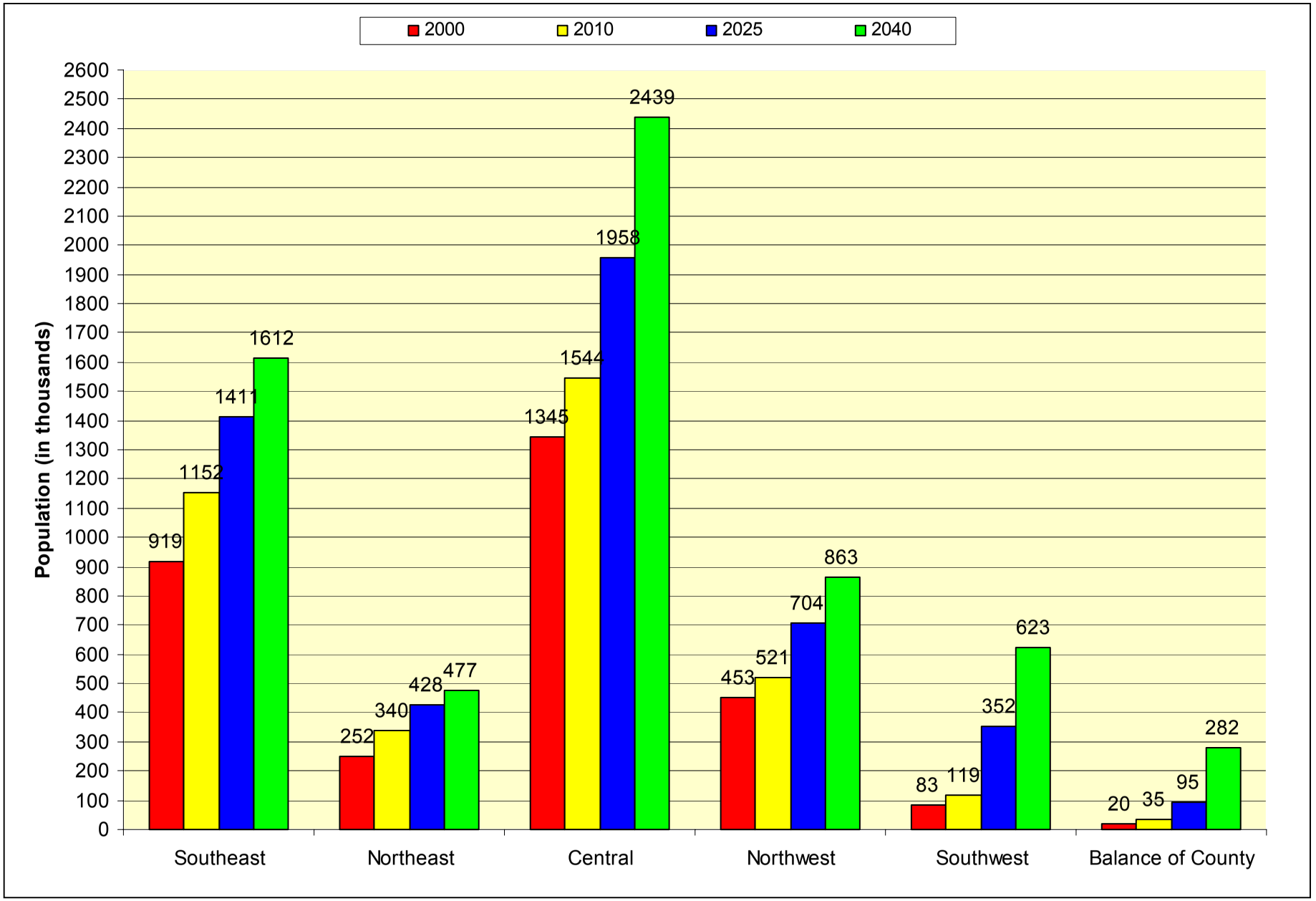


Figure 4-2

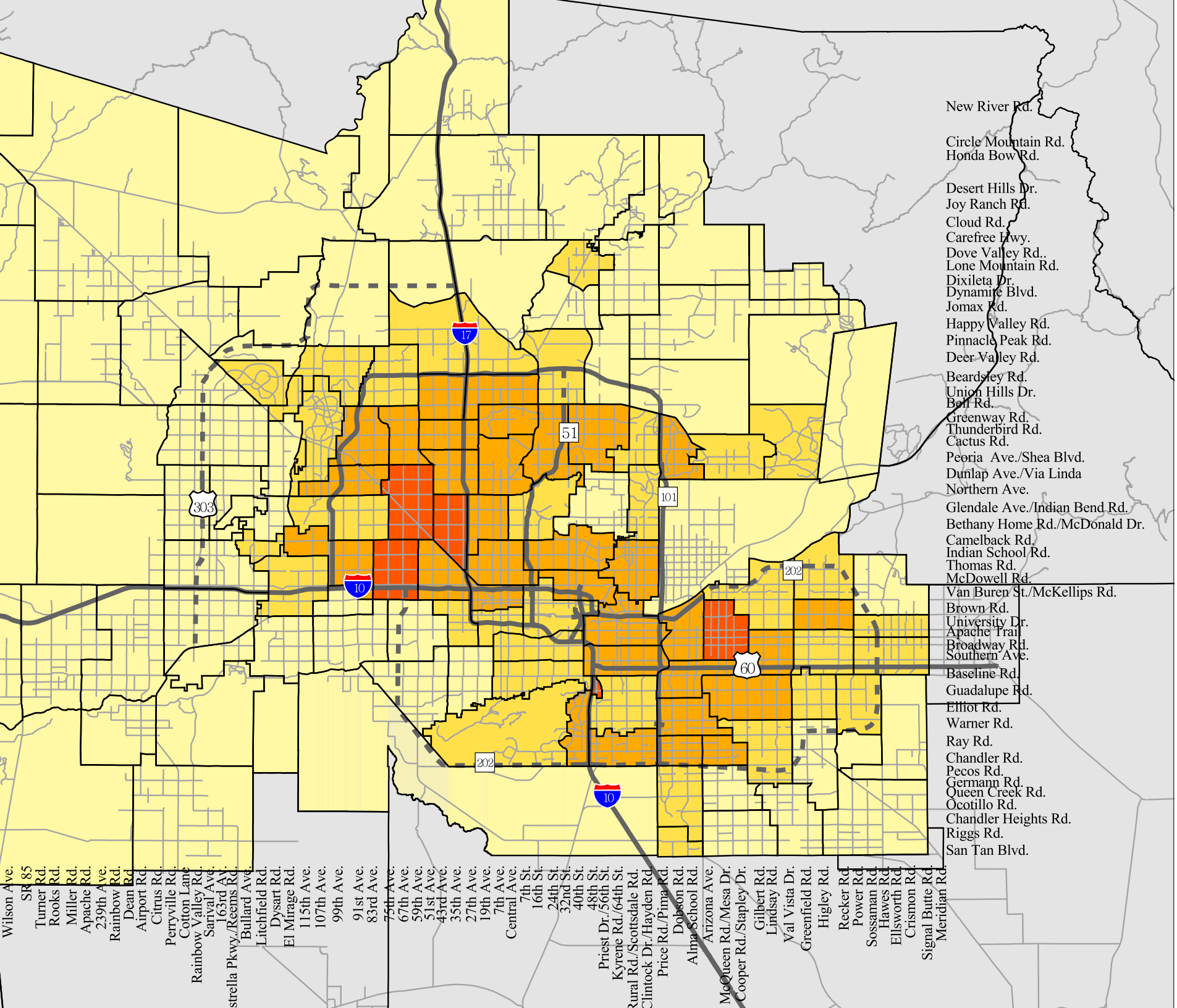
Land Distribution in Maricopa County by Use - Adopted General Plans



Source: U.S. Census 2000 and MAG Adopted Socioeconomic Projections 1997

Figure 4-3

Maricopa County Population by Subregion 2000-2040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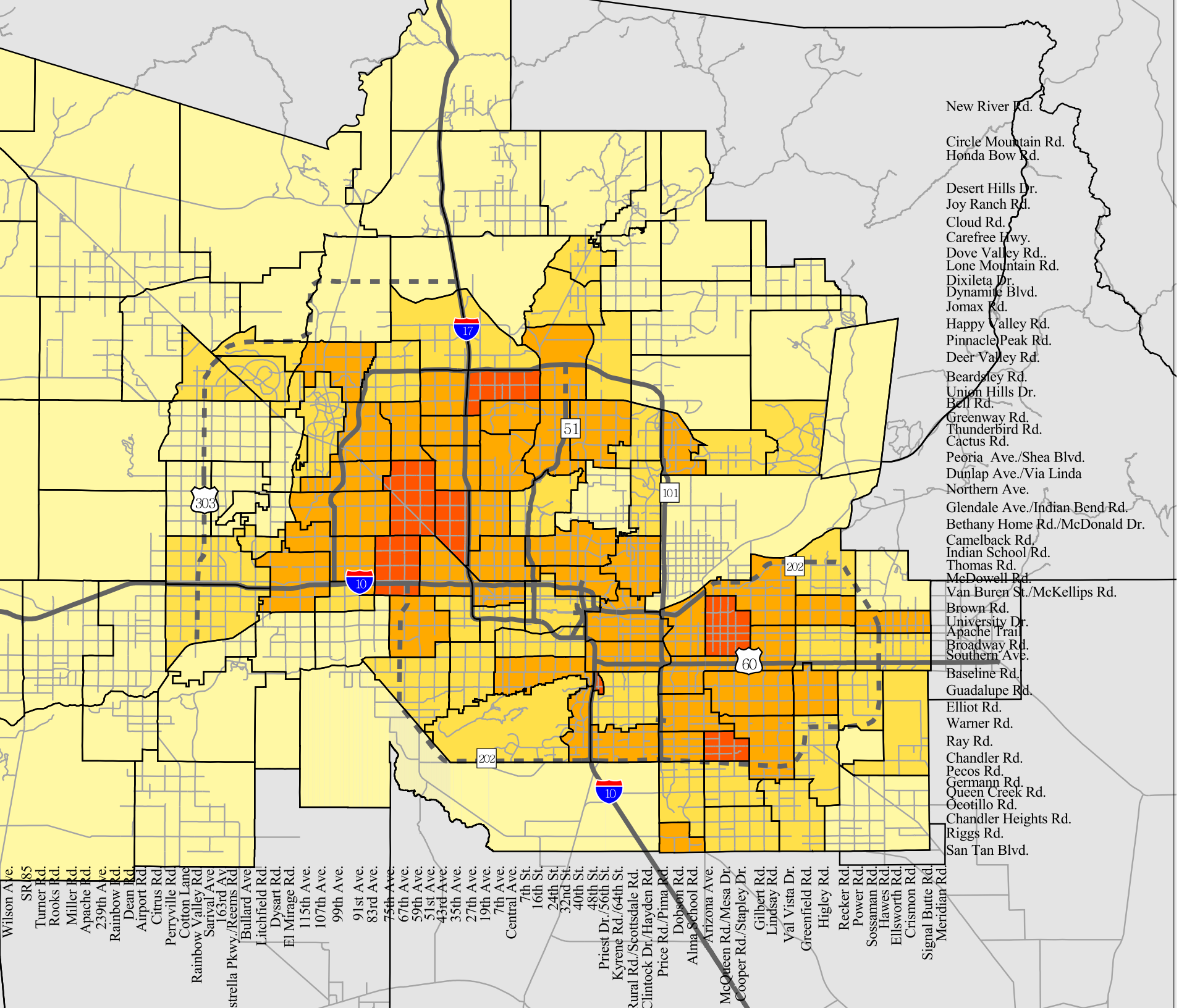
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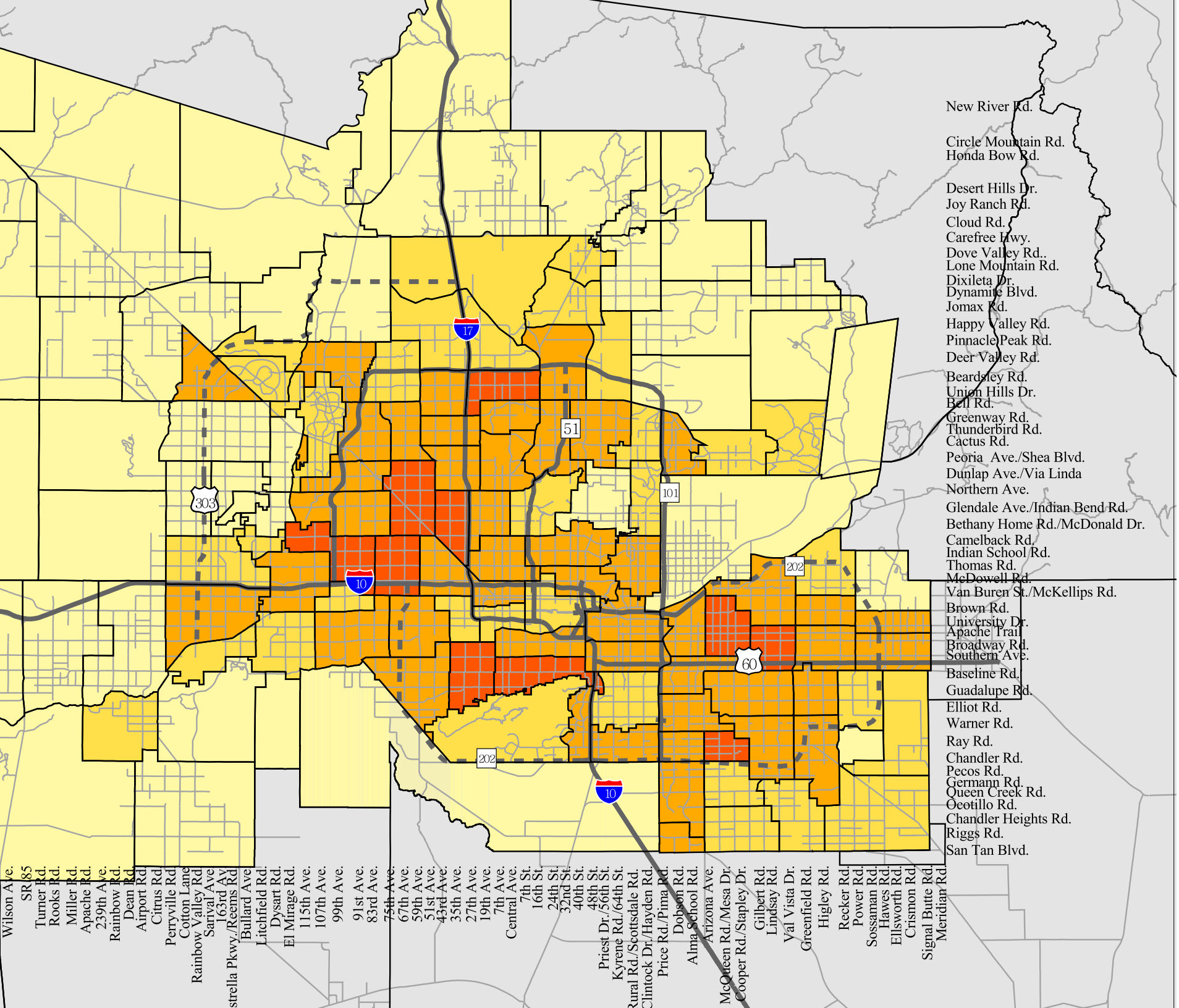
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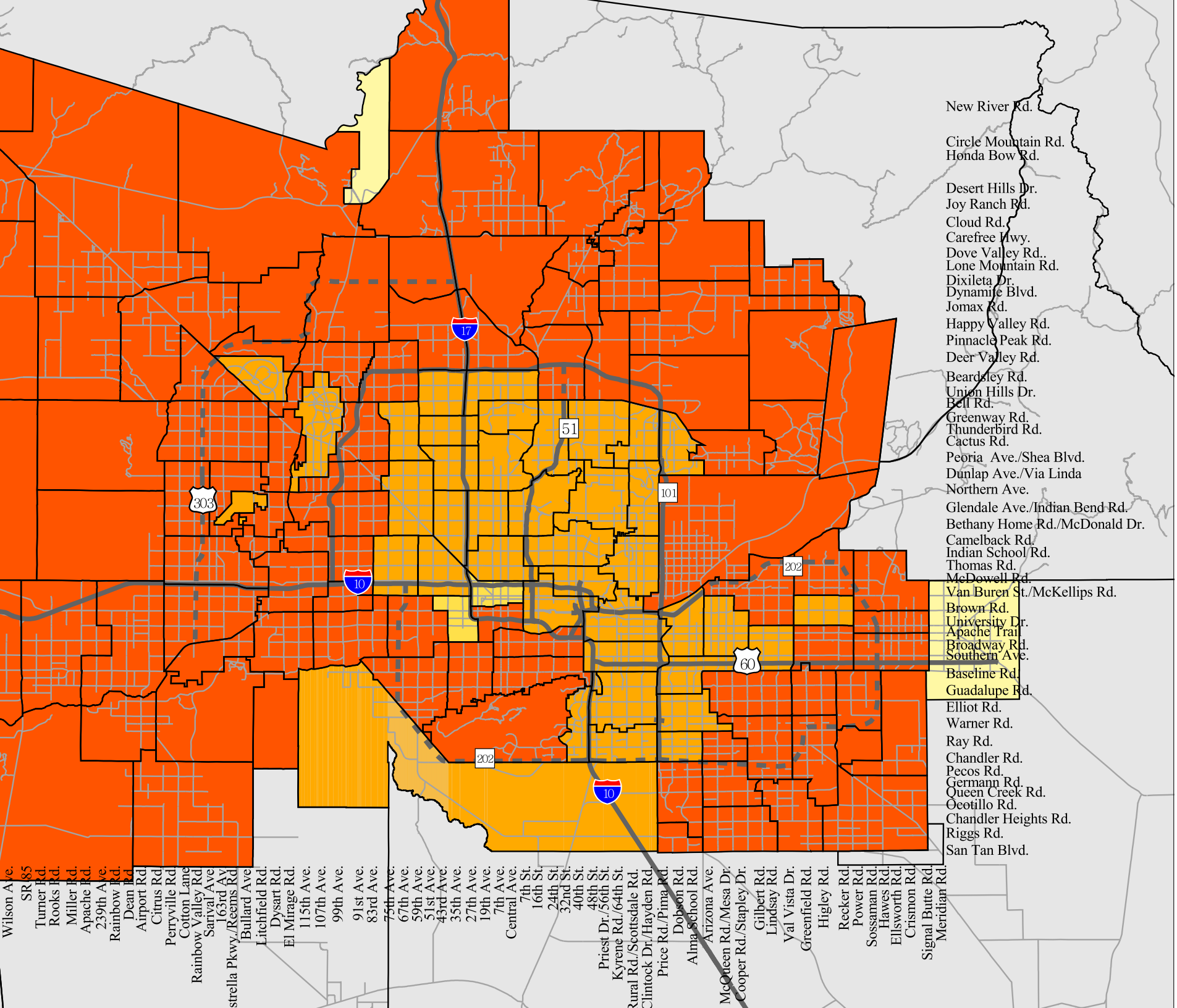
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Table 4.1: Projected Population by Subregion, 2010-2040

Subregion	2010		2025		2040	
	Total	% Growth from 2000	Total	% Growth from 2000	Total	% Growth from 2000
Southeast	1,151,594	25%	1,410,747	53%	1,612,018	75%
Northeast	339,545	35%	428,340	70%	476,571	89%
Central (Phoenix)	1,544,093	15%	1,958,470	46%	2,439,218	81%
Northwest	520,685	15%	704,272	55%	863,091	91%
Southwest	119,074	43%	351,692	322%	623,479	648%
Balance of County *	34,584	73%	94,904	375%	281,843	1,312%
Maricopa County	**3,709,575**	**21%**	**4,948,425**	**61%**	**6,296,220**	**105%**

% growth based on MAG allocation of U.S. Census 2000 to Municipal Planning Areas.

*Includes Gila Bend, Wickenburg and unincorporated rural areas.

Sources: MAG allocation of U.S. Census 2000 and MAG Adopted Socioeconomic Projections, June 1997.

Table 4.2 displays the projected number of households by subregion for the years 2010, 2025 and 2040. Over the 40-year period beginning in 2000, the number of households in Maricopa County is expected to increase by approximately 110%. A comparison of Tables 4.1 and 4.2 reveals that the number of households is projected to grow faster than population in most subregions. Within metro Phoenix, the growth rate will be highest in the southwest subregion and lowest in the southeast.

Table 4.3 lists 2010, 2025 and 2040 employment projections and percent growth (from the year 2000) by subregion. Figure 4-8 summarizes this information in bar chart format. The southwest subregion is projected to have by far the highest growth rate, with employment sextupling. The lowest growth rates are projected for the central and northeast subregions.

In absolute numbers, 40-year growth in employment is expected to be greatest in the southeast subregion (484,000), Phoenix (388,000) and the southwest (205,000). Employment as a percentage of the regional total will fall from 50% to 39% in Phoenix, rise from 3% to 9% in the southwest, and rise by smaller percentages in the southeast and northwest subregions.

From 2000 to 2040, employment in Maricopa County is projected to grow at a somewhat slower rate than population (95% versus 105%). As a result, the number of jobs per resident will decrease from 0.48 today to 0.46 in 2040. Much of this trend is attributable to the relative aging of the county's population (see Section 2.1). However, the number of jobs per resident is expected to rise substantially in the southeast subregion, from 0.46 in 2000 to 0.56 in 2040; and in the northwest, from 0.26 to 0.34.

Table 4.4 summarizes the jobs/housing balance in jobs per household by subregion, for the years 2000, 2010, 2025 and 2040. Except in the southwest and "balance of county" subregions, changes within each subregion are projected to be small. The southwest subregion will undergo uneven spurts of housing and employment growth, a common pattern in sparsely settled areas undergoing rapid development. Compared with the rest of the region, the jobs/household ratio will remain lower in the northwest subregion, partially because of the high proportion of retired residents in this area. In the county as a whole, the ratio will remain fairly steady, at 1.2 to 1.3 jobs per household.

Figures 4-9 through 4-11 show the projected expansion of areas of high employment density for the years 2010, 2025 and 2040. Figure 4-12 illustrates the projected change in employment density by RAZ from 2000 to 2040, while Figure 4-13 summarizes regional population and employment totals for the years 2000, 2010, 2025 and 2040.

Table 4.2: Projected Number of Households by Subregion, 2010-2040

Subregion	2010		2025		2040	
	Total	% Growth from 2000	Total	% Growth from 2000	Total	% Growth from 2000
Southeast	424,050	25%	520,235	53%	592,233	75%
Northeast	147,895	34%	188,589	71%	209,651	90%
Central (Phoenix)	566,357	19%	721,861	52%	899,640	90%
Northwest	204,846	16%	279,852	59%	352,306	100%
Southwest	38,664	52%	120,321	373%	220,142	766%
Balance of County *	12,935	72%	35,186	369%	107,092	1,327%
Maricopa County	**1,394,747**	**23%**	**1,866,044**	**65%**	**2,381,064**	**110%**

% growth based on MAG allocation of U.S. Census 2000 to Municipal Planning Areas.
*Includes Gila Bend, Wickenburg and unincorporated rural areas.

Sources: MAG allocation of U.S. Census 2000 and MAG Adopted Socioeconomic Projections, June 1997.

Table 4.3: Projected Employment by Subregion, 2010-2040

Subregion	Year					
	2010		2025		2040	
	Total	% Growth from 2000	Total	% Growth from 2000	Total	% Growth from 2000
Southeast	577,369	36%	772,599	82%	908,124	114%
Northeast	191,690	24%	243,907	58%	272,684	77%
Central (Phoenix)	821,325	12%	941,867	28%	1,122,704	53%
Northwest	169,774	46%	228,543	97%	293,126	152%
Southwest	96,732	133%	180,012	334%	246,934	496%
Balance of County*	20,155	60%	33,058	162%	52,692	318%
Maricopa County	***1,877,045***	***27%***	***2,399,986***	***62%***	***2,896,264***	***95%***

*Includes Gila Bend, Wickenburg, unincorporated rural areas.

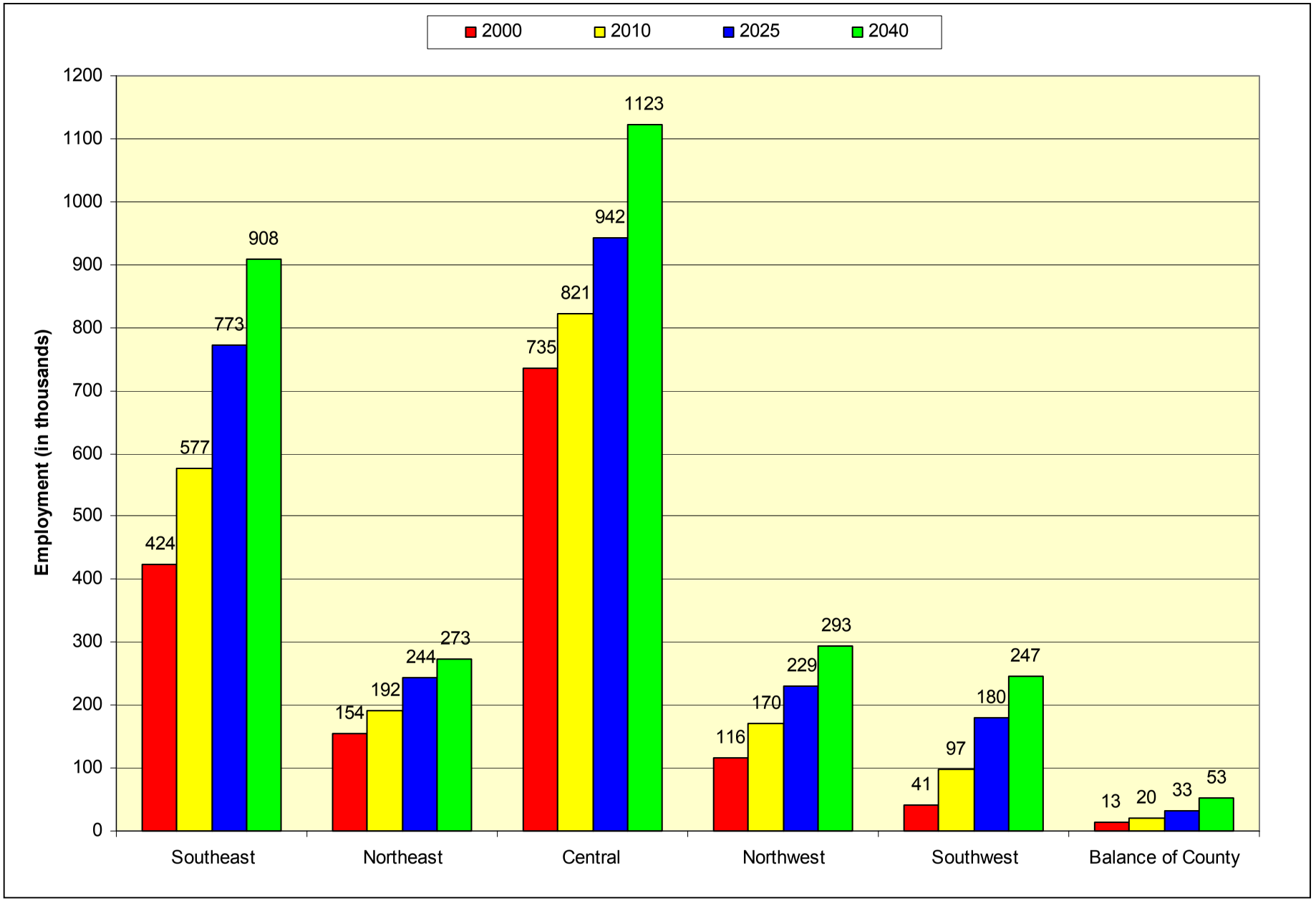
Source: MAG Adopted Socioeconomic Projections, June 1997.

Table 4.4: Jobs per Household by Subregion, 2000-2040

Subregion	Year			
	2000	2010	2025	2040
Southeast	1.2	1.4	1.5	1.5
Northeast	1.4	1.3	1.3	1.3
Central (Phoenix)	1.5	1.5	1.3	1.2
Northwest	0.7	0.8	0.8	0.8
Southwest	1.6	2.5	1.5	1.1
Balance of County*	1.7	1.6	0.9	0.5
Maricopa County	***1.3***	***1.3***	***1.3***	***1.2***

*Includes Gila Bend, Wickenburg, unincorporated rural areas.

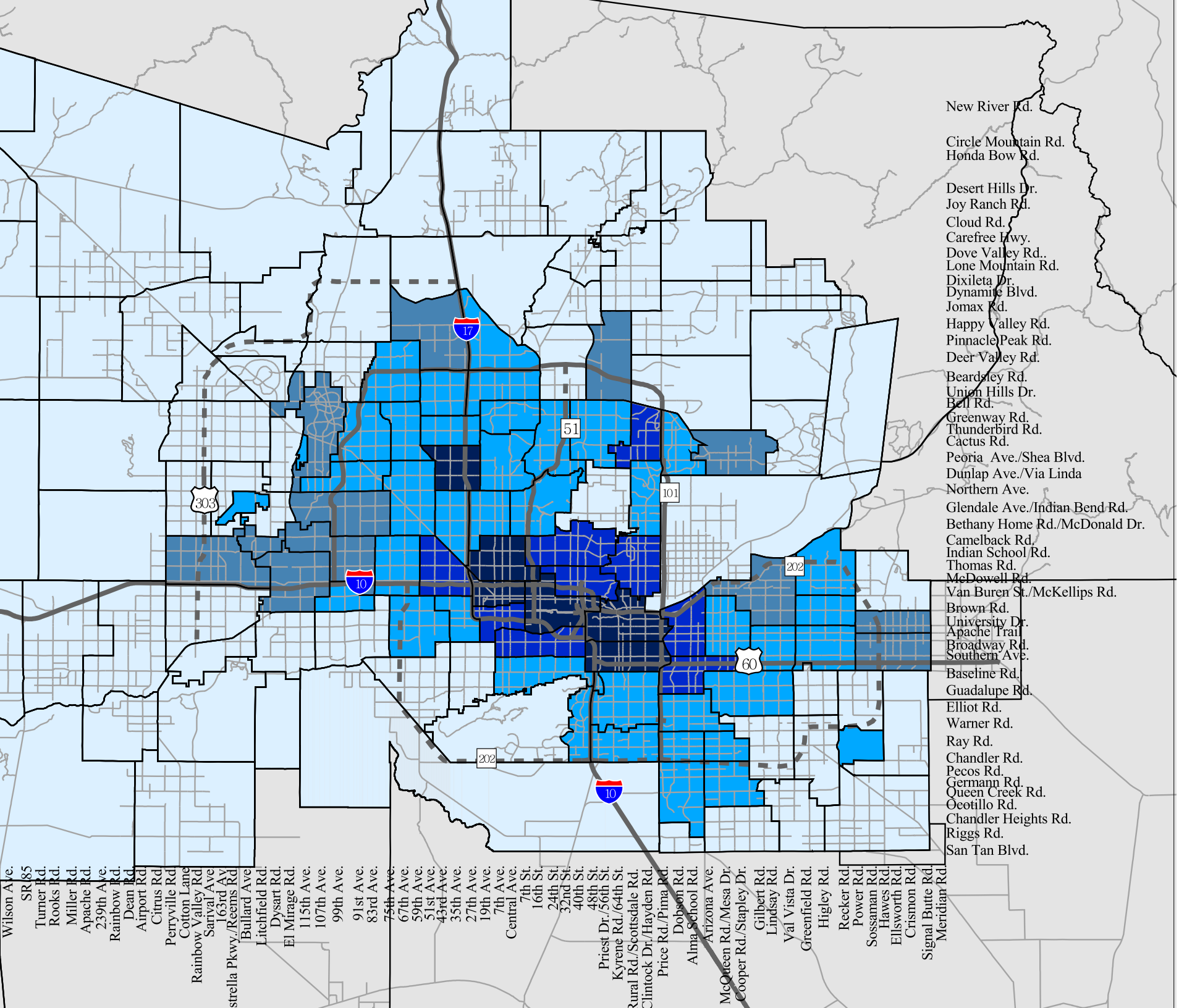
Source: MAG Adopted Socioeconomic Projections, June 1997.



Source: U.S. Census 2000 and MAG Adopted Socioeconomic Projections 1997

Figure 4-8

Maricopa County Employment by Subregion 2000-2040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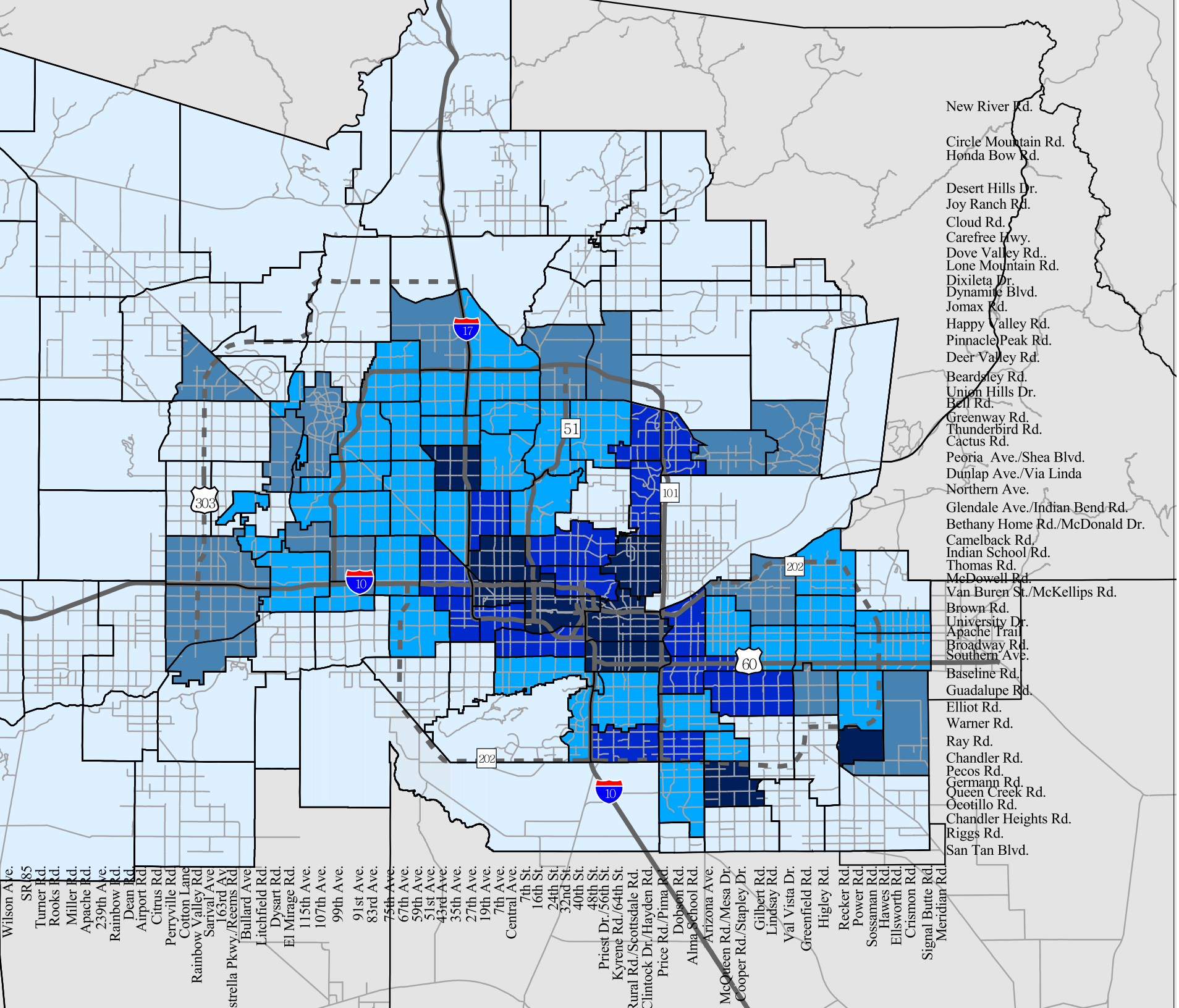
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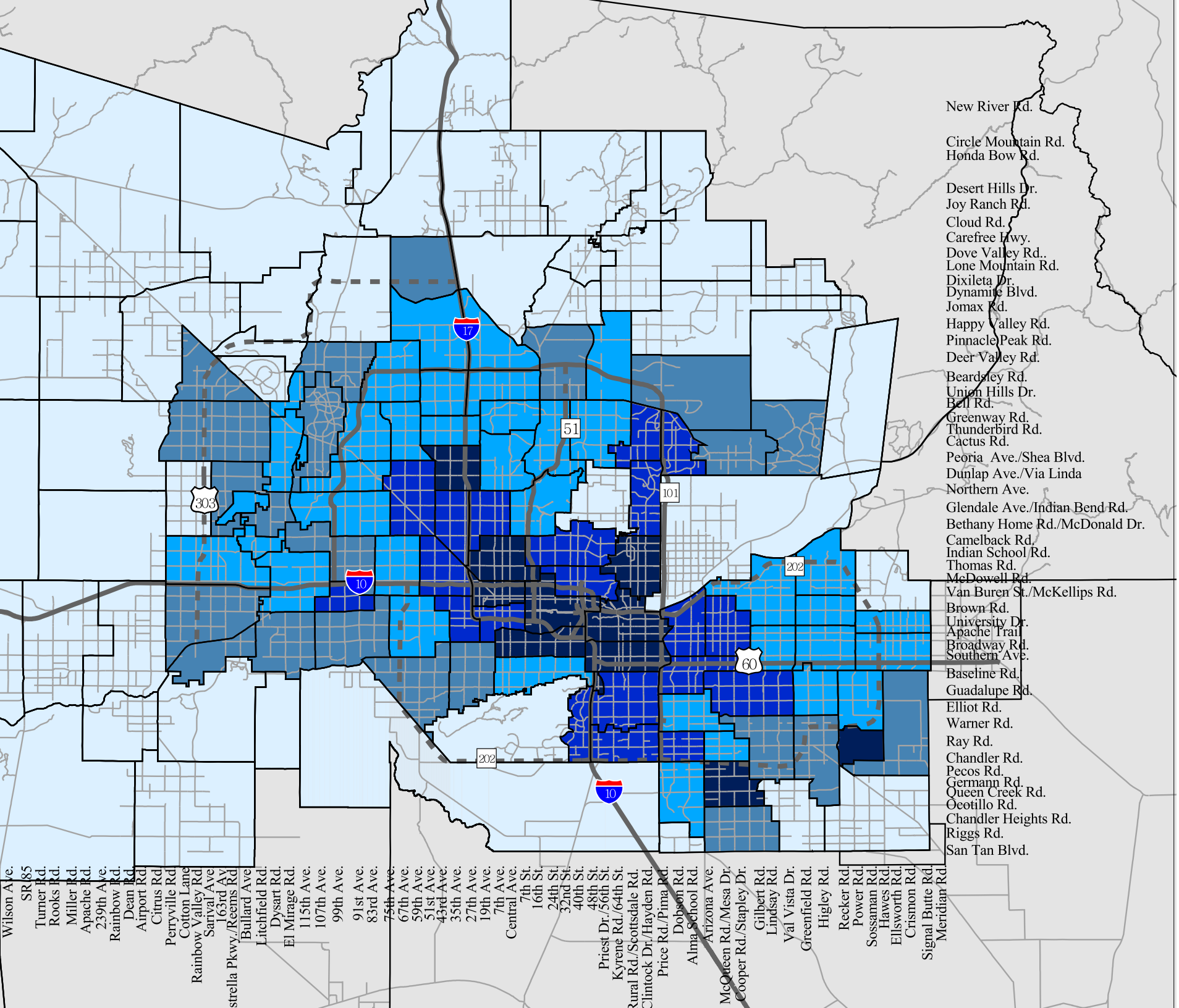
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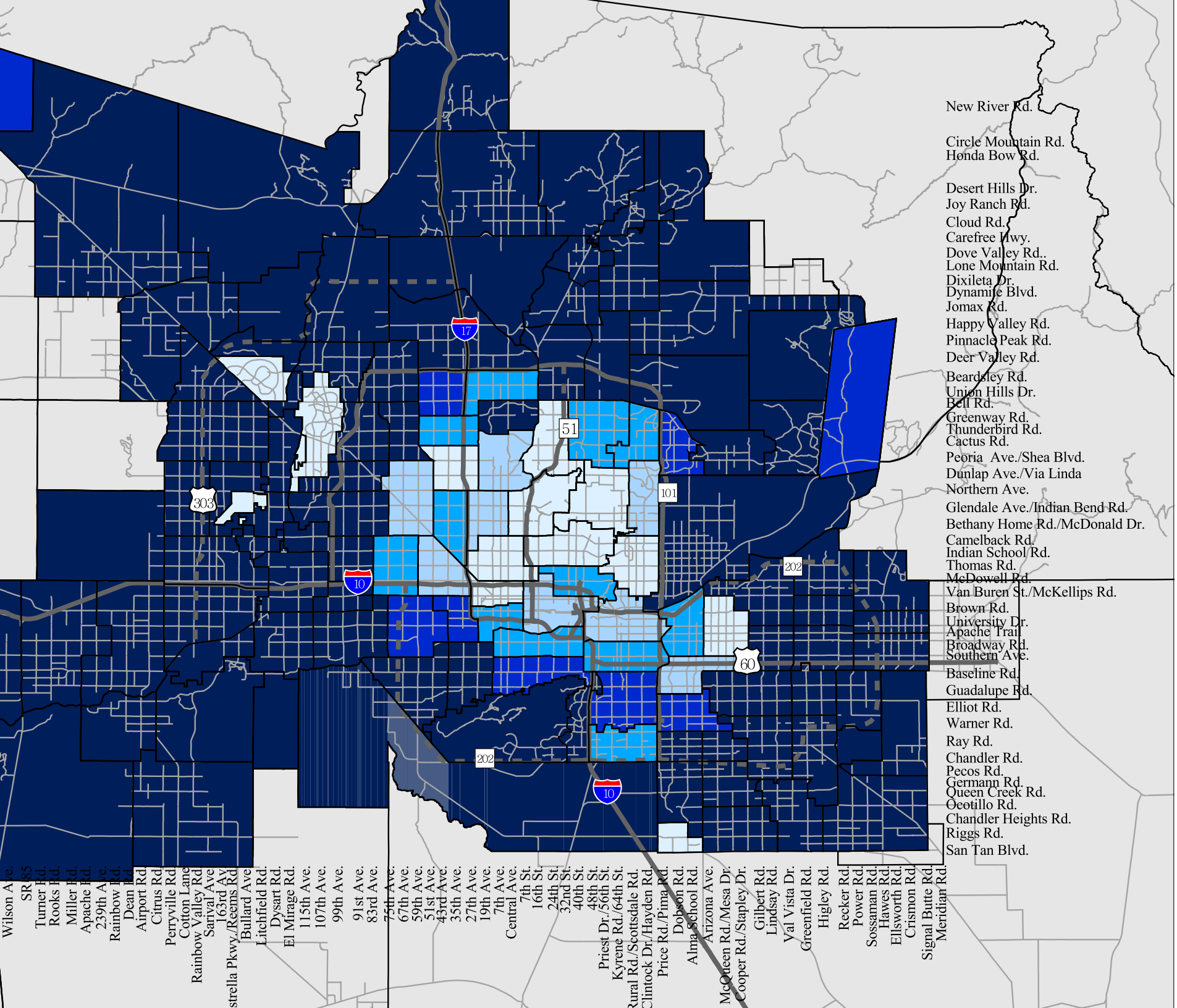
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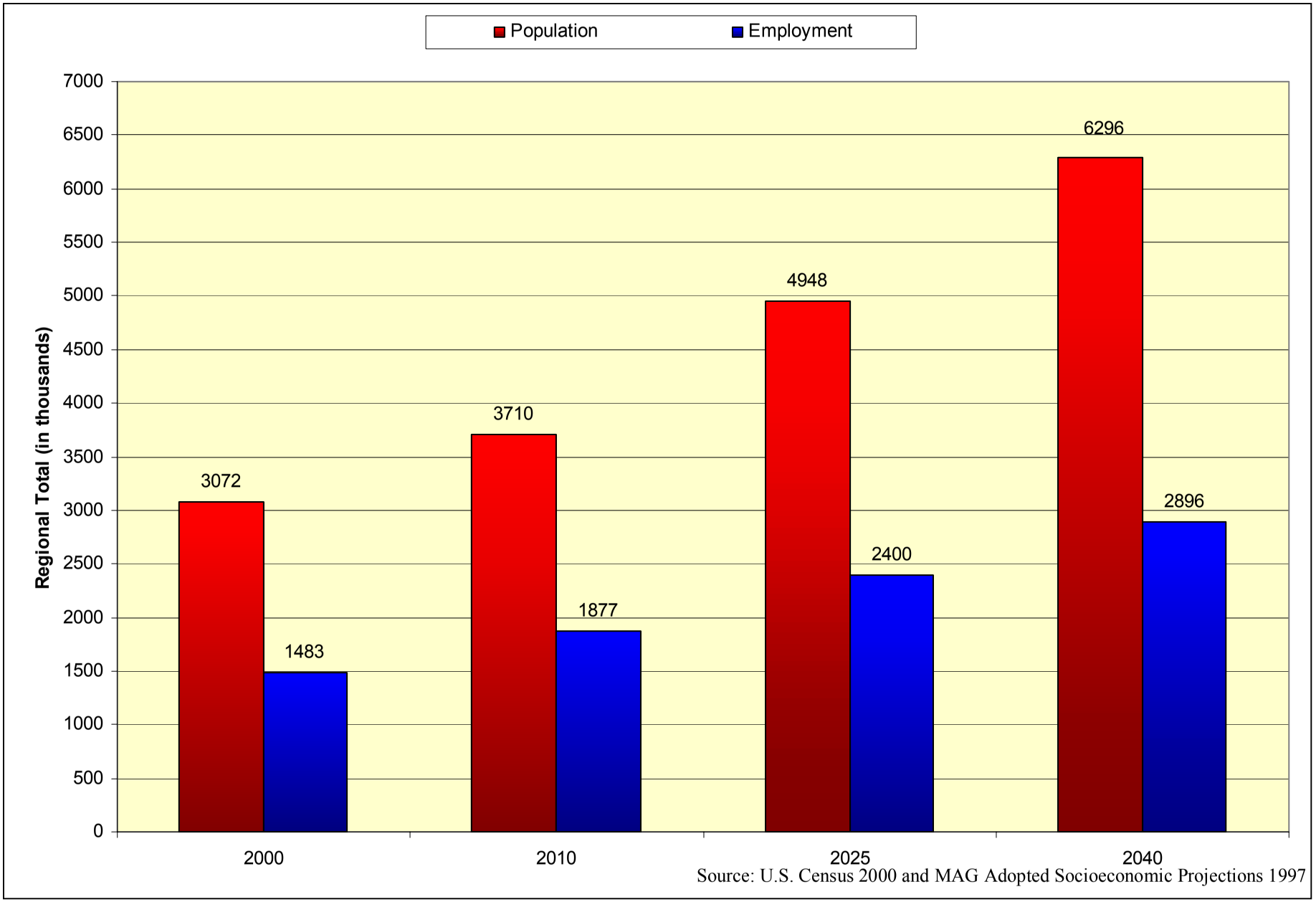


Figure 4-13

Maricopa County Population and Employment, 2000-2040

5.0 EXISTING TRANSPORTATION SYSTEMS

This chapter provides a descriptive summary of the existing transportation system in the MAG region, including an overview of the system's travel modes, use, and history.

5.1 System Description

This section provides an overview of the region's existing roadway, transit, intermodal and demand management systems.

5.1.1 Roadway Network Description

Functional Classification System

The existing roadway system serving the greater Phoenix area is composed of freeways, arterials, collectors and local streets. Table 5.1 summarizes the existing roadway network's centerline miles and lane miles by functional classification. Functional classification is a system of dividing roadways into specific categories based upon access and mobility functions. For purposes of the Regional Transportation Plan, the roadway hierarchy in the MAG transportation model forms the basis of the following categories:

- *Freeways*: Freeways are divided highways with four or more travel lanes that are designed to carry large volumes of high-speed traffic and serve long, regional trips. Freeways have full access control, with entry and exit restricted to grade-separated traffic interchanges.
- *Expressways*: Partially access-controlled roadways whose primary function is to facilitate subregional travel. The typical expressway has a limited number of at-grade intersections, but portions of the route may have full access control.
- *Arterials*: Arterial streets are the primary surface roadways carrying large traffic volumes at moderate speeds, typically posted at 35 to 45 miles per hour. The backbone of the roadway system in metro Phoenix consists of arterial streets along a mile grid alignment. Arterial streets usually have four or more lanes in developed areas.
- *Collectors*: Collector streets are designed to carry lower traffic volumes for shorter distances than arterials. Collectors receive traffic from neighborhoods and distribute it to arterials, and vice versa. They serve more of a land access function as opposed to providing mobility for long-distance traffic.
- *Local Streets*: Local streets provide direct property access and bring local neighborhood traffic to the collector streets.

As shown in Table 5.1, freeways comprise 9% of the system's lane miles and one-fifth of its capacity miles, but carry nearly one-third of the region's 17 million vehicle miles of travel (VMT) during the weekday PM peak period. Arterial roadways carry the largest share (50%) of PM peak period VMT on 45% of the capacity miles. Collector and local streets account for 35% of capacity miles, but less than one-fifth of PM peak VMT.

Table 5.1: Regional Roadway System Size and PM Peak Period Usage

Type of Roadway	Daily Capacity Miles	% Capacity Miles	Lane Miles	% Lane Miles	PM Peak VMT	Peak % VMT
Freeway & Expressway	31,209,570	20%	1,486	9%	5,379,093	32%
Arterial	69,789,840	45%	8,724	52%	8,534,546	50%
Local & Collector	53,492,640	35%	6,687	40%	3,052,925	18%
TOTAL	***154,492,050***	***100%***	***16,897***	***100%***	***16,966,564***	***100%***

Source: MAG LRTP and MAG traffic model.

The following sections describe some of the key features of the existing roadway system.

Regional Freeway and Highway System

Wilbur Smith Associates prepared the first regional freeway plan published in 1960. The plan included east/west freeways along the "Moreland Corridor" (today's I-10), through the Tempe/Mesa area, and along the Glendale Avenue/Lincoln Drive corridor. It also included an outer beltway that would have extended from Tempe along Indian Bend Wash in Scottsdale and through the Paradise Valley area of Phoenix between the Bell and Greenway section lines, then south to McDowell near 67th Avenue. I-17 had been previously planned and was under construction. Funding was available for the Interstates but not for the other proposed freeways.

A new regional transportation plan was adopted in 1978. The freeway plan was similar to the 1960 plan, with some corridors moved to reflect more current land use plans and recent development. In 1980, a location study was prepared for the "outer loop" (now SR 101). The proposed location was very close to today's alignment.

In 1985, voters approved Proposition 300, which authorized a one-half cent sales tax for 20 years to build a regional freeway system. Since 1986, freeway construction has been a constant in the Valley. As the new freeways were designed, additional improvements (such as more interchanges, grade separations, expanded setbacks and sound attenuation) were demanded by the public and local jurisdictions. These enhancements significantly increased some costs. Meanwhile, revenue collection fell and construction slowed during a recessionary period in the late 1980s and early 1990s. In 1995, with the awareness that the revenue streams would be inadequate to complete the entire system as originally envisioned, the Paradise, Grand and Estrella corridors were deleted from the freeway network, and the South Mountain corridor was targeted for privatization and/or future funding sources. Revenue collection and the pace of construction picked up again during the more robust economic times that followed in the later 1990s. The Proposition 300 system, as subsequently modified, is now scheduled for completion by 2007.

The one-half cent sales tax authorized by Proposition 300 will end following calendar year 2005. After that date, no regional funding source will exist to pay for system expansion, unless new legislation authorizes such a source.

The Grand Avenue (US 60) corridor was dropped from the MAG Freeway/Expressway Plan in 1995. In 1998, MAG completed the Grand Avenue Corridor Study. The study evaluated grade separations, limited expressway and full expressway options. A major investment study (MIS) from I-17 to Loop 101 was completed in 1999. The study concluded that immediate construction of additional grade separations was needed. Seven grade separations and a full interchange at SR 101 will be completed by 2006. Funding is also identified within the 20-year horizon of the MAG Long Range Transportation Plan to complete Grand between I-17 and SR 101 as an expressway.

The Estrella Expressway (Loop 303) was restored to the MAG Long Range Transportation Plan (LRTP) in 1999 as a four-lane facility between MC 85 and Grand Avenue. The Maricopa County Department of Transportation (MCDOT) is currently preparing an Environmental Assessment and Design Concept Report for a four-lane interim facility, which could ultimately be improved to a full freeway.

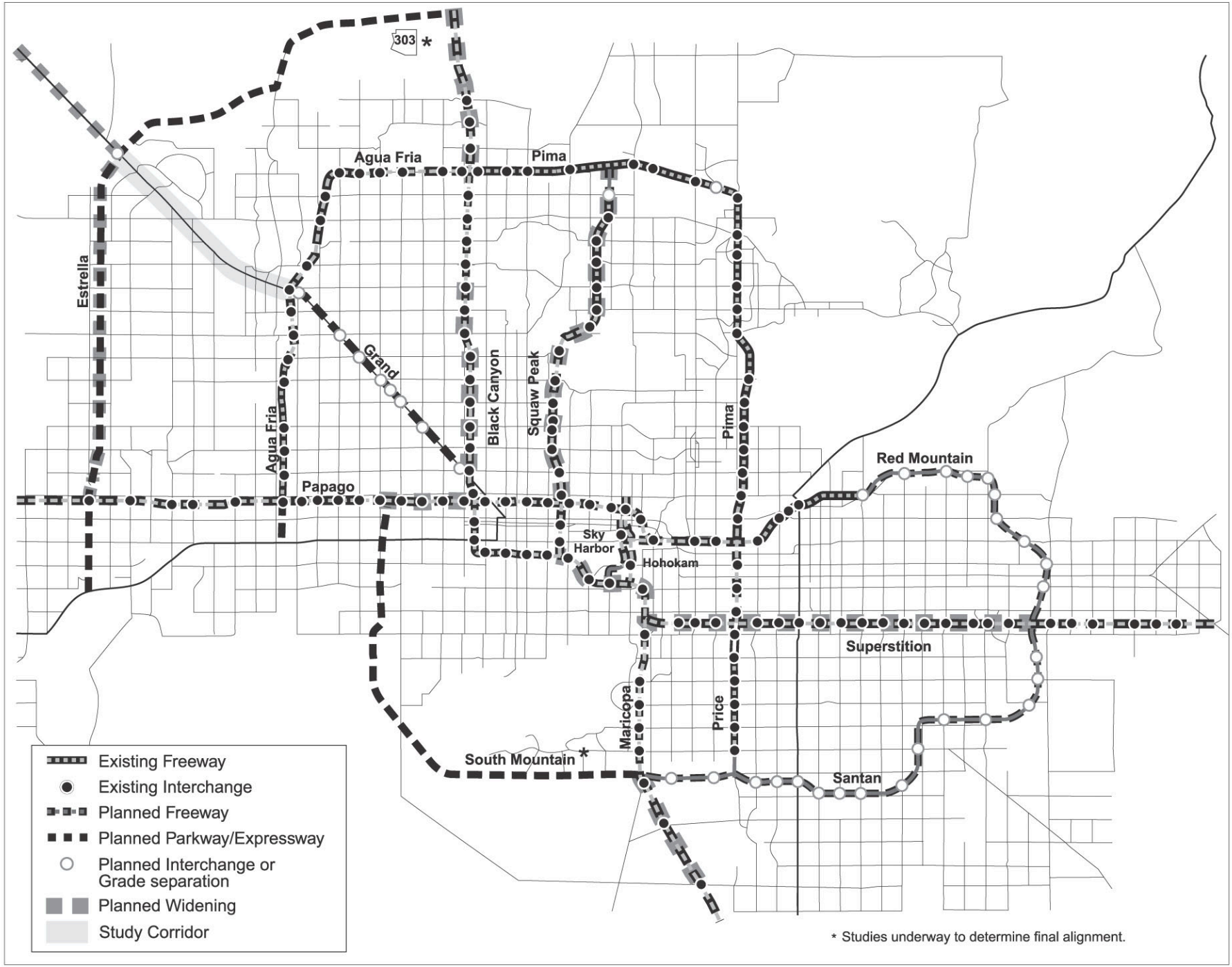
Figure 5-1 illustrates the region's existing and planned freeways. The number of lanes on existing freeways is shown in Figure 5-2. Six lanes, either with or without additional high-occupancy vehicle (HOV) lanes, is the standard cross-section in the Phoenix metro area. Portions of I-10, US 60 and SR 202 have eight or even ten general-use lanes, however.

In addition to the freeways and Grand Avenue, three other state highways contribute to the fabric of the regional freeway system as regional access routes. State Route 87, the "Beeline Highway," connects the East Valley to Payson and the Mogollon Rim, major outdoor recreation areas located approximately 100 miles to the northeast. Over the last 20 years, the Arizona Department of Transportation has widened this facility to four lanes for 80 miles between Mesa and Payson. SR 87 also crosses Mesa and Chandler as an arterial route to Coolidge and Pinal County.

State Route 85 connects Interstate Highways 8 and 10 west of Phoenix, running between Buckeye and Gila Bend. This is the most direct route connecting much of the region to Yuma and San Diego. Significant commercial traffic operates in this two-lane corridor as well. South of Gila Bend, the corridor crosses the U.S.-Mexican border at Lukeville and provides access to the beaches of Puerto Penasco (Rocky Point), Sonora, a major tourist attraction. ADOT has programmed funds to begin upgrading SR 85 to a four-lane facility north of I-8.

State Route 74 provides a connection between Interstate 17 and US 60 (Grand Avenue) just south of Wickenburg. The eastern third of this 30-mile roadway lies within currently undeveloped areas of Phoenix and Peoria. This is an area poised for major development activity in the coming years. The need to assure preservation of this corridor as a regional route is widely recognized.

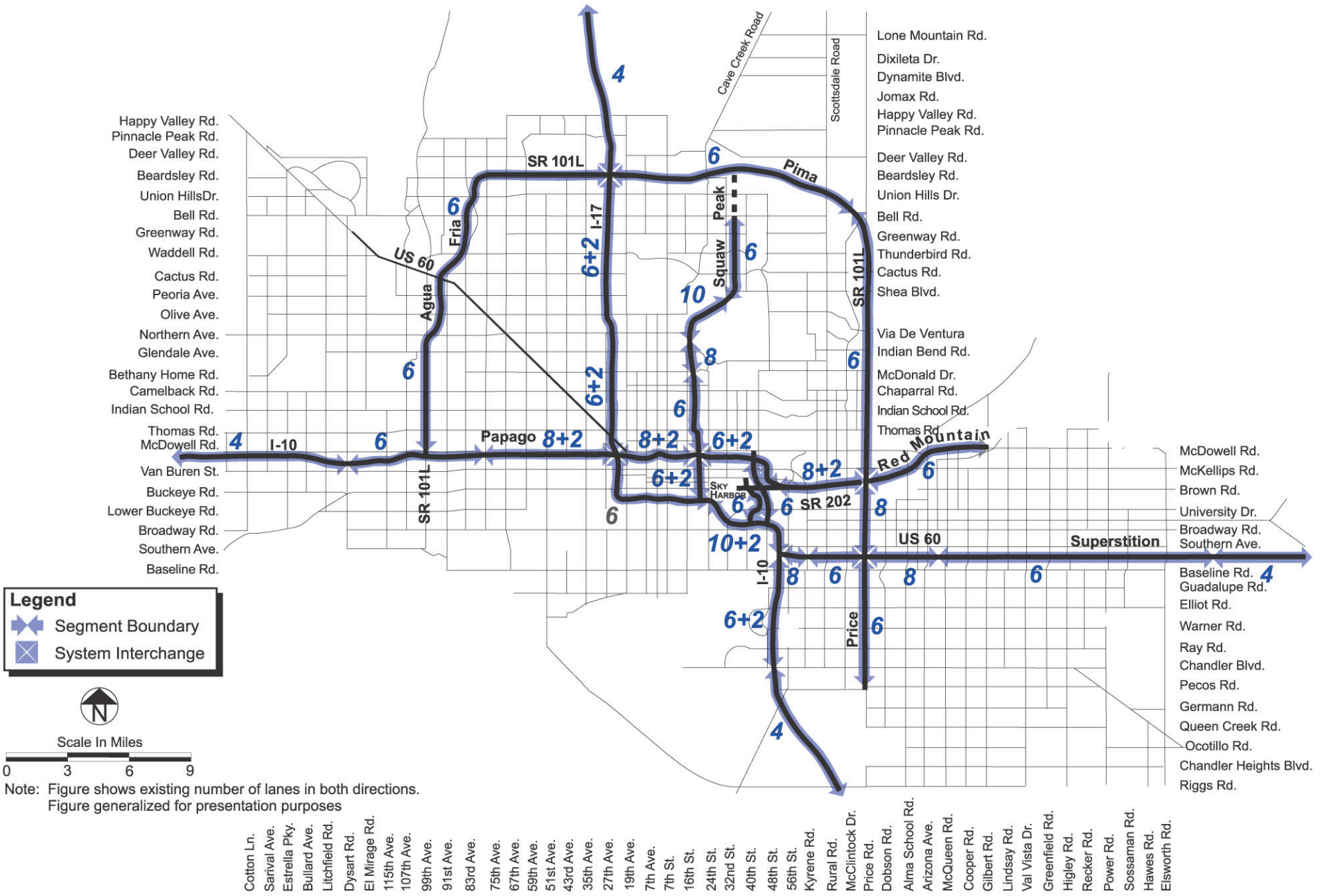
Figure 5-3 displays the key state highways, which serve as significant regional access routes.



Source: Maricopa Association of Governments, August, 2001. URS/BRW August, 2001.

Figure 5-1

Existing and Planned Freeways and Expressways

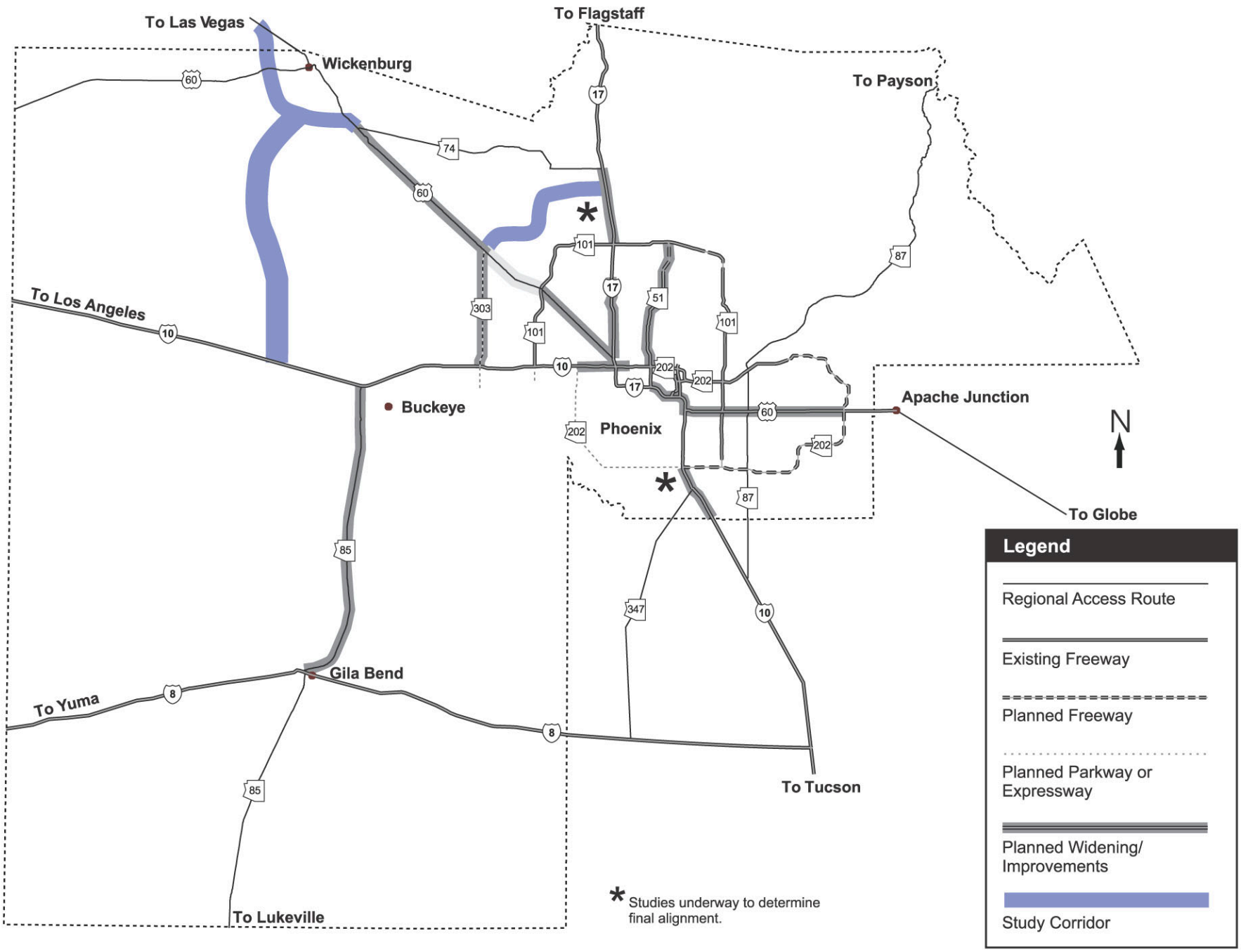


Note: Figure shows existing number of lanes in both directions.
Figure generalized for presentation purposes

Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 5-2

Year 2001 Number of Lanes (Including HOV Lanes) on Regional Freeway System



Source: Maricopa Association of Governments, August, 2001. URS/BRW August, 2001.

Figure 5-3

Regional Highways and Access Routes

Roads of Regional Significance

MAG adopted the concept of Roads of Regional Significance in 1991, and the network was most recently refined in 1999. These roads are envisioned as a series of upgraded, six-lane principal arterials, with enhanced carrying capacity and access management that will enable them to complement the freeway network as major regional routes. The concept includes both urban routes and gateway routes at the region's periphery. Existing Roads of Regional Significance are highlighted in Figure 5-4.

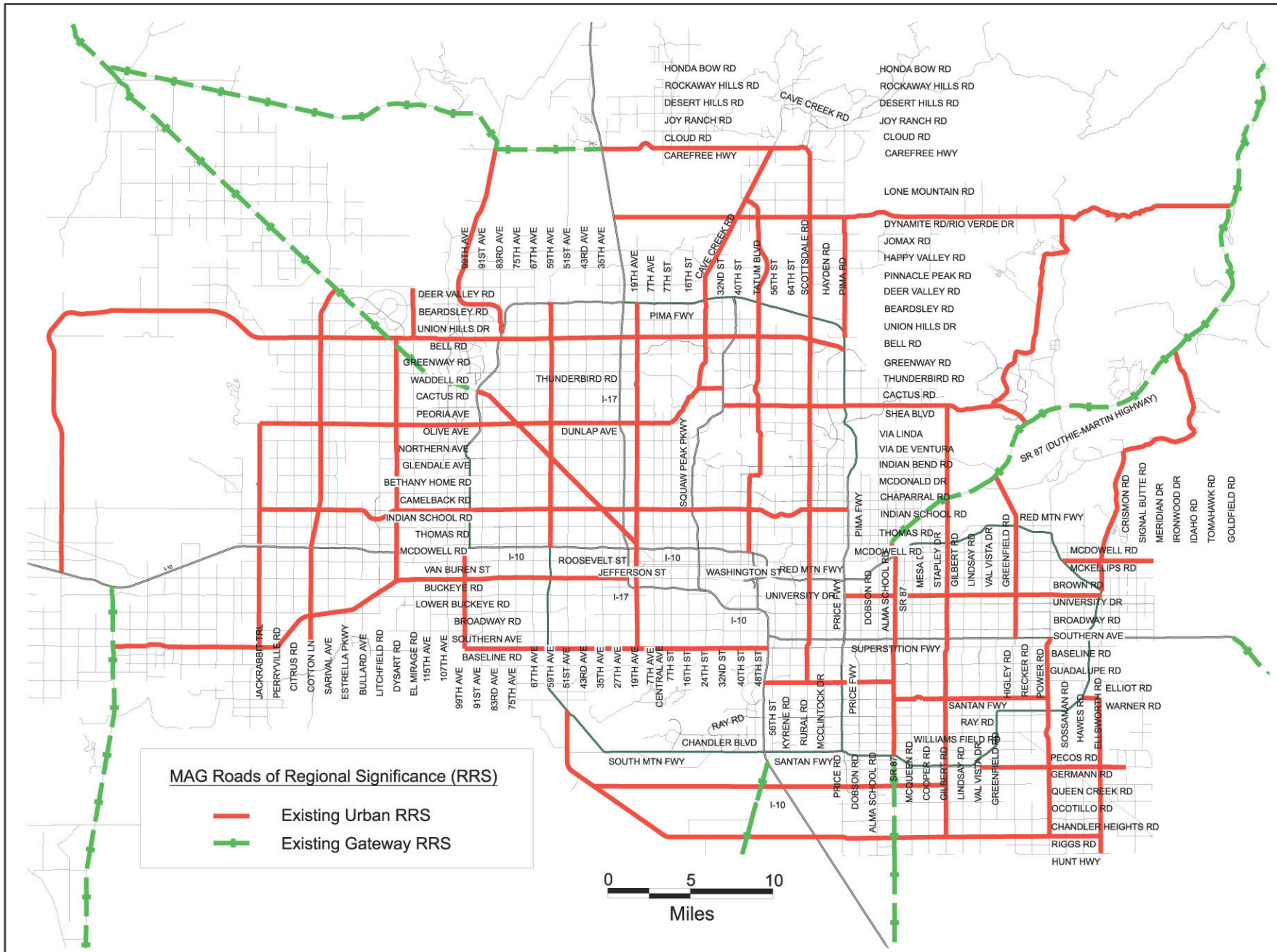
5.1.2 Public Transit

Public transportation in Phoenix began in 1887, with horse-drawn trolley cars along Washington Street. Shortly thereafter, the first electric streetcar made its debut. The City of Phoenix took over operation of the service in 1925. During the 1930s, the city introduced bus service, which took over completely when streetcars were abandoned in 1948.

Over the next 30 years, a number of changes took place. Fixed-route, scheduled bus operations were contracted out to a private operator and were gradually expanded beyond Phoenix into adjacent cities. Demand-response (dial-a-ride) services were introduced in Phoenix and other cities beginning in the 1970s. The Maricopa County Human Services Department initiated a specialized transportation service for seniors and persons with disabilities in 1980, in partnership with the American Red Cross. During the 1980s, the bus system was reconfigured from a radial network focusing on downtown Phoenix to a grid system following the north-south and east-west arterials.

In 1985, Proposition 300, the measure funding a regional freeway system, also created the Regional Public Transportation Authority (RPTA). The statutory responsibility of this agency was to develop a regional transit plan, find dedicated funding, and operate regional transit services. New local fixed route bus service was initiated by Scottsdale in 1986 and Mesa in 1987. During this period, the first regional mass transit plan was developed. A funding proposal entitled Valtrans, requesting a one-half cent sales tax for a 103-mile automated, elevated rapid transit system and a greatly improved bus fleet, was defeated by voters in March 1989.

In response to this defeat, an ad hoc citizens' committee was established in 1990 to develop a new comprehensive regional transit plan. This plan, completed in 1991, called for a doubling of regional bus service, a tripling of demand-response services, and investigation of fixed-guideway transit service in appropriate corridors. In 1994, following adoption of this new plan, a second funding measure known as Proposition 400 was taken to the voters. Proposition 400 proposed a one-half cent sales tax, split equally between transit improvements and additional support for the regional freeway network. This measure also failed at the polls, but the plan was used to create the transit element of the MAG Long Range Transportation Plan.



Source: Maricopa Association of Governments, August 2001.

Figure 5-4

Arterial Streets & Roads of Regional Significance

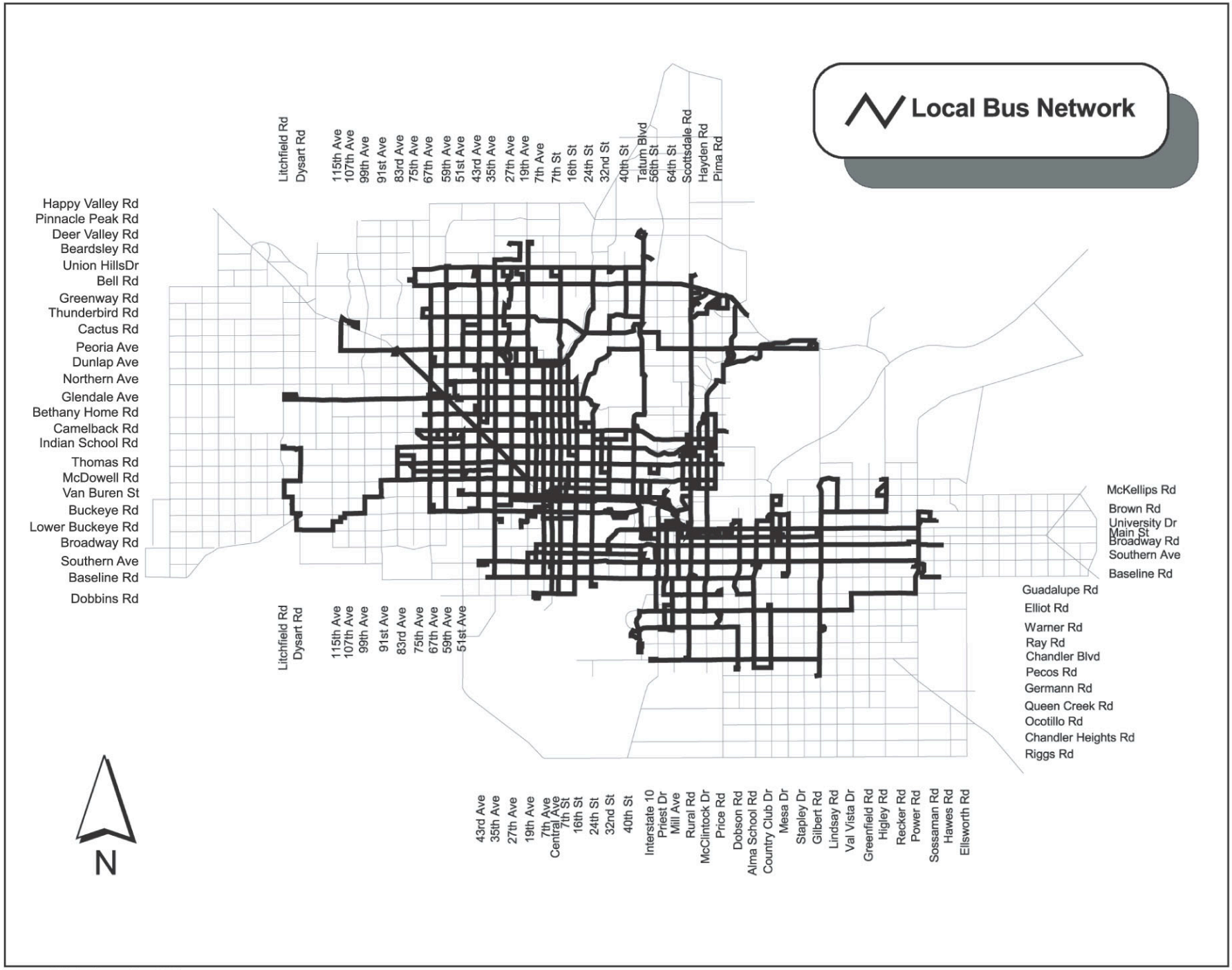
Following this second defeat for regional transit, a number of Valley cities began to explore local funding options as an alternative to regional transit funding. In 1996, voters in Tempe endorsed a half-cent transit sales tax for that community. The cities of Phoenix and Scottsdale submitted funding measures to their citizens in September of 1997. Both measures lost, although the measure in Phoenix was defeated by only 122 votes out of over 100,000 ballots cast. In 1998, voters in Mesa approved a "quality of life" sales tax to address a number of public service issues, including transit. In March 2000, Phoenix voters passed Transit 2000, a program of light rail, bus system improvements and dial-a-ride improvements funded by a new 0.4% sales tax over a period of 20 years. The revenue will both expand the transit service area and hours of operation, and increase service levels for existing services. The funds will also support construction of Phoenix's share of the planned regional light rail transit system. The Glendale City Council subsequently called an election for November 6, 2001, to support a one-half cent sales tax that would extend a light rail connector into that community, while matching Phoenix's Transit 2000 level of bus service within five years. The election package, which will also fund selected roadway projects, passed overwhelmingly.

Fixed Route Bus Service

Fixed route bus service is currently the primary mode of public transportation in the MAG area. Valley Metro, the regional transit identity of RPTA, provides a coordinating function for the region's fixed route bus network. All local and regional fixed route service is provided through private sector contracts administered by the cities of Mesa, Phoenix, Scottsdale, Tempe and the RPTA, although bus service operates seamlessly across municipal boundaries, with a uniform fare structure and transfers honored by all providers. The regional fixed route bus system currently has 57 local routes and six circulator routes. All buses are wheelchair-accessible and can accommodate bicycles.

Routes vary in frequency and hours of operation; however, most local routes operate from 6:00 a.m. to 8:00 p.m. on weekdays (to 10:00 PM or later in Phoenix and Tempe), with a typical frequency of 15 to 30 minutes during peak travel hours. Reduced frequency and hours of operation generally characterize Saturday and Sunday bus service. Significant improvements have recently been made in Tempe, where buses run until 1:00 AM seven days a week and 15-minute service is offered during peak hours. Similar improvements are being implemented in Phoenix over a five-year period. Currently, just over 22 million bus miles of revenue service are provided per year.

In spite of new funding measures in a few cities, some significant growth areas are still without service. These include the Desert Foothills (Anthem) area, the Black Canyon corridor north of Deer Valley Road, Scottsdale north of the Central Arizona Project canal, and the ASU East/Williams Gateway center. Current service areas are shown in Figure 5-5.



Source: RPTA, December 2001.

Figure 5-5

Commuter Express Transit Service

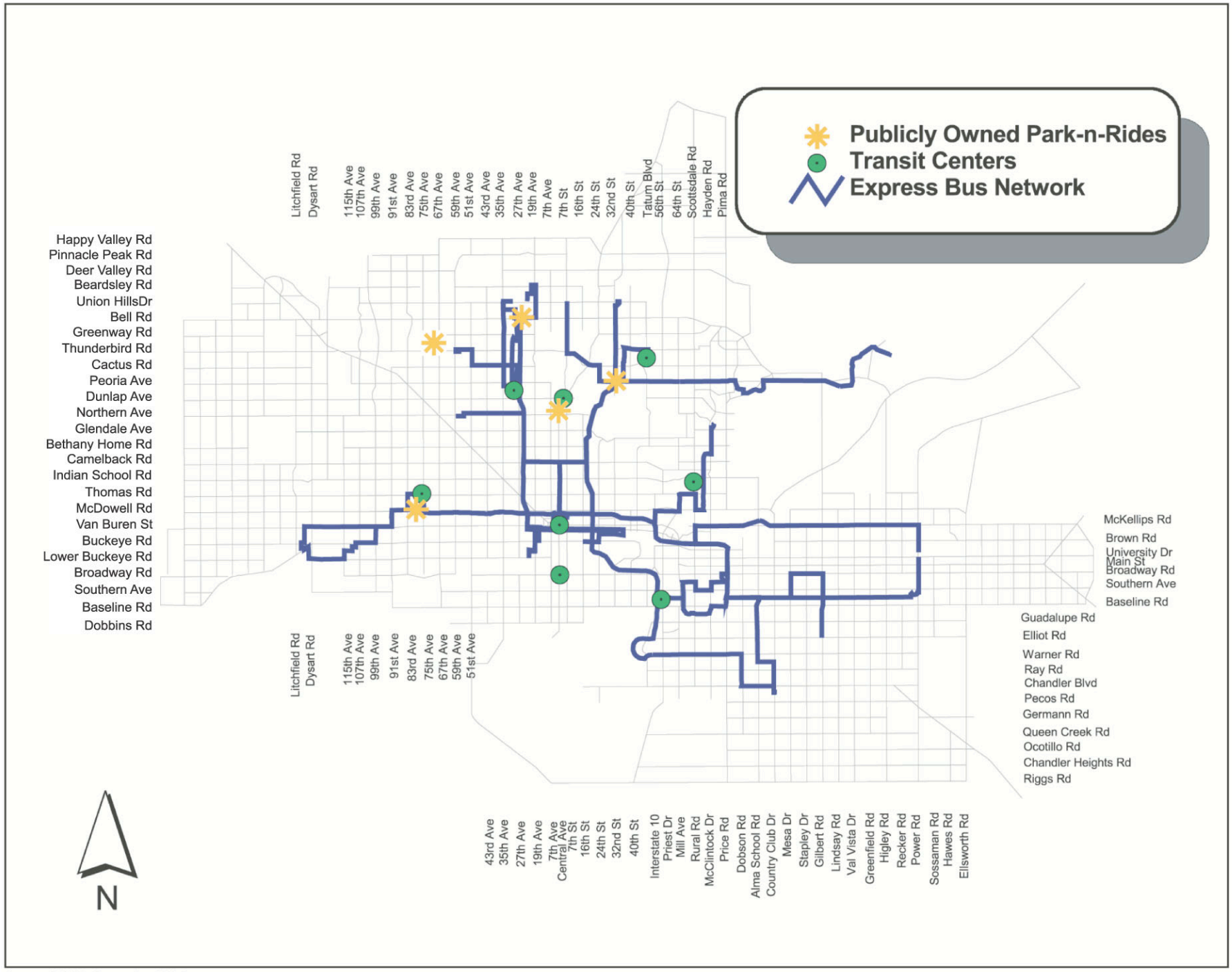
Commuter express bus service, along with a supporting network of park-and-ride lots and high-occupancy vehicle (HOV) facilities, currently exists primarily as an alternative mode for persons traveling to and from work. The system's 21 routes provide 137 one-way weekday bus trips and 2,987 revenue miles of service, with 3,360 daily boardings. The Phoenix area currently has 53 park-and-ride facilities, with 39 of the lots serving one or more express routes. Four of the Phoenix lots are publicly owned and operated.

Forty-three centerline miles of high-occupancy vehicle (HOV) lanes currently exist on freeways in the Phoenix metropolitan area. The HOV system includes dedicated ramps and ramp bypass lanes at key locations. HOV-only ramps are located along I-10 at 3rd Street, 3rd/5th Avenues and 79th Avenue. HOV facilities are open to all traffic during off-peak periods (times other than weekdays from 6:00 to 9:00 AM and 3:00 to 7:00 PM).

RPTA surveys report that typical express bus passenger characteristics include:

- The majority of passengers (61%) arrive at the bus stop by car.
- One-third (34%) walk from home to the bus stop and the remaining 5% ride a bike or transfer from another bus.
- More than three-fifths of express riders travel one mile or less to the bus stop, and about 90% travel three miles or less.
- The average express rider is 10 years older than the average rider of the entire bus system (local and express) and has a median household income of $46,700. By comparison, the median household income of a local passenger is $19,500.
- Over 90% of express riders have one or more vehicles at home. In comparison, 80% of the patrons of local/regional fixed routes are transit dependent.
- Traffic congestion, convenience and monetary savings are the most commonly cited reasons for riding express buses.
- Over 90% of express boardings are for work trips. School trips are the next largest category.
- Three-fourths of express passengers ride daily (five days a week).
- Downtown Phoenix is by far the most common destination (69% of passenger trips) followed by the State Capitol area (22%) and Uptown Central (9%). These percentages reflect the existing distribution of express bus service.

Valley Metro is incrementally restructuring commuter express routes. As the regional freeway system and new park-and-ride facilities are completed, express routes are being moved from arterial streets onto the freeways, where use of HOV lanes can achieve travel speeds approaching those of auto commuters. Commuter express routes will also be restructured around corridors to be served by new Light Rail Transit. In appropriate locations, routes will be revised to feed rail termini rather than running "over the top" of rail service. Figure 5-6 illustrates current express bus routes.



Source: RPTA, December 2001.

Figure 5-6

Express Bus Service and Transit Facilities

Transit Facilities

Figure 5-6 also shows the location of major existing transit facilities, including Central Station at Central and Van Buren in Phoenix, the Sunnyslope Transit Center in Phoenix, Loloma Station in Scottsdale, the South Central Avenue Transit Station now under construction in Phoenix, and transit centers at the Desert Sky, Metrocenter, Paradise Valley and Arizona Mills shopping malls. Four park-and-ride facilities are publicly owned: at 79th Avenue/I-10, I-17/Bell and SR 51/Shea and Sunnyslope Transit Center. Except for these publicly owned facilities, park-and-ride lots use shared-use spaces in private parking lots adjacent to retail centers, churches, etc. Additional public park-and-ride facilities are preferable to this option: as retail areas mature and transit patronage rises, spatial conflicts arise at these shared-use facilities.

Dial-A-Ride

Within Maricopa County, there are ten separate dial-a-ride services that cover approximately 950 square miles. Some dial-a-rides serve seniors and persons with disabilities, while others extend service to the general public.

With few exceptions, dial-a-ride service does not cross the municipal boundary of the city funding it. If a person wants to travel to a neighboring city or service area, transfers are made at identified locations along or near municipal boundaries. The principal exception is the multi-jurisdictional East Valley Dial-A-Ride. This system, managed by RPTA, serves the cities of Tempe, Scottsdale, Mesa, Gilbert and Chandler. Even here, however, the days and hours of service vary by city.

In January of 1998, a Regional Dial-A-Ride Analysis was undertaken by RPTA in response to concerns about quality of service in the Valley. Complaints had been expressed by some passengers regarding difficulties in using current Phoenix-area dial-a-ride systems, particularly for trips extending beyond the boundaries of the individual systems. As a result of this study, the Tempe/Scottsdale and the Mesa/Gilbert/Chandler systems were merged into the East Valley Dial-A-Ride. One goal of regionalized dial-a-ride services would be the development of "seamless" travel within the greater Phoenix area — that is, the ability of dial-a-ride passengers to travel (as bus riders do) without regard to political boundaries, with minimal transfers and few differences between systems.

The transit provisions of the Americans with Disabilities Act (ADA) require that, whenever and wherever local buses operate, a parallel service be provided for persons with disabilities who are unable, because of their disability, to access or use local bus service. In this region, the ADA complementary paratransit service, more commonly referred to as ADA service, must be provided in all areas within three-fourths mile of local bus service. The city or entity funding the local bus service is also responsible for funding and overseeing ADA service.

The ADA service is not intended for all persons with disabilities, but only for those who have a disability that prevents them from using accessible bus service when and where local buses operate. It is estimated that approximately 2% of the population has a disability that prevents them from using accessible bus service: i.e., service where the vehicles and facilities are wheelchair accessible.

Dial-a-ride transit services are considerably more expensive, per trip, than fixed route bus service. One reason that many dial-a-ride patronage levels remain high is the low level of fixed route service compared to many peer communities. As bus service levels are increased with new local funds, at least in the three cities with a dedicated transit sales tax, opportunities will exist to transition many dial-a-ride patrons onto scheduled bus service. Dial-a-ride resources can then be more efficiently used to expand service areas and extend mandated ADA service into new fixed route service areas. Figure 5-7 shows the various dial-a-ride service areas.

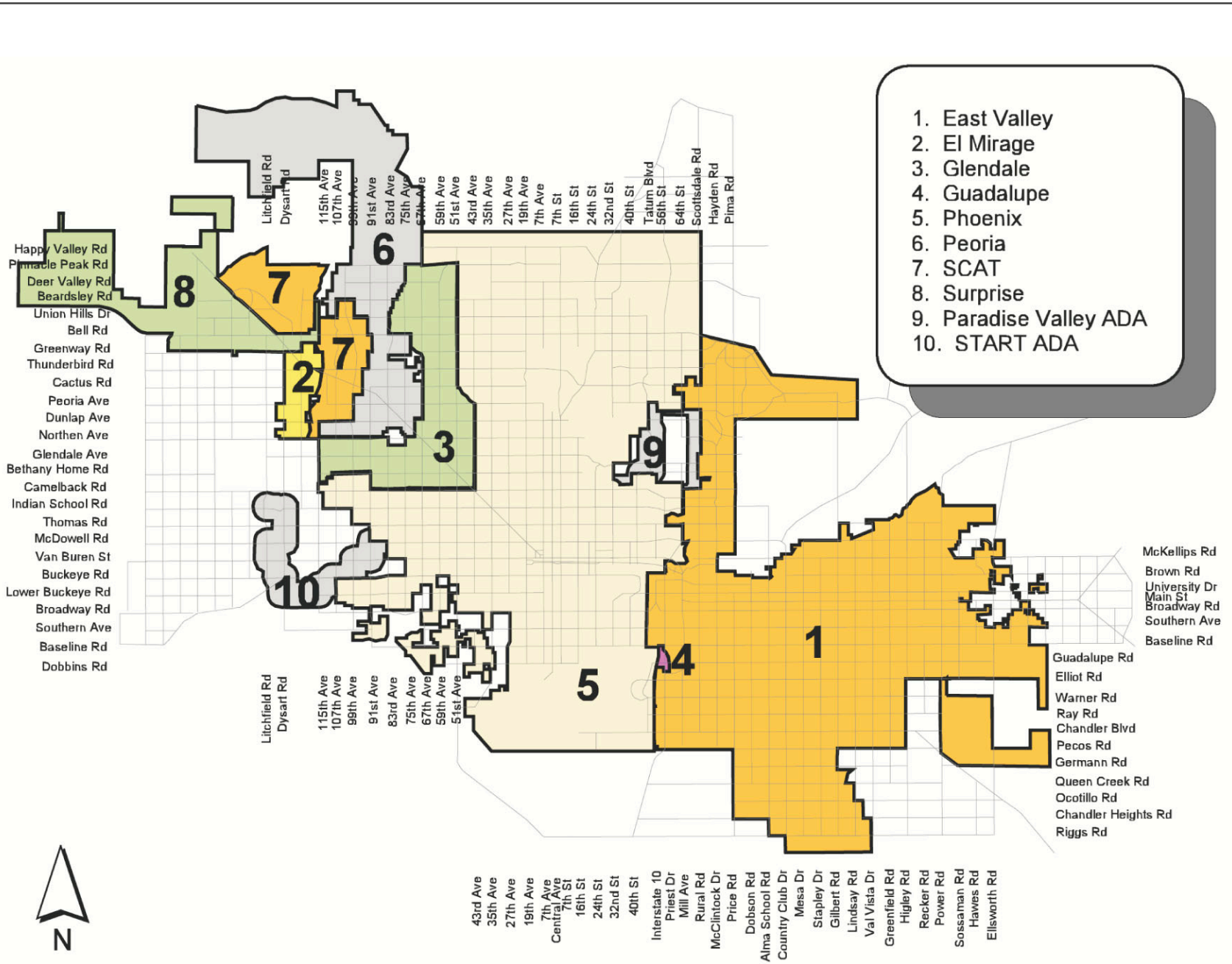
5.1.3 Transportation Demand Management

Efforts to reduce the number of miles traveled in the Valley by single-occupant vehicles include creative marketing of public transit, promotion of ridesharing, the formation and use of vanpools, walking, bicycling, telecommuting, and alternative work schedules. Such measures are collectively referred to as Transportation Demand Management (TDM).

Federal transportation funds support the Regional Ridesharing Program and provide partial support for the Capitol Rideshare Program. The Regional Ridesharing Program supports efforts to share an automobile ride and to use alternative modes of transportation. One of the services of the Regional Ridesharing Program is a computerized ride-matching program that provides commuters interested in carpooling or vanpooling with a list of potential partners. Transit information is provided to those interested in receiving bus schedules. Another key role of the Ridesharing Program is to assist employers of 50 or more employees to meet the goals of the County Trip Reduction Program (described below) through the provision of support services and programs

The Clean Air Campaign, an area-wide public awareness program designed to reduce unnecessary vehicle use, has existed since 1987, when it was initiated by the Phoenix Chamber of Commerce. The campaign is a public/private partnership with sponsors that include the Phoenix Chamber of Commerce, the Arizona Departments of Environmental Quality and Transportation, Maricopa County, MAG and RPTA. The campaign has urged residents not to drive at least one day a week. In the past, due to a restricted budget, the campaign has concentrated its media campaign during the critical six- to eight-week carbon monoxide pollution season from mid-November to mid-January. During the summer of 1996, a summer ozone media campaign was launched to address the critical need to avoid a federal reclassification related to meeting ozone standards.

Air quality improvement was the primary factor leading to the establishment of the Maricopa County Trip Reduction Program (TRP). As mandated by Arizona legislation in 1988, employers with 100 or more workers at a site began participating in this program in 1989. Participating employers are required to conduct an annual survey of the commuting modes of their employees, and prepare and implement a travel reduction plan to reduce Single Occupant Vehicle (SOV) trips and VMT. Employers cannot be penalized for not meeting their trip reduction goals, but only for failure to make a good faith effort.



Source: RPTA, December 2001.

Figure 5-7

Dial-A-Ride Service Areas by Managing Agency

In 1992, Maricopa County strengthened the Trip Reduction Program by providing third, fourth and fifth year travel reduction goals of 5% annually, and by expanding the ordinance to apply to employers with 75 or more employees at a work site. In November 1993, a special session of the state legislature passed an air quality bill that further expanded the TRP to include employers of 50 or more employees and increased the goals to a reduction of 10% per year in SOV trips or miles traveled. Currently, over 1,300 employers are participating in the program, representing about 480,000 students and employees.

In the summer of 1996, another special session of the legislature passed an innovative enhancement to the Trip Reduction Program whereby employers are allowed to implement several new "flexibility" strategies to meet their TRP goals. The majority of employers have not met the annual goal of a 10% reduction in SOV trips or miles. Now, under these flexibility provisions, employers have an expanded menu of measures for implementation, including reduction of business-related vehicle trips, off-peak commuting, reduced use of other gasoline-powered equipment, and stationary source emission reductions.

With the advent of new technological devices and the change to a service/information-based economy, a growing number of employers are allowing their employees to work in a location other than the central office. With telecommuting, employees can be linked to the central office by a personal computer or fax machine. According to Maricopa County TRP data, the number of employers with telecommuting programs has increased more than 400% in the past two years, with over 280 Valley employers indicating that they allow some form of telecommuting.

Vanpooling consists of a group of seven to 15 employees who share the ride to work and equally divide the expenses of operating the vanpool. The driver of the vanpool receives a free ride to and from work each day, and is allowed limited free personal use of the van every month. Vanpool riders receive a ride to and from work, pay a monthly fare, and have time to read, relax, converse, or prepare for the day's work during their daily commute. Currently 200 vanpools provide 918,000 passenger trips per year. Participants' fares currently cover 86% of the cost, with the rest covered by federal transportation funds.

5.1.4 Other Modes

Rail Corridors

The region has two private rail carriers. The Burlington Northern Santa Fe (BNSF) line leaves the transcontinental mainline along the I-40 corridor east of Ash Fork, traveling south along the "Peavine" route through Skull Valley and Hillside before entering Maricopa County north of Wickenburg. From there, it follows the Grand Avenue (US 60) alignment to the State Capitol area, where it connects to the Union Pacific line. This line is used only for freight, serving several freight termini and intermodal transfer facilities. The large number of grade crossings and relatively high volume of rail traffic contribute to congestion at six-point and other intersections along Grand Avenue.

Currently only two arterials, Indian School Road and Grand Avenue (at the Peoria underpass/overpass), have grade-separated crossings of the BNSF, although several more will be built during the next five years.

The Union Pacific line enters Arizona at Yuma and generally parallels the Gila River. Near Wellton, a branch line heads northeast towards Phoenix, while the main line heads east to Casa Grande and Tucson parallel to the I-8 and I-10 corridors. The branch line enters the urban area through Buckeye and proceeds east between Van Buren Street and Buckeye Road, passing through downtown Phoenix immediately south of America West Arena and Bank One Ballpark. It crosses the Salt River in downtown Tempe and heads east into Mesa before turning southeasterly and leaving the urban area through Gilbert and Queen Creek. It then passes through Coolidge before rejoining the mainline at Picacho. There are several spurs and branches within the Phoenix metro area, including the Tempe Branch and the Chandler Branch. Numerous grade-separated roadway crossings of the UP exist in Phoenix, Tempe and Mesa.

Passenger rail service to Phoenix was suspended in 1996. The nearest Amtrak station opened at Maricopa, approximately 40 miles south, in October 2001. Union Pacific has announced plans to abandon the branch line from Wellton to Arlington, which would preclude future passenger service between Phoenix and Los Angeles. There are no plans, however, to abandon the line within the urban area, where some freight activity still occurs. Rail freight lines in metro Phoenix are displayed in Figure 5-8.

Commercial and Military Aviation Airports

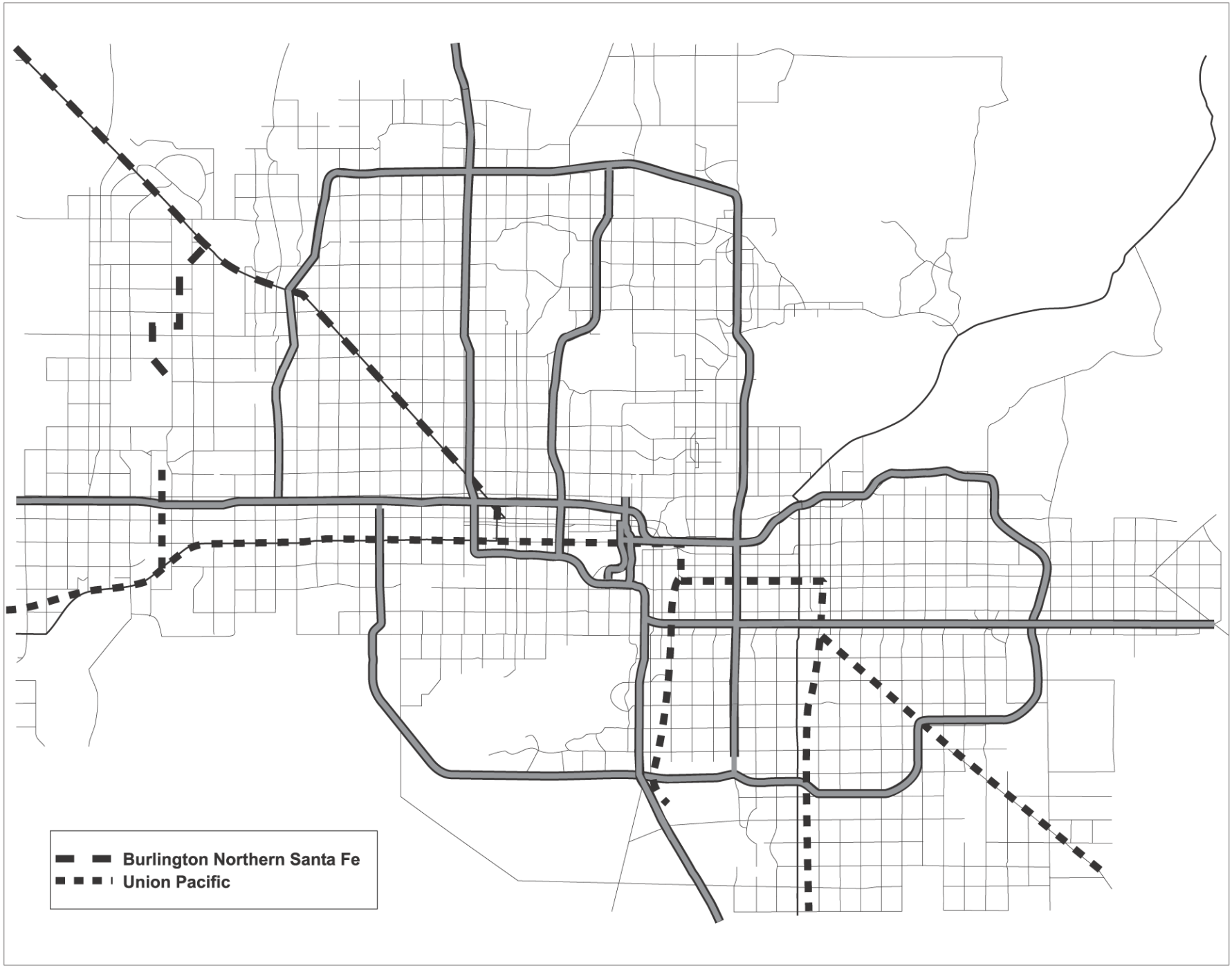
MAG is the officially designated agency for regional aviation system planning. The first MAG Regional Aviation System Plan (RASP) was developed in 1979, with updates completed in 1986, 1993, and 2001.

Between 1960 and 1990, airline operations at Phoenix Sky Harbor International Airport doubled. The number of annual passengers during that period increased 1,800%. Currently Sky Harbor serves over 32 million passengers and 550,000 operations. It was estimated (before 9/11/2001) that by 2020, annual passengers will exceed 60 million, and there will be over 700,000 operations per year. A third runway at Sky Harbor began operations in 2000.

Luke Air Force Base in Glendale continues full military operations. The RASP calls for measures to assist the continued viability of Luke's operations by establishing procedures to minimize conflicts between military activities and nearby land development. One such measure is a model sound attenuation ordinance for surrounding areas developed by MAG staff and the MAG Building Codes Committee. The ordinance, which has been adopted by Maricopa County, Goodyear, Glendale and El Mirage, reduces the interior noise level of new residences built within the noise contours of the base.

General Aviation Airports

There are 16 general aviation airports in the greater Phoenix area. Six of these are classified as reliever airports, providing alternative facilities for small aircraft that would otherwise use Sky Harbor. A number of these facilities were developed as military pilot training fields during World War II.



Source: Maricopa Association of Governments, August, 2001.□ URS/BRW August, 2001.

Figure 5-8

Existing Rail Lines

Much general aviation consists of the operations of corporate aircraft. Significant economic development has occurred because of the existence of employment-based land uses around general aviation facilities, including Scottsdale Municipal Airport, Phoenix Deer Valley Airport, Phoenix-Goodyear Airport and Glendale Municipal Airport. General aviation and other airport locations are shown in Figure 5-9.

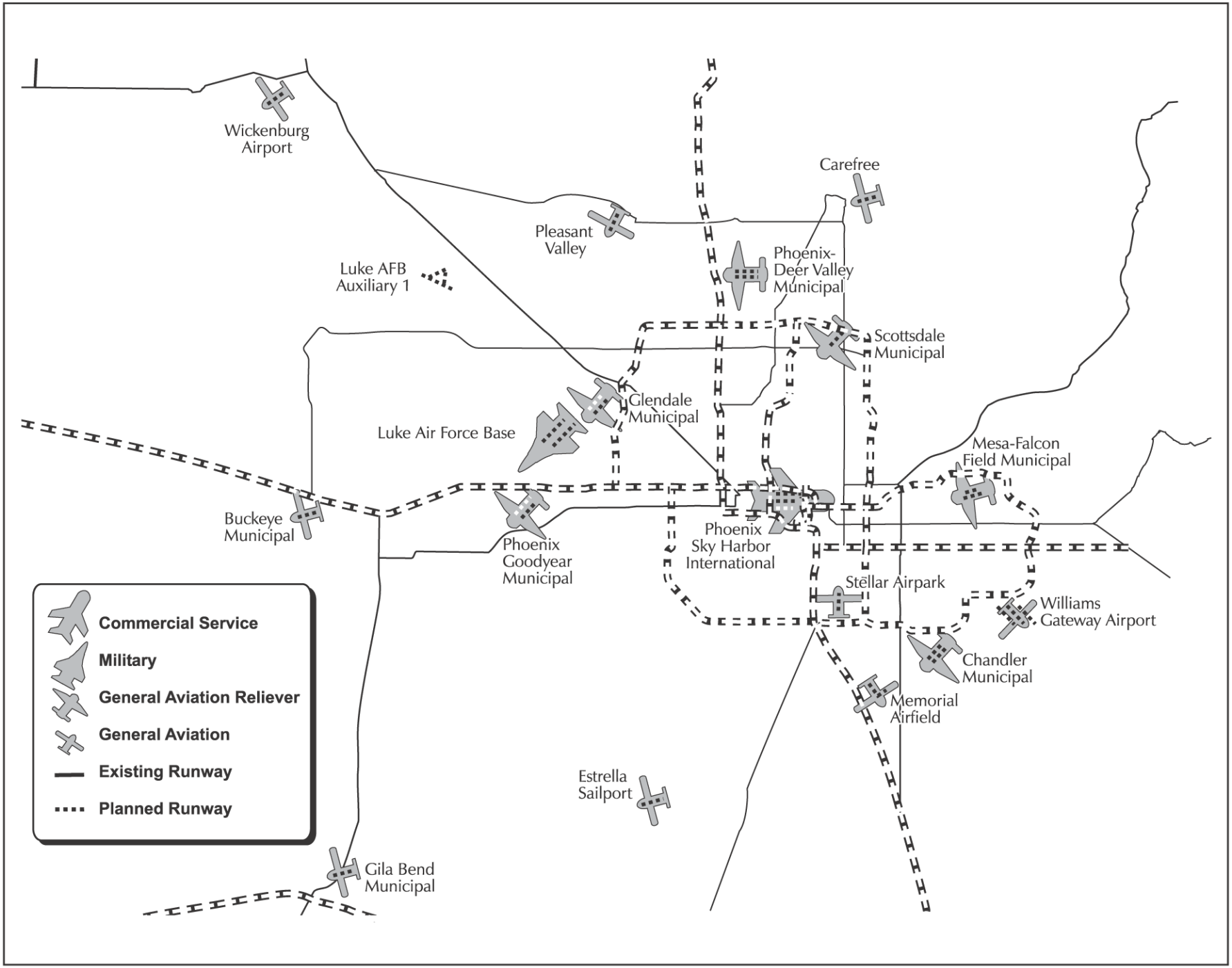
Intermodal Facilities

The use of the term "intermodal" became common after passage of the Intermodal Transportation Efficiency Act of 1991 (ISTEA). The term refers to use of more than one mode of transportation to complete what ISTEA referred to as "linked trip making." This was recognition that the various modes of passenger and freight transportation are interdependent. It was also a recognition that users of alternate modes, especially transit, rail and aviation, often do not make their entire trip by those modes; and that the connection points between autos, transit, rail facilities, truck terminals and airports should be conducive to and encourage these connections.

ISTEA required states and metropolitan planning agencies to develop an Intermodal Management System (IMS). The IMS was one of six management systems required by ISTEA, along with a Public Transit Asset Management System, a Bridge Management System, a Safety Management System, a Congestion Management System, and a Pavement Management System. (TEA-21, the successor legislation to ISTEA, made these management systems optional, but many planning agencies continue to use them.) These systems were envisioned as analytical tools to identify needs, evaluate alternative solutions, and prioritize transportation projects at statewide and metropolitan levels. The MAG IMS inventoried intercity bus terminals, rail freight terminals, rail passenger terminals, pipeline terminals, truck terminals and Sky Harbor International Airport.

The Phoenix metropolitan area is served by scheduled, private intercity motor coach service in nine transportation corridors:

- To Los Angeles via I-10
- To Flagstaff via I-17 (with continuing service east to Albuquerque via I-40)
- To Tucson and El Paso via I-10
- To Globe, Safford and El Paso via US 60 and US 70
- To Payson and Show Low via SR 87 and SR 260
- To Kingman and Las Vegas via US 60 and US 93
- To Lake Havasu City and Las Vegas via US 60 and US 95
- To San Diego via SR 85 and I-8.
- To Gila Bend and Ajo via SR 85



Source: Maricopa Association of Governments, August, 2001. URS/BRW August, 2001.

Figure 5-9

Regional Airports

Intercity bus service has been deregulated and is subject to change without notice. Additional information on these services appears in ADOT's 1995 *Intercity Bus Analysis*.

Sky Harbor International Airport is currently served by two bus routes: Route 13 and the Red Line, a major regional route linking Phoenix, Tempe and Mesa. The airport also lies just south of the Initial Operating Segment of the Central Phoenix/East Valley Light Rail Transit system now being designed. Airport planners envision an automated people mover system connecting Sky Harbor to the light rail service. Such a connection would enhance intermodal connectivity at the airport. The airport is also served by a wide variety of private ground transportation services including taxis, shared-ride shuttles, rental car companies, and courtesy vehicles from private parking facilities and the hospitality industry.

Non-Motorized Modes

MAG has published a 2001 Metropolitan Phoenix Area Bikeways Map that depicts striped on-street bike lanes, signed (but unstriped) on-street bike routes, paved and unpaved (off-street) paths, special grade separations and other bicycle facilities. The shared-use paths, overpasses and underpasses accommodate pedestrians as well as bicyclists.

MAG does not produce a regional pedestrian facilities map, but has recently published a potential pedestrian activity map as part of the MAG Pedestrian Plan 2000. This map is the result of a study to assess facility conditions, evaluate potential pedestrian activity and recommend improvements to achieve desired levels of service for pedestrian facilities.

The MAG 1999 Regional Bicycle Plan classifies bikeways as *regional* bikeways to primarily serve interjurisdictional bicycle trips and *local* bikeways to serve more localized trips. The Phoenix metro area has approximately 102 miles of regional on-street bicycle lanes, which are striped and marked lanes ranging in width from five to seven feet. It also has 91 miles of regional edge stripe bikeways, which are similar to bicycle lanes but may be less than five feet in width and are not signed or marked for bicycles; 386 miles of regional on-street bicycle routes, which are generally signed but unstriped routes on low-volume, low-speed local streets; and 17 miles of regional paved shared-use paths, which are generally 10- to 12-foot wide paths situated along canal banks, within roadway or utility corridor rights-of-way, or in linear parks. Shared-use paths are used by pedestrians, bicyclists, roller bladers and other users.

The MAG Regional Bicycle Plan shows approximately 1,135 of local bicycle lanes, 576 miles of local bicycle routes, 119 miles of local paved shared-use paths, and 133 miles of local unpaved paths. A comprehensive inventory of sidewalk facilities in Maricopa County was not available for review.

5.2 Existing Travel Demands and System Performance

This section summarizes the magnitude and characteristics of existing regional travel demands. Performance of the existing roadway and transit systems is also reviewed.

5.2.1 Network Evaluation Methodology

To define and evaluate current and future network performance, it is necessary to establish a consistent set of standards. For the purpose of this Status of Regional Transportation analysis, three distinct network evaluation categories have been identified: Network Statistics, Network Operational Conditions and Network Performance Indicators.

Table 5.2 lists the measures selected under each evaluation category. These measures will be applied for the Year 2001 analysis as well as all future year (2010, 2025 and 2040) conditions.

In reviewing the categories and specific measures to gauge the performance of networks, it is important to recognize that the arterial system has been evaluated according to the level of congestion predicted at arterial network intersections. This is because the arterial system is configured primarily in a grid pattern and the performance/Level of Service of any individual segment is based on the ability of major signalized intersections to accommodate peak period traffic volumes.

Table 5.2: Summary of Network Evaluation Standards

Network Evaluation	Specific Network Performance Measures
Network Statistics	• Person Trips • Vehicle Trip Length • Lane Miles* • Daily Roadway Capacity Miles* • PM Peak Period Vehicle Miles of Travel* (VMT) • Freeway Number of Lanes • Daily Transit Capacity Miles (bus + rail)
Network Operational Conditions	• Freeway Average Daily Traffic Volumes • PM Peak Period Freeway System Performance and Levels of Service (LOS) • PM Peak Period Arterial Intersection Levels of Service • Daily Transit Passenger Miles (bus + rail)
Network Performance Indicators	• Congested PM Peak Period VMT* • Congested PM Peak Period Lane Miles* • Average PM Peak Period Travel Speed* • PM Peak Period Travel Delay per VMT* • Transit Passenger Miles/Capacity Mile

* Performance indicators or measures reported by facility type.

Source: BRW, Inc. (URS/BRW, September 2001).

5.2.2 Existing Person Trips

Table 5.3 displays year 2001 daily person trips for work and non-work purposes. As shown, 12,962,000 person trips occur on a typical weekday, with approximately 29% of these trips being work-related. This includes travel to and from work, as well as work-related travel during the workday. Table 5.4 shows the existing mode split for weekday trips. The average vehicle trip length (Table 5.5) is currently 12.5 miles for work trips, 5.7 miles for non-work trips and 7.4 miles overall. For information on roadway capacity miles, lane miles and PM peak period VMT, see Table 5.1 above.

Table 5.3: Year 2001 Total Weekday Person Trips

Purpose	Daily Person Trips	Percent
Work	3,820,000	29%
Non-Work	9,142,000	71%
TOTAL	***12,962,000***	***100%***

Source: MAG, July 2001.

Table 5.4: Year 2001 Weekday Mode Split

Mode	Trips	Percent of Total
Single Occupant Vehicle	6,023,000	46.5%
Multiple Occupant Private Vehicle	4,268,000	32.9%
Transit	76,000	0.6%
Non-Motorized (work trips only)	58,000	0.5%
Other*	2,537,000	19.6%
TOTAL	***12,962,000***	***100%***

*Includes Sky Harbor, truck, external-internal and external-external trips.

Source: MAG, July 2001.

Table 5.5: Existing Year 2001 Average Vehicle Trip Length

Purpose	Average Trip Length (in Miles)
Work	12.5
Non-Work	5.7
All	7.4

Source: MAG, October 2001.

5.2.3 Existing Roadway System Traffic

Figure 5-10 displays existing average daily traffic (ADT) volumes on the MAG freeway system. The highest volumes occur on I-10 between US 60 and I-17, with ADTs in excess of 100,000. Daily volumes near 100,000 occur on I-10 west of I-17 and on portions of I-17, SR 202 and US 60.

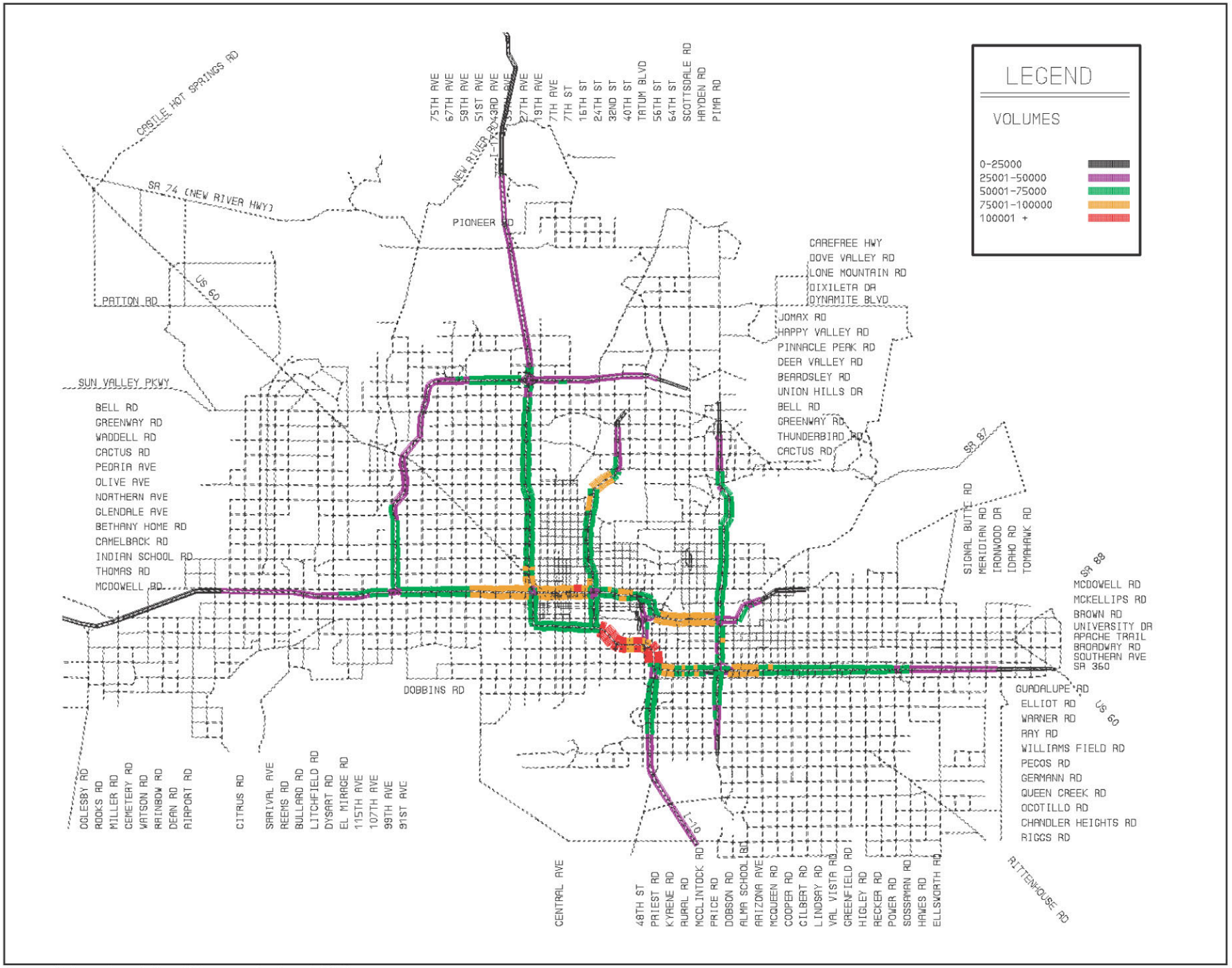
5.2.4 Existing Roadway System Congestion

Capacity analysis focuses on the maximum number of vehicles that a given roadway facility can accommodate within a specified time period. The Level of Service (LOS) concept characterizes operational conditions within a traffic stream in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. LOS represents driver satisfaction by the letters 'A' through 'F,' with 'A' representing the most favorable conditions (i.e., free flow with minimal delays) and 'F' representing the least favorable (i.e., demand equaling or exceeding capacity, resulting in severe congestion with long delays). LOS D is generally the minimum acceptable in metropolitan areas.

Figures 5-11 and 5-12 show congested locations (level of service E or F) on the region's freeway and arterial roadway systems. Table 5.6 indicates that 29% of freeway lane miles are currently congested in the PM peak period. The congested segments include 31% of general purpose lane (GPL) miles, but only 9% of high occupancy vehicle (HOV) lane miles. Major locations of recurring freeway congestion include I-17 from south of Greenway Road to I-10; I-10 from 75th Avenue to Elliot Road; US 60 from Gilbert Road to I-10; SR 51 from Glendale Avenue to I-10; and SR 101 (Pima Freeway) from Indian Bend Road to Thomas Road.

About 10% of arterial lanes miles are congested during the PM peak period (Table 5.6), while 17% of major surface street intersections are congested during the PM peak. Intersections in the center of the urban area (generally from Thunderbird Road to Elliot Road, and Gilbert Road to Grand Avenue) are more likely to experience congestion than those at the periphery.

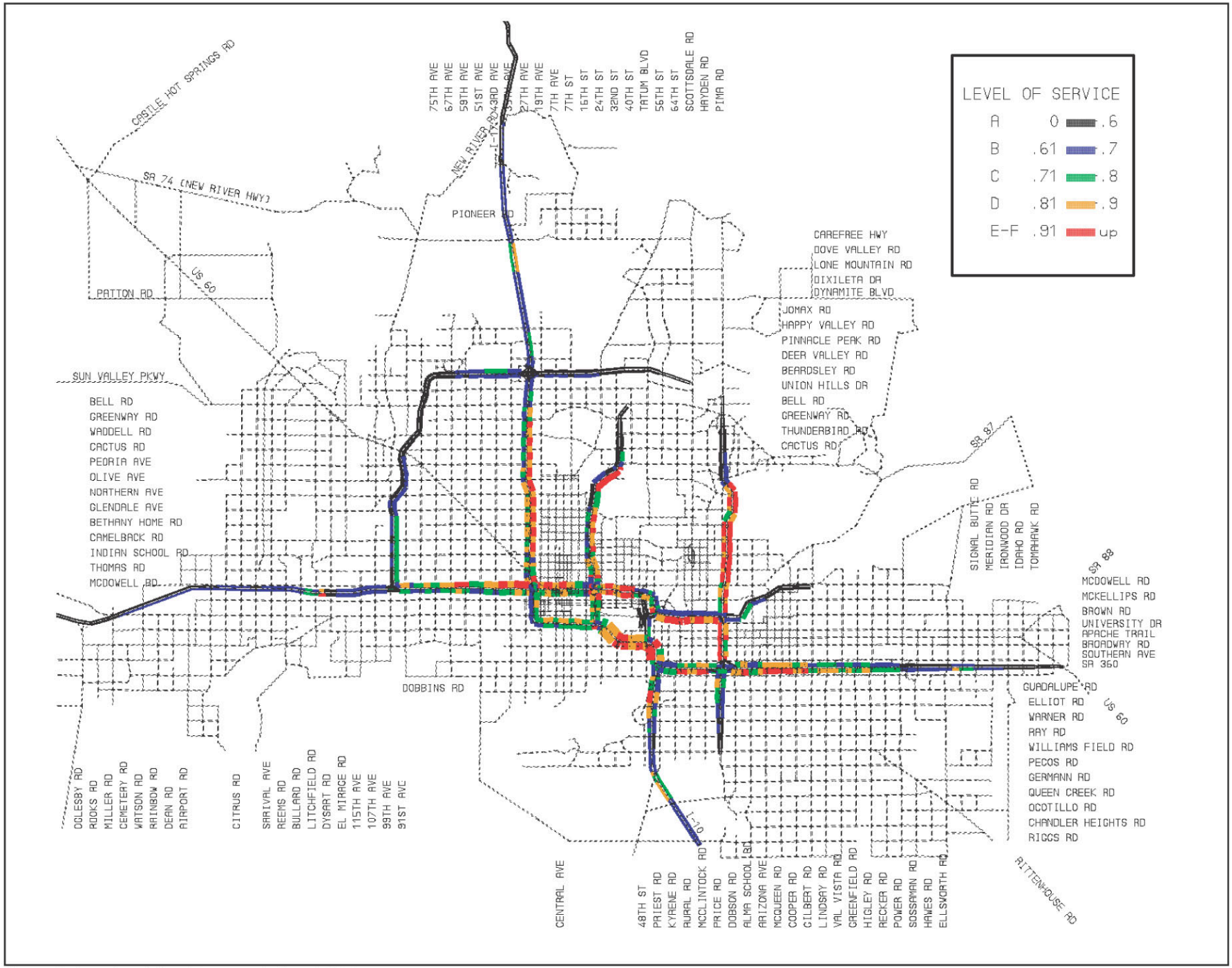
As shown in Table 5.6, 44% of freeway VMT and 22% of arterial VMT in the PM peak period currently occur under congested conditions. The average PM peak period speed on freeway general purpose lanes is 36 mph, while the average arterial speed is 24 mph. The average PM peak period delay per vehicle mile of travel is 41 seconds on both freeways and arterials.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 5-10

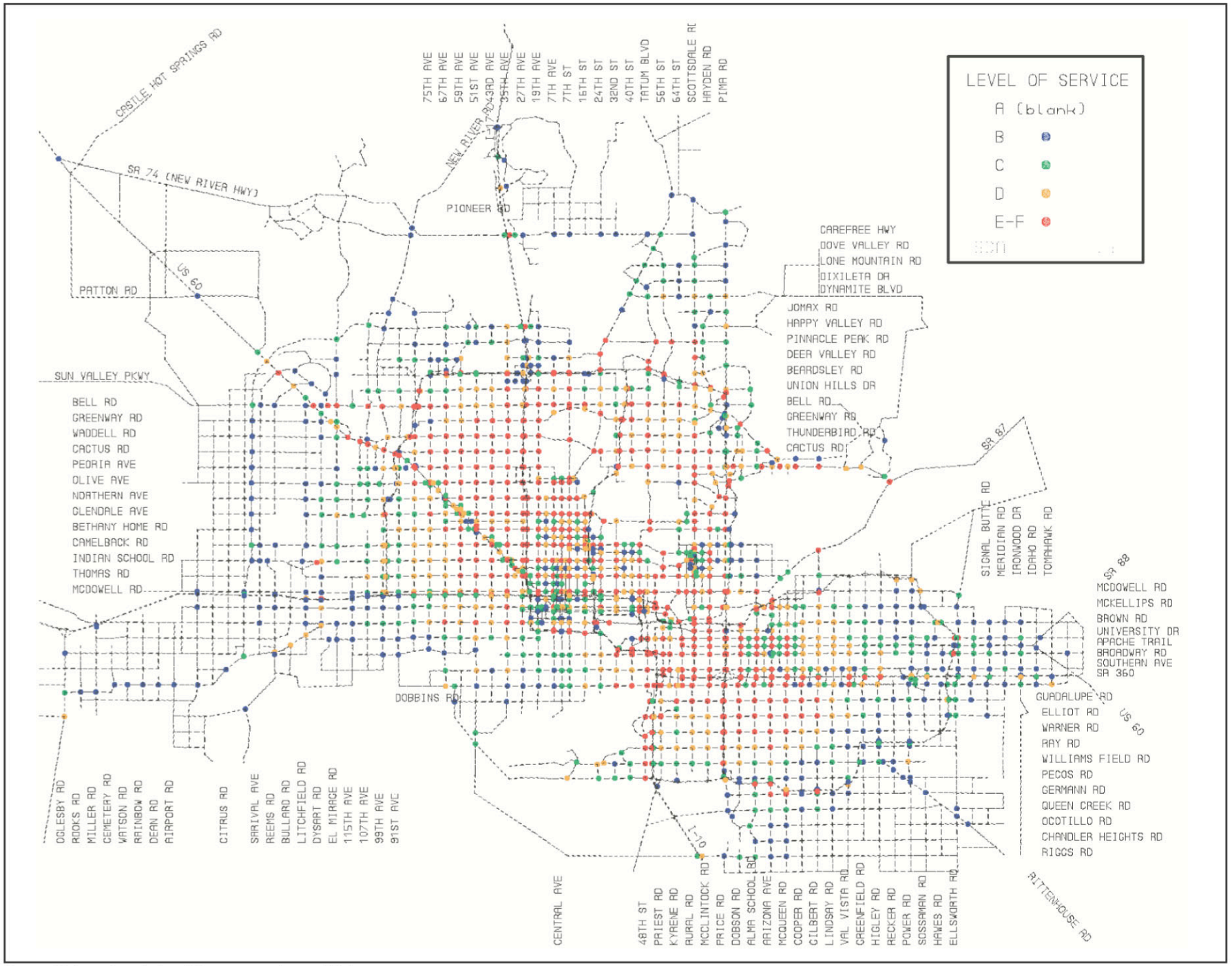
Current Average Daily Traffic by Direction on Freeways



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 5-11

Current PM Peak Hour Freeway Performance and Level of Service



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-12

Predicted Year 2010 PM Peak Hour Intersection Performance and Level of Service

Table 5.6: Year 2001 PM Peak Period Congestion and Average Travel Speed

Roadway Type	VMT		Lane Miles		Average Speed (mph)	Delay/ VMT (seconds)
	Congested	Congested as % of Total	Congested	Congested as % of Total		
Freeway & Expressway	2,352,186	44%	437	29%	36 (GPL) 57 (HOV)	41
Arterial	1,877,653	22%	846	10%	24	41

Source: MAG and BRW, Inc., July 2001.

5.2.5 Existing Transit System Performance

Fixed Route Performance

Valley Metro fixed route service (both local and express routes) had 37.5 million passenger boardings during fiscal year (FY) 1999-2000. This represents 29.55 boardings per revenue hour of service, and just under 1% of the total person trips in the region. The operating cost was $1.99 per boarding and $59 per revenue hour, of which passenger fares covered 31%. In spite of peak period congestion, 90% of all bus trips ran on time.

As of 2001, the estimated number of daily (weekday) passenger miles traveled on the regional bus system is 568,000, according to the MAG model. The fixed-route bus system offers 5,154,000 daily capacity miles, resulting in a ratio of 0.11 passenger miles per capacity mile.

5.2.6 Dial-A-Ride Performance

Dial-A-Ride services in the region provided 968,000 trips during FY 1999-2000. The operating cost per revenue hour was $37.18. Operating cost per boarding was $16.12 — far higher than the $1.99 per boarding for fixed route service. Fourteen percent of all boardings required wheelchair assistance. About 9% of dial-a-ride operating costs were covered by fares.

6.0 PLANNED TRANSPORTATION SYSTEMS AND FUTURE PERFORMANCE

This chapter provides a descriptive summary of currently adopted plans for the transportation system in greater Phoenix. It draws upon the MAG Long Range Transportation Plan 2001 Update, the MAG 2002-2006 Transportation Improvement Program (TIP), the City of Phoenix "Transit 2000" program, and other guidelines for future development.

The MAG Regional Transportation Model for years 2010, 2025 and 2040 was examined to predict future conditions based on expected growth and the implementation of the above plans. Chapter 5.0 contains a discussion of the network evaluation methodology, which is the same for existing and future conditions.

6.1 Programmed Improvements

This section describes improvements currently programmed in the MAG Transportation Improvement Program (TIP).

6.1.1 Programmed Roadway Improvements

Programmed Freeway Improvements

The adopted regional freeway system is on schedule for completion by 2007. The fiscal year (FY) 2002-2006 MAG Transportation Improvement Program (TIP) includes 157 freeway projects dedicated to this end. The principal funding source behind the regional freeway system, the Regional Area Road Fund (RARF), is obtained from a one-half cent sales tax collected within Maricopa County through calendar year 2005. This is combined with a special 15% allocation of state motor fuel taxes targeted specifically, in Maricopa County, for construction of limited access facilities.

Programmed Major Roadway Improvements

The FY 2002-2006 MAG TIP includes 545 street, 30 maintenance and 52 safety projects. Projects are distributed throughout the region. While a number of types of projects are included, most of the projects involve street widening. Some new street construction is also included.

Programmed High Occupancy Vehicle Improvements

The FY 2002-2006 TIP includes numerous HOV improvements, primarily park-and-ride lots and freeway HOV lanes and interchanges. New lanes are programmed for the SR 51 (Squaw Peak) and the US 60 (Superstition) Freeways, and interchanges are programmed between both of those facilities and Interstate 10. Some 24 projects are classified as "air quality/transportation demand management" improvements.

Intelligent Transportation Corridors

The term Intelligent Transportation Systems (ITS) refers to the integration of technology-based transportation infrastructure. It involves the coordinated use of advanced sensors, computers, electronics, audio/video and other electronic information technologies to increase the safety and efficiency of the surface transportation systems. Previously known as IVHS (Intelligent Vehicle Highway Systems), the nomenclature was changed to reflect an awareness that the technology was not only creating "smart roads" and "smart cars," but also addressing other modes such as public transit, bicycles and pedestrians. ITS helps improve safety and efficiency by:

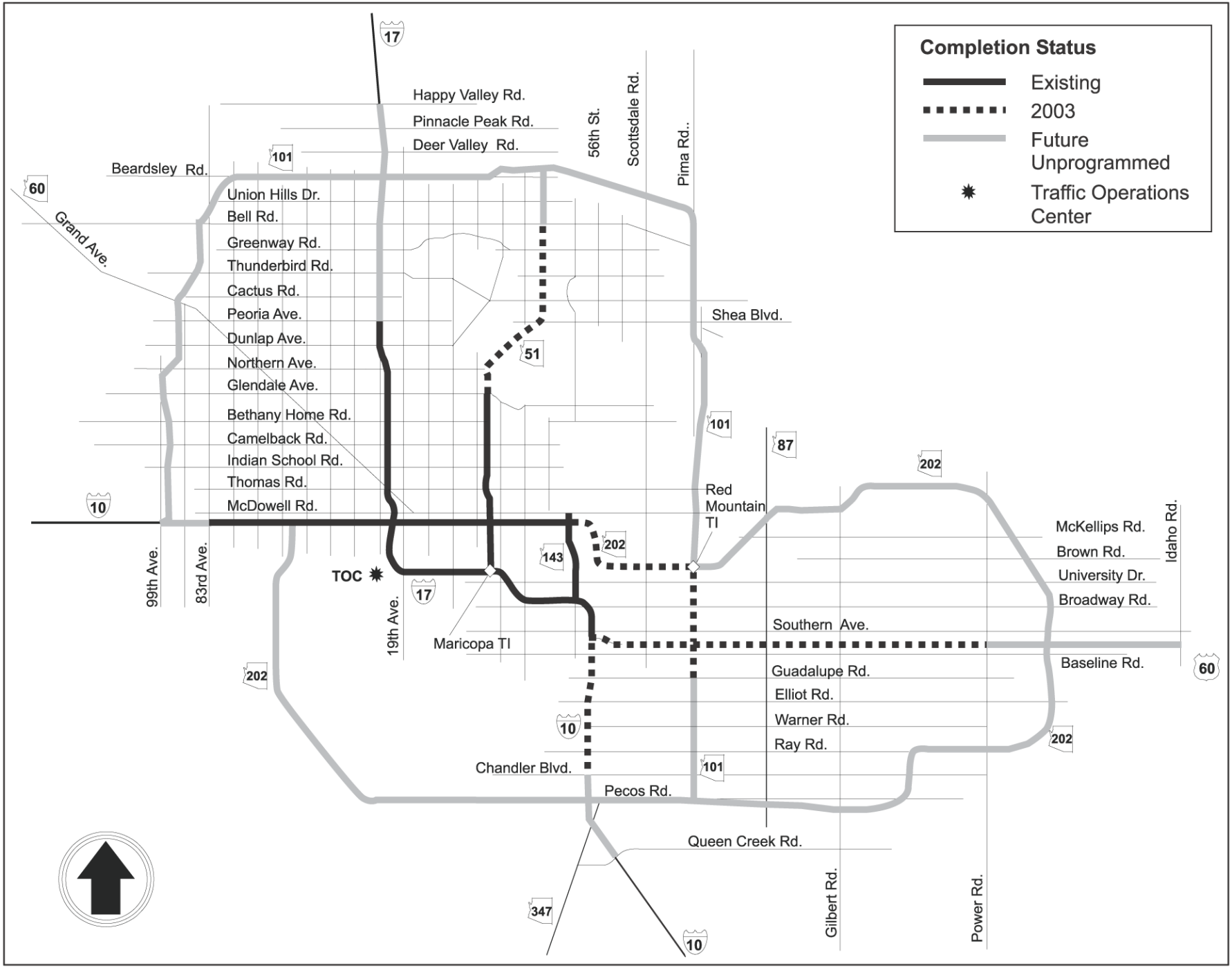
- Collecting and transmitting "real time" information on conditions and schedules to drivers or transit patrons before or during their travel
- Relieving congestion by reducing accidents through better traffic flow, detecting and clearing incidents, and rerouting traffic
- Providing drivers with navigational aids
- Increasing productivity of commercial vehicle and public transit fleets through automated scheduling, dispatching and weigh-in-motion systems

Over the last few years, MAG has taken progressive steps toward mainstreaming ITS in the transportation planning process. MAG currently leads regional ITS planning efforts. In 1996, the first ITS Strategic Plan adopted by the region identified priorities for implementing ITS solutions in the region. A range of alternatives for developing and maintaining ITS were evaluated and recommended in the plan.

In September 1999, MAG initiated a project to update the strategic plan. This project was necessitated by significant ITS developments at the local and national levels. A Regional ITS Stakeholder Group, consisting of the MAG ITS Committee and other regional ITS stakeholders, provided oversight for this project. The Plan update was adopted in February 2001 and will serve as the road map for future ITS deployment in the region.

The Arizona Department of Transportation (ADOT) is using a coordinated group of traffic management strategies to help manage the regional freeway system. This Freeway Management System (FMS) consists of electronic message signs, ramp metering devices, closed circuit television cameras, vehicle detectors, and a telecommunications network that links all these devices to a traffic operations center.

MAG recognizes the completion of the FMS as a high priority for the region. MAG has therefore approved the installation of communications conduits and other infrastructure wherever new freeway segments are constructed. Figure 6-1 shows the current FMS and its projected expansion.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-1

Freeway Management System

The MAG area is nationally recognized as a leader in deploying ITS technologies. In 1996, the U.S. Department of Transportation (USDOT) introduced a program called the Model Deployment Initiative (MDI). The MAG area was one of four areas selected as a MDI program recipient. The project, named AZTech™, was primarily funded by a $7.5 million USDOT grant. The intent of the program was to move ITS improvements onto the arterial street system. Eight high priority "Smart Corridors," covering over 160 miles of arterial streets, are being instrumented for vehicle detection, surveillance cameras and variable message signs. The project has improved traffic signal coordination and linked 12 regional traffic management centers. These Smart Corridors are shown in Figure 6-2. The current MAG TIP contains 54 ITS projects.

6.1.2 Programmed Transit Improvements

Programmed Bus Service Expansion

Incremental improvements to bus transit operations are programmed throughout the region. The majority of these improvements are being made within the City of Phoenix, where Transit 2000, funded by a 0.4% sales tax increase, was approved in March 2000. Following approval of a 0.5% transportation sales tax in November 2001, Glendale is developing a similar five-year transit improvement program.

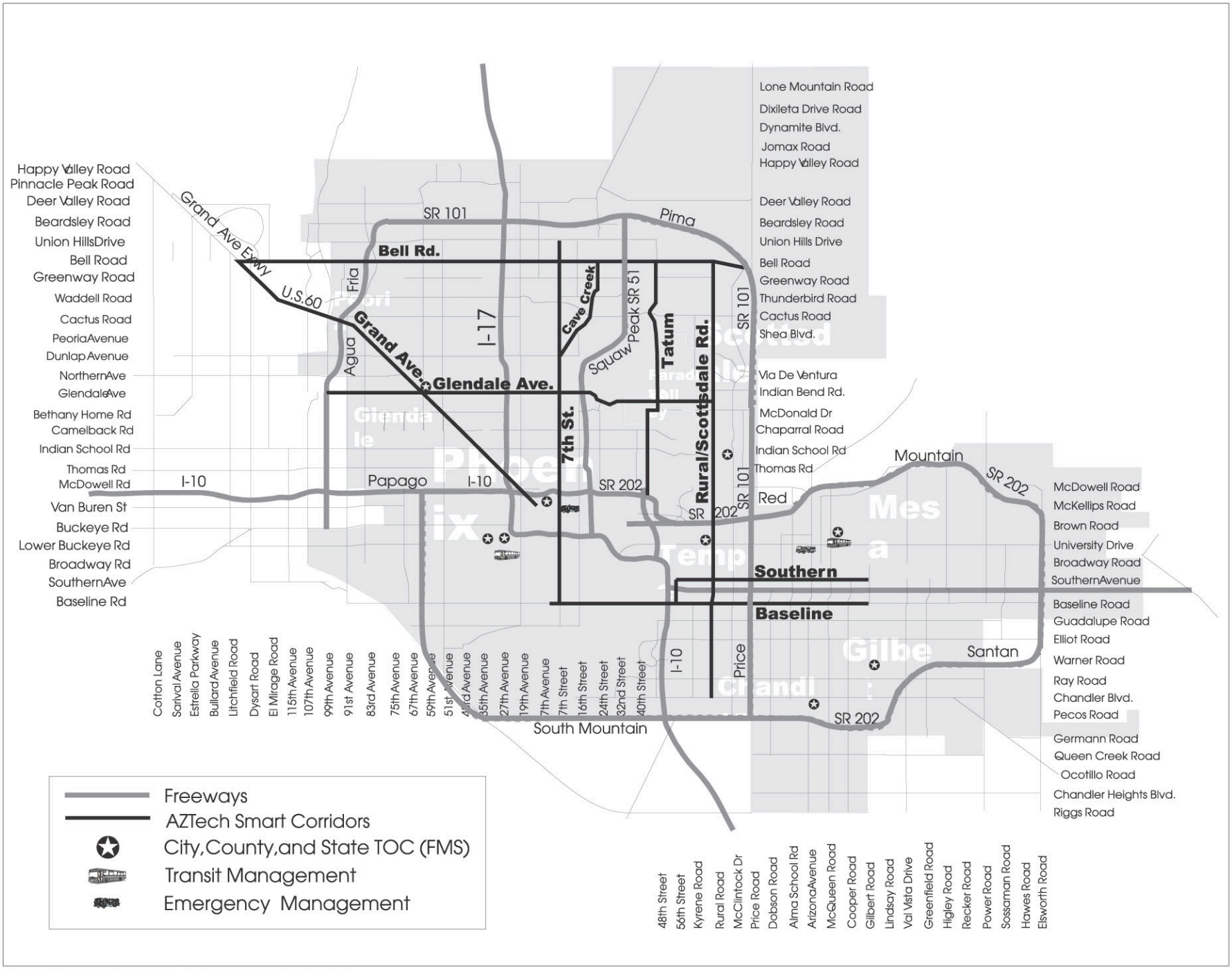
Because new bus delivery takes 18 months to two years, initial service improvements in Phoenix were limited to those that could be done with the existing fleet: extended hours of operation on weekdays and new weekend service on all routes. Beginning in 2002, existing routes will be geographically extended. Beginning in 2003, implementation of routes on roads without current service will begin, as will limited stop service on Camelback and Bell roads. All Transit 2000 bus service improvements in the City of Phoenix will be in place by 2005. The MAG 2002-2006 TIP includes nearly $1.5 billion for transit capital projects including rolling stock, maintenance facilities, and light rail components. The TIP also provides for construction of 12 regional park-and-ride lots from among the locations shown in Figure 6-3.

Dial-A-Ride

Incremental improvements to dial-a-ride service will be made during the next five years, especially in Phoenix and Glendale. Service level improvements to reduce delays are programmed, as is additional service to provide ADA-mandated complementary paratransit in areas where fixed route services are expanded.

Bus Rapid Transit (BRT)

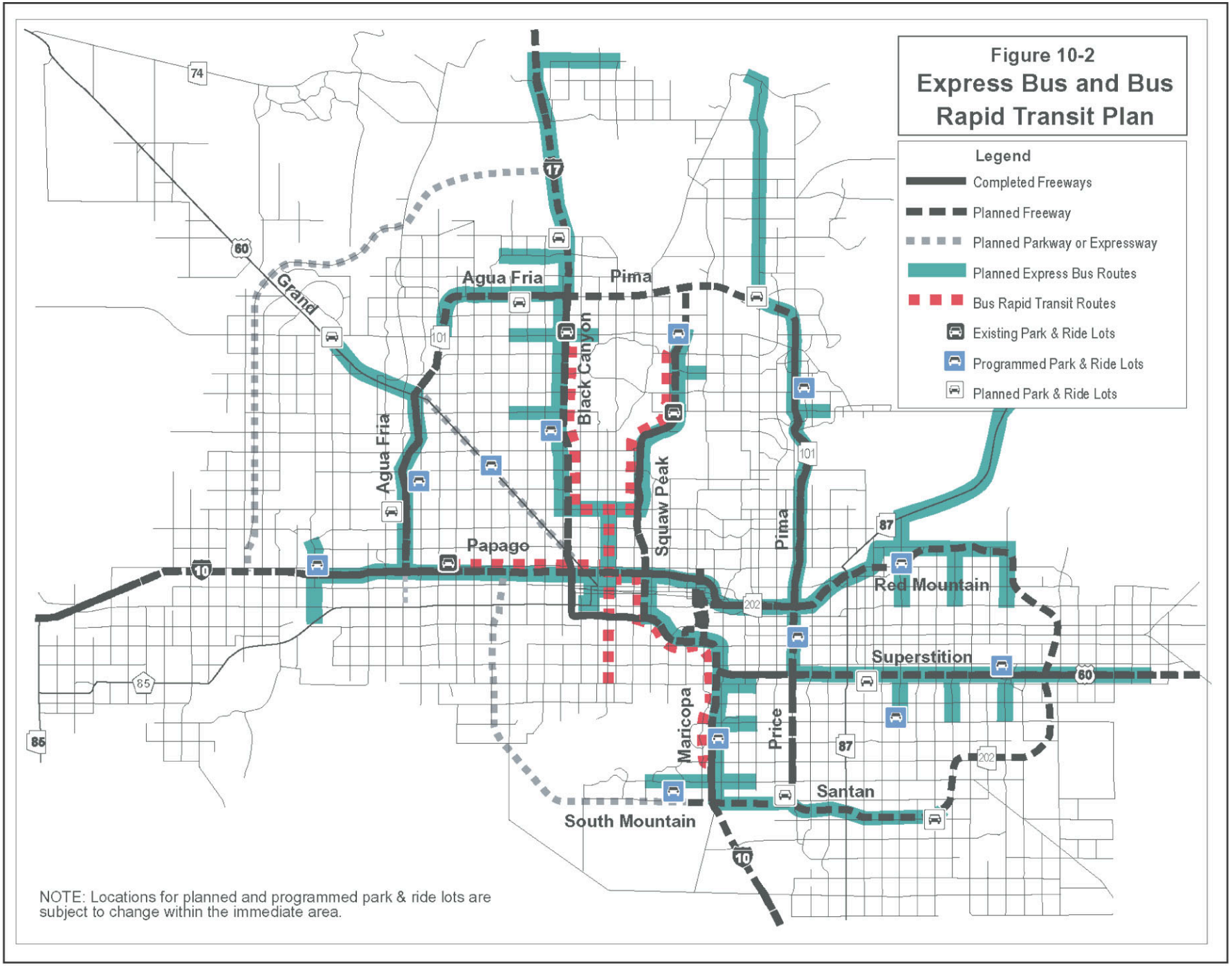
As planned by the City of Phoenix, Bus Rapid Transit (BRT) is an expanded commuter express bus concept. High-frequency BRT will operate weekdays from 5:00 to 9:00 AM and 3:00 to 7:00 PM, taking advantage of freeways and HOV facilities wherever possible. In 2003 Phoenix will initiate BRT service in the I-17 north, SR 51 north, I-10 west, I-10 east and South Central Avenue corridors. For the first time, a limited number of "reverse commute" express trips will be provided. New park-and-ride lots to serve the BRT system are being developed near I-10/Pecos Road and SR 51/Bell Road.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-2

AZTech ITS Model Deployment Initiative



Source: Maricopa Association of Governments, August, 2001.

Figure 6-3

Express Bus and Rapid Transit Plan

Light Rail Transit (LRT)

The 2000 MAG Long Range Transportation Plan (LRTP) includes a 39-mile light rail corridor. The funding plan for the initial 20-mile operating segment includes $1.45 billion for light rail design, right-of-way, construction and vehicles. This initial operating segment, from the East Valley Institute of Technology in Mesa to Spectrum Mall in Phoenix, is slated for completion in 2006. Funding will come from the federal government and the cities of Phoenix, Tempe and Mesa.

6.1.3 Programmed Non-Motorized Modes

The FY 2001-2005 MAG TIP identifies 54 bicycle and 37 pedestrian projects. In addition, a number of highway and roadway projects throughout Maricopa County incorporate bicycle and pedestrian facility improvements. MAG has established a ranking process that first determines which roadway projects submitted for programming include bicycle and pedestrian improvements, and then provides higher ranking for those projects.

6.2 Planned Improvements

This section describes planned system improvements as identified in the current MAG Long Range Transportation Plan.

6.2.1 Planned Roadway Improvements

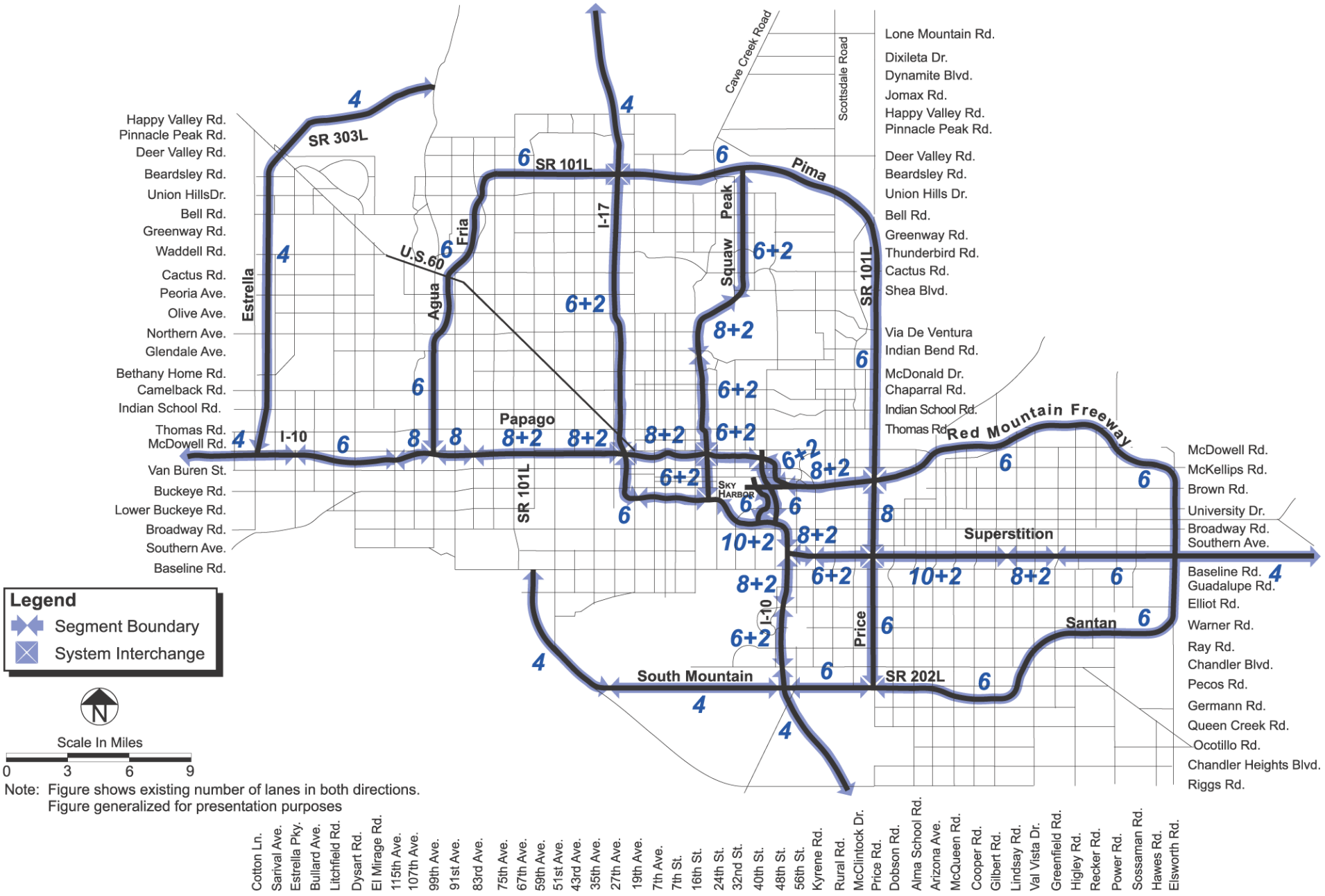
Planned Freeway Improvements

Beyond the scope of current programming, planned freeway projects remain. Figures 6-4 and 6-5 depict the planned number of lanes (general-use plus HOV) for the MAG freeway system in the years 2010, 2025 and 2040. RARF funding, which will end after 2005, will not be adequate to complete the South Mountain Freeway. Improvements to the Loop 303 Estrella Highway will still be required. An extension to the roadway from Grand Avenue to I-17 is one area of focus, and another is widening and full access control from I-10 to Grand Avenue. While some widening improvements to SR 85 are programmed, additional resources will be needed to provide a fully access-controlled facility.

The current MAG Long Range Transportation Plan (LRTP) calls for continued funding for intersection "flyovers" and access control for Grand Avenue. The plan also calls for a commitment of an additional $164 million for improvements to the South Mountain, Estrella, and Grand corridors between 2008 and 2020, and an additional $34 million for various other system improvements such as interchange improvements.

Planned Major Roadway Improvements

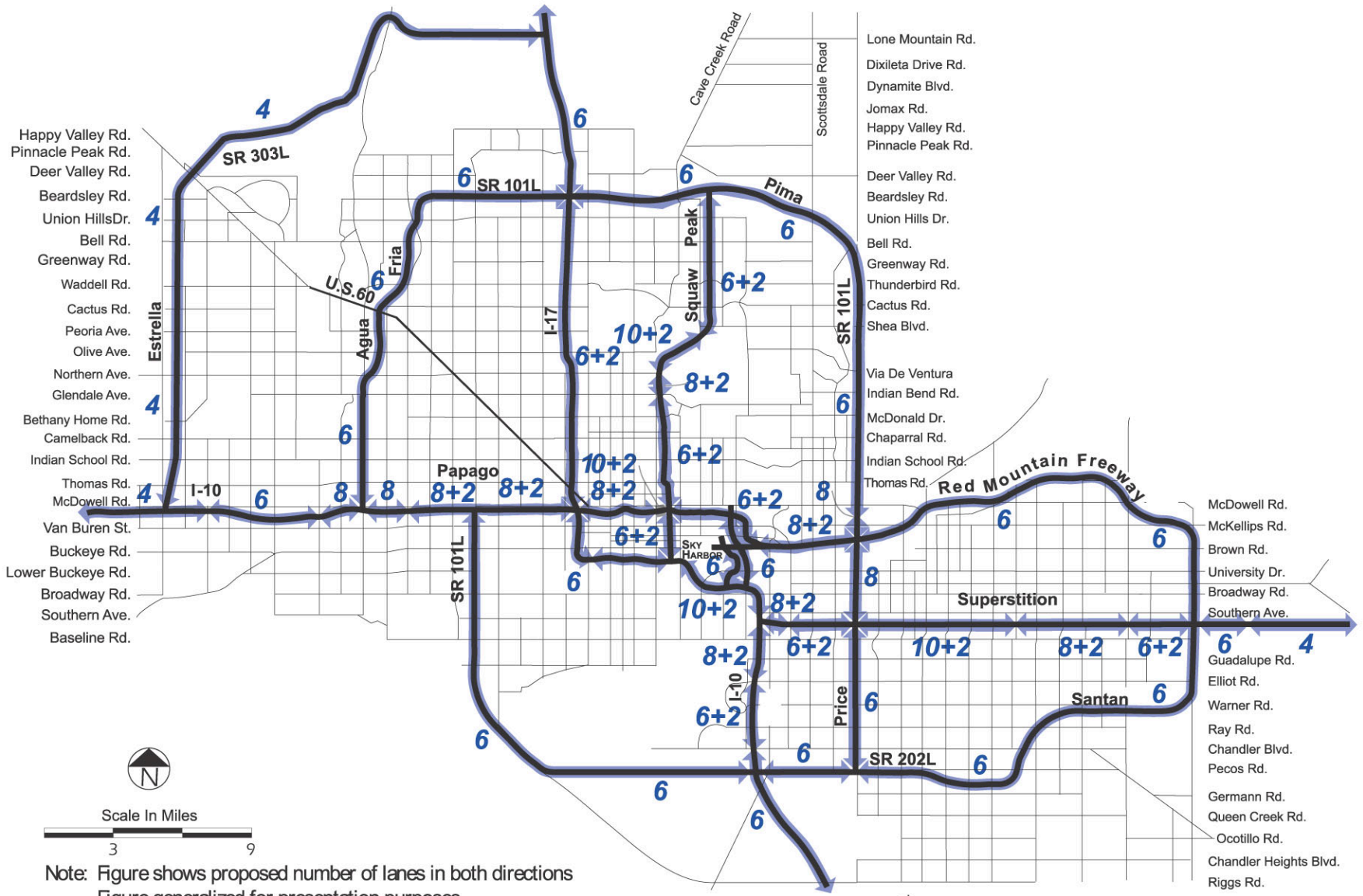
There are currently just under 9,000 lane miles of arterial streets in the region. It is anticipated that by 2020 there will be a 45% increase in the number of arterial lane miles. MAG member agencies are periodically surveyed on planned street improvements and the information is included in the MAG modeling networks. It is assumed that new arterial street construction will be paid for primarily from private sources, but that street widening will be paid from public sources. It is also assumed that all local streets will be constructed with private dollars and capitalized in the cost of the developments.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-4

Year 2010 Number of Lanes (Including HOV Lanes) on Regional Freeway System



Note: Figure shows proposed number of lanes in both directions
Figure generalized for presentation purposes

Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-5

Years 2025 and 2040 Number of Lanes (Including HOV Lanes) on Regional Freeway System

Planned High Occupancy Vehicle Improvements

The current MAG LRTP calls for completion of an expanded HOV system. The 1994 MAG HOV plan is now being updated, with an assessment of High Occupancy Toll (HOT) Lanes. These special lanes would be free of charge for HOVs, while using ITS technologies to impose tolls on single-occupant vehicles.

6.2.2 Planned Transit Improvements

Planned Bus Service Expansion

The existing regional transit plan in the LRTP is to triple the number of existing revenue miles for fixed route bus, with enhanced frequencies and extended hours in areas that currently have service, as well as new service in currently unserved areas. These service level targets were developed by applying transit service level standards from the Long Range Transit Plan (RPTA 1999) to all existing service areas and expanding service areas into new locations as warranted by population and employment density. Service standards adopted as goals in the Long Range Transit Plan include peak and off-peak trip frequency per hour, as well as hours and days of operation. The expanded service area is shown in Figure 6-6.

Dial-A-Ride

The LRTP calls for a tripling of dial-a-ride services. This expansion would provide dial-a-ride services complementary to the new rail and bus service discussed above, and also help meet the needs of an expanding senior population.

Express Bus Service

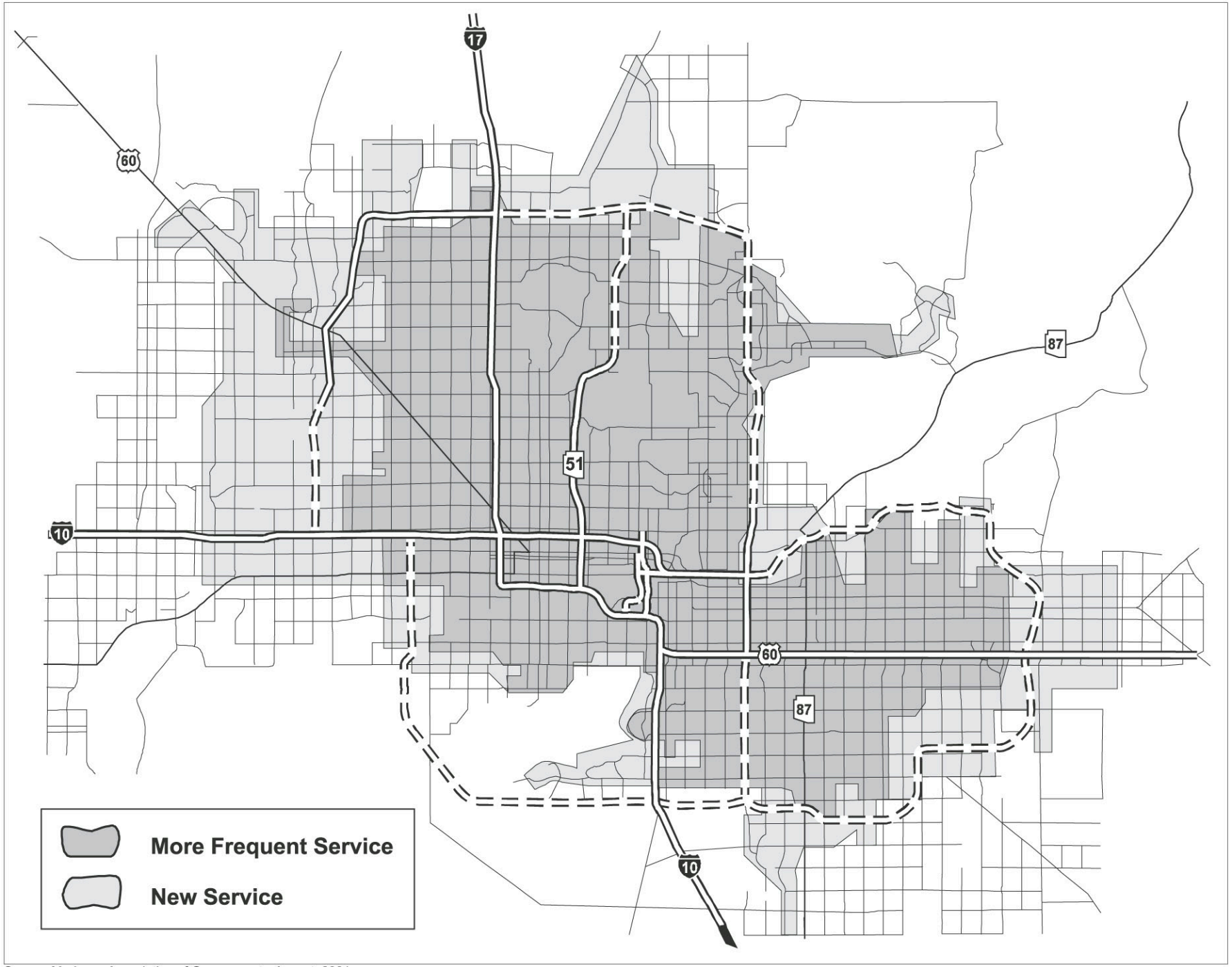
The current LRTP calls for a quadrupling of the number of miles of express bus service. Like the Phoenix BRT, this expanded regional express bus system would provide frequent service in major corridors for eight hours per weekday. The system would also include park-and-ride lots and stations offering express bus, local bus, light rail and neighborhood circulator services. The extended express bus network is shown in Figure 6-3 above.

Light Rail Transit (LRT)

The Light Rail Transit Plan in the 2000 MAG LRTP calls for construction of a 39-mile system serving Glendale, Phoenix, Tempe and Mesa. Possible extensions to the planned system are currently being evaluated in Tempe, Scottsdale, and Chandler. The system plan is shown in Figure 6-7.

6.2.3 Planned Non-Motorized Modes

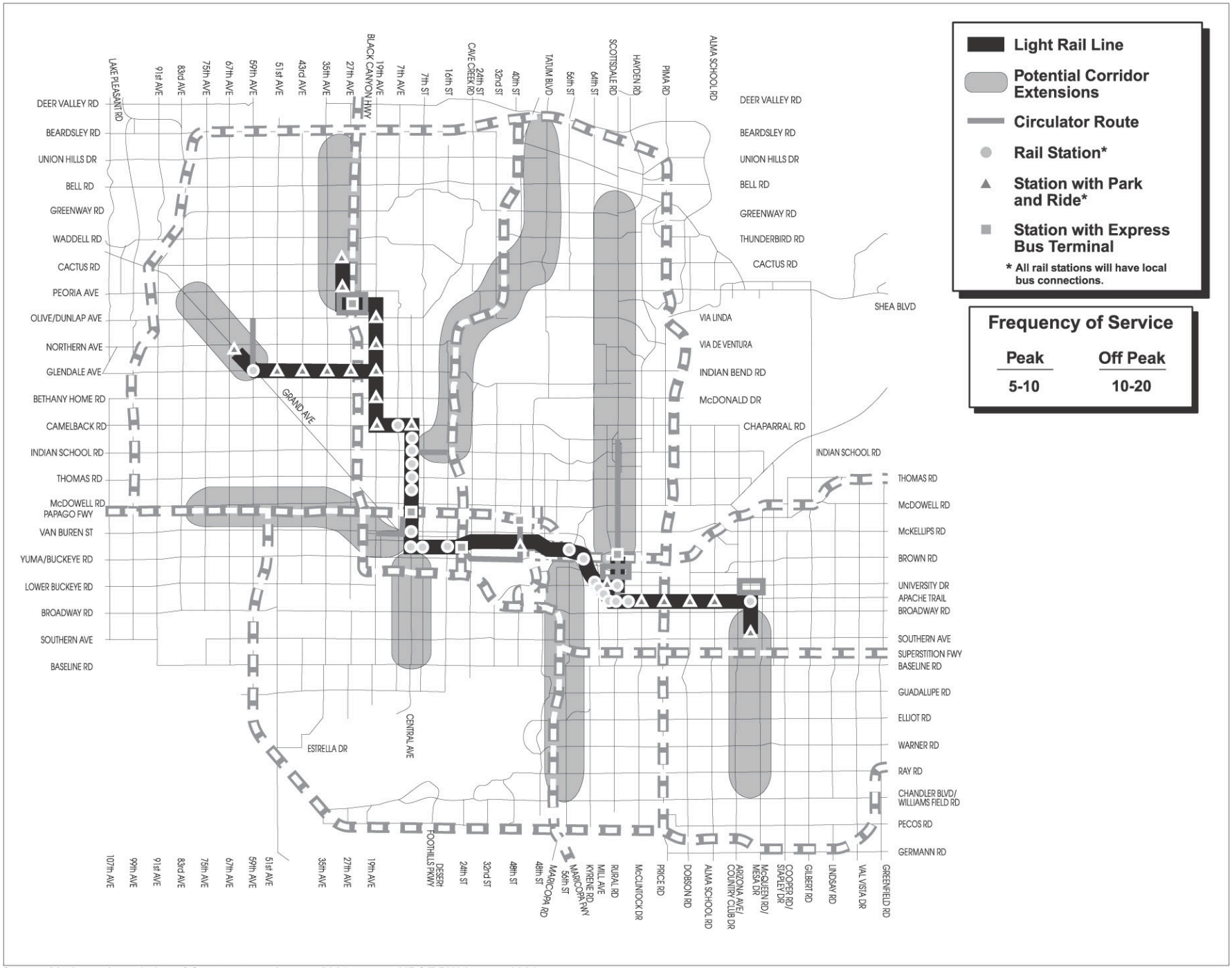
Planned bicycle and pedestrian projects and programs are contained within the 1999 MAG Regional Bicycle Plan, 2001 MAG Regional Off-Street System Plan, MAG Pedestrian Plan 2000, and various local plans.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-6

Planned Fixed Route Bus Service



Source: Maricopa Association of Governments, August, 2001. URS/BRW August, 2001.

Figure 6-7

Light Rail System Plan

The MAG Regional Bicycle Plan includes approximately 820 miles of on-road regional bikeways and 533 miles of off-road regional bikeways. In addition, the plan includes approximately 417 miles of local on-road bikeways, 57 miles of local off-road bikeways, and 1,526 miles of bikeways classified as "other." This category was used if the local plan did not indicate the type of facility planned. Some local jurisdictions do not have bicycle plans or were unable to submit plans for incorporation into the MAG Regional Bicycle Plan, so some on-road and off-road bikeways may not be documented.

The MAG Regional Off-Street System Plan (ROSS) was prepared to create a regional off-street shared-use path/trail plan with both paved and unpaved facilities. The plan identifies primary issues, goals and objectives, potential corridors and design guidelines, and provides an implementation strategy. Corridors include canals, desert washes and waterways, flood control structures and rights-of-way, highway and freeway rights-of-way, railway corridors, and utility easements. The ROSS does not identify total mileage for the potential paved and unpaved paths in the region, but includes a "Potential Corridors" map.

The MAG Pedestrian Plan 2000 evaluated 1,000 miles of major roadways for potential pedestrian activity and determined which would most benefit from pedestrian improvements. The Pedestrian Plan identified specific land use, public awareness, funding, design guidance and other objectives to be attained over a five-year period. The plan does not directly indicate the mileage of pedestrian facility improvement needs, but illustrates the rankings of the 1,000 miles evaluated.

MAG does not program or plan airport improvements. This responsibility is handled statewide by ADOT, which prepares a five-year airport development program. The program for FY 2002 to FY 2006 lists projects totaling $958 million in Maricopa County.

6.3 Future Year Travel Demands

This section reviews projected person trips, VMT, average trip length, and mode utilization for the years 2010, 2025, and 2040.

6.3.1 2010 Travel Demand

Person Trips

Table 6.1 displays forecast person trips for 2010 for work and other purposes. By 2010, a total of 15,909,000 person trips will occur on an average weekday, representing an increase of 23% over existing conditions. Approximately 30% of these trips will be work-related—about the same as today's 29%. Table 6.2 shows the projected weekday mode split of year 2010 person trips.

Table 6.1: Forecast Year 2010 Person Trips

Purpose	Weekday Person Trips	Percent
Work	4,707,000	30%
Non-Work	11,202,000	70%
TOTAL	***15,909,000***	***100%***

Source: MAG, July 2001.

Table 6.2: Forecast Year 2010 Weekday Mode Split

Mode	Trips	Percent of Total
Single Occupant Vehicle	7,303,000	45.9%
Multiple Occupant Private Vehicle	5,262,000	33.1%
Transit	161,000	1.0%
Non-Motorized (work trips only)	64,000	0.5%
Other*	3,119,000	19.6%
TOTAL	***15,909,000***	***100%***

*Includes Sky Harbor, truck, external-internal and external-external trips.

Source: MAG, July 2001.

Average Vehicle Trip Length

Trip length is an important measure of the spatial separation of trip ends and the directness and connectivity of the transportation system which serves them. Table 6.3 displays average trip length by purpose for the forecast year 2010. The average length of all trips is projected to increase by 5% from the 2001 level.

Table 6.3: Forecast Year 2010 Average Vehicle Trip Length

Purpose	Average Trip Length (in Miles)
Work	13.4
Non-Work	5.9
All	7.8

Source: MAG, October 2001.

VMT and Capacity Miles

Table 6.4 displays projected PM period VMT, roadway capacity miles and lane miles for 2010. In comparison with existing conditions, VMT is projected to increase by 28%, while the number of capacity miles will increase by just 11%. From 2001 to 2010, the proportion of VMT carried by freeways will increase slightly, from 32% to 33%. Figure 6-8 displays 2010 traffic volumes on the region's freeway system.

Table 6.4: 2010 VMT and Roadway Miles by Functional Class

Type of Roadway	PM Peak VMT	% VMT	Daily Capacity Miles	% Capacity Miles	Lane Miles	% Lane Miles
Freeway & Expressway	7,254,939	33%	38,538,570	23%	1,835	10%
Arterial	10,599,244	49%	77,060,640	45%	9,633	52%
Local & Collector	3,899,783	18%	55,200,000	32%	6,900	38%
TOTAL	***21,753,966***	***100%***	***170,799,210***	***100%***	***18,368***	***100%***

Source: MAG, July 2001.

Transit

Transit passenger miles are projected to grow by 165%, from 568,000 to 1,506,000, between 2001 and 2010. Of the 938,000 new passenger miles, 383,000--over 40%--are attributable to the light rail system, whose first line is scheduled to open in 2006. With the number of fixed-route capacity miles nearly doubling to 10,169,000, the resulting ratio of passenger miles to capacity miles will be 0.15.

6.3.2 2025 Travel Demand

Person Trips

Table 6.5 displays forecast person trips for 2025 for work and non-work purposes. In 2025, 21,161,000 person trips will occur on an average weekday, representing a 63% increase over existing conditions. Table 6.6 shows the projected daily mode split of year 2025 person trips.

Table 6.5: Forecast Year 2025 Total Person Trips

Purpose	Weekday Person Trips	Percent
Work	6,265,000	30%
Non-Work	14,896,000	70%
TOTAL	***21,161,000***	***100%***

Source: MAG, July 2001.

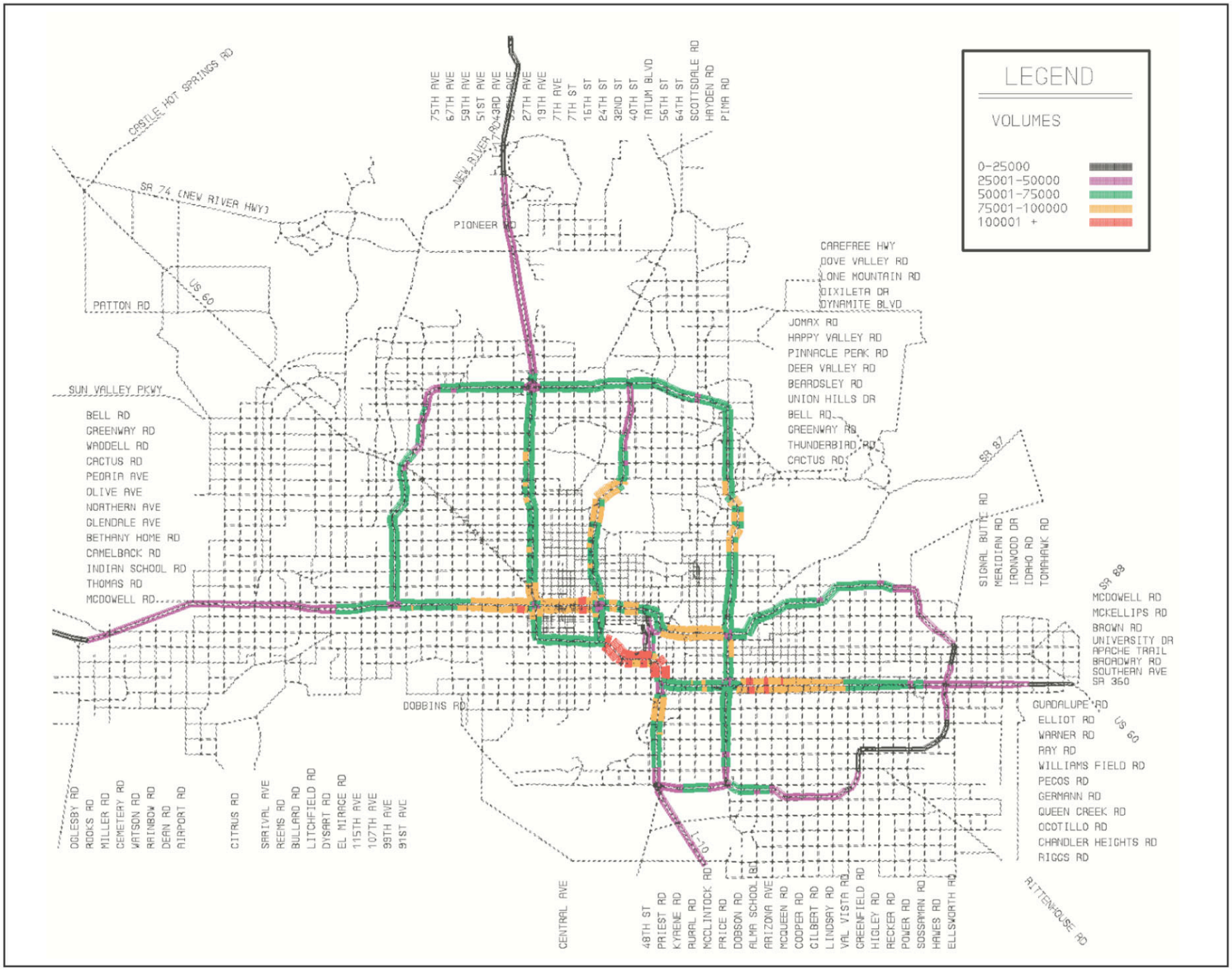


Figure 6-8

Predicted Year 2010 Average Daily Traffic on Freeways

Table 6.6: Forecast Year 2025 Weekday Mode Split

Mode	Trips	Percent of Total
Single Occupant Vehicle	9,620,000	45.5%
Multiple Occupant Private Vehicle	7,213,000	34.1%
Transit	168,000	0.8%
Non-Motorized (work trips only)	81,000	0.4%
Other*	4,079,000	19.3%
TOTAL	***21,161,000***	***100%***

*Includes Sky Harbor, truck, external-internal and external-external trips.

Source: MAG, July 2001.

Average Vehicle Trip Length

Table 6.7 displays average trip length by purpose for 2025. The average trip length is projected to increase by 8% from 2010 to 2025.

Table 6.7: Forecast Year 2025 Average Vehicle Trip Length

Purpose	Average Trip Length (Miles)
Work	14.1
Non-Work	6.2
All	8.4

Source: MAG, August 2001.

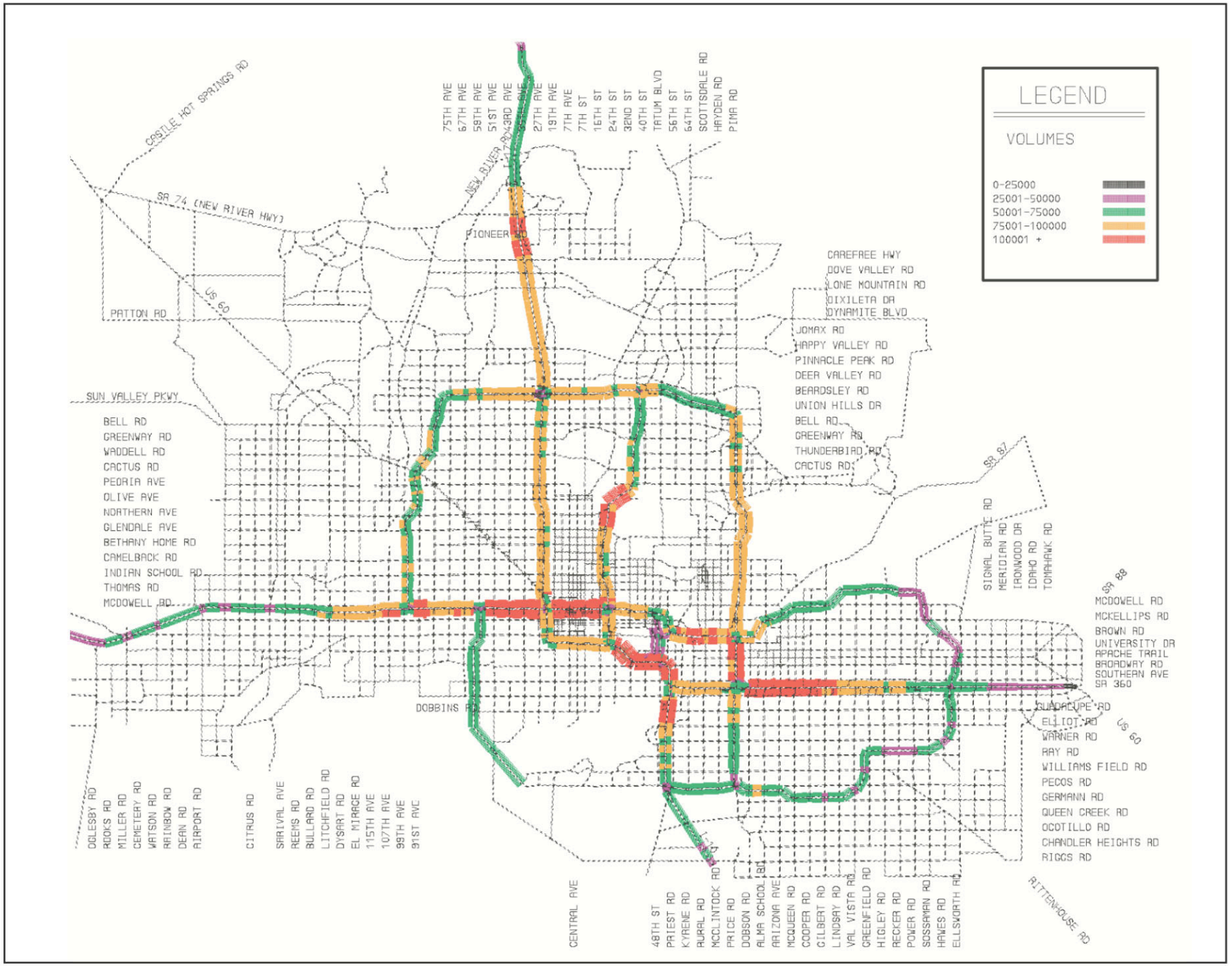
VMT and Capacity Miles

From 2010 to 2025, PM peak period VMT is projected to increase again, by 39%. Meanwhile, roadway capacity miles will increase by only 17%. Table 6.8 shows the projected 2025 lane miles, capacity miles and PM peak VMT, while Figure 6-9 displays projected 2025 traffic volumes on the region's freeway system.

Table 6.8: 2025 VMT and Roadway Miles by Functional Class

Type of Roadway	PM Peak VMT	% Total VMT	Daily Capacity Miles	% Capacity Miles	Lane Miles	% Lane Miles
Freeway & Expressway	9,318,970	31%	43,392,510	22%	2,066	10%
Arterial	15,245,638	50%	98,659,360	49%	12,332	57%
Local & Collector	5,734,832	19%	57,448,080	29%	7,181	33%
TOTAL	***30,299,440***	***100%***	***199,499,959***	***100%***	***21,579***	***100%***

Source: MAG, July 2001.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-9

Predicted Year 2025 Average Daily Traffic on Freeways

Transit

Transit passenger miles are projected to increase 15%, from 1,506,000 to 1,725,000, between 2010 and 2025. At the same time, the number of capacity miles is expected to remain virtually constant. Thus, the ratio of passenger miles to capacity miles will rise from 0.15 to 0.17.

6.3.3 2040 Travel Demand

Person Trips

Table 6.9 displays total forecast person trips for 2040 by work and non-work purposes. Some 26,518,000 person trips will occur each weekday, representing an increase of approximately 105% over existing conditions. Approximately 29% of the trips will be work-related. Table 6.10 shows the projected daily mode split of year 2040 person trips.

Table 6.9: Forecast Year 2040 Total Person Trips

Purpose	Weekday Person Trips	Percent
Work	7,821,000	29%
Non-Work	18,697,000	71%
TOTAL	***26,518,000***	***100%***

Source: MAG, July 2001.

Table 6.10: Year 2040 Weekday Mode Split

Mode	Trips	Percent of Total
Single Occupant Vehicle	11,810,000	44.5%
Multiple Occupant Private Vehicle	9,386,000	35.4%
Transit	153,000	0.6%
Non-Motorized (work trips only)	111,000	0.4%
Other*	5,058,000	19.1%
TOTAL	***26,518,000***	***100%***

*Includes Sky Harbor, truck, external-internal and external-external trips.

Source: MAG, July 2001.

Average Vehicle Trip Length

Table 6.11 shows average trip length by purpose for 2040. The average trip length is forecast to increase to 8.7 miles, representing growth of 18% and 12% over the years 2001 and 2010.

Table 6.11: Forecast Year 2040 Average Vehicle Trip Length

Purpose	Average Trip Length (Miles)
Work	14.2
Non-Work	6.5
All	8.7

Source: MAG, August 2001.

VMT and Capacity Miles

From 2025 to 2040, PM peak period VMT is projected to increase again, by 29%. No additional freeway or arterial capacity miles are yet planned for the 2025-2040 period. Table 6.12 shows the projected PM peak VMT, daily capacity miles and lane miles, while Figure 6-10 displays 2040 traffic volumes on the freeway system.

Table 6.12: 2040 VMT and Roadway Miles by Functional Class

Type of Roadway	PM Peak VMT	% Total VMT	Daily Capacity Miles	% Capacity Miles	Lane Miles	% Lane Miles
Freeway & Expressway	10,742,209	27%	43,392,510	22%	2,066	10%
Arterial	20,628,408	53%	98,659,360	49%	12,332	57%
Local & Collector	7,734,047	20%	57,646,880	29%	7,206	33%
TOTAL	***39,104,664***	***100%***	***199,698,750***	***100%***	***21,604***	***100%***

Source: MAG, July 2001.

Transit

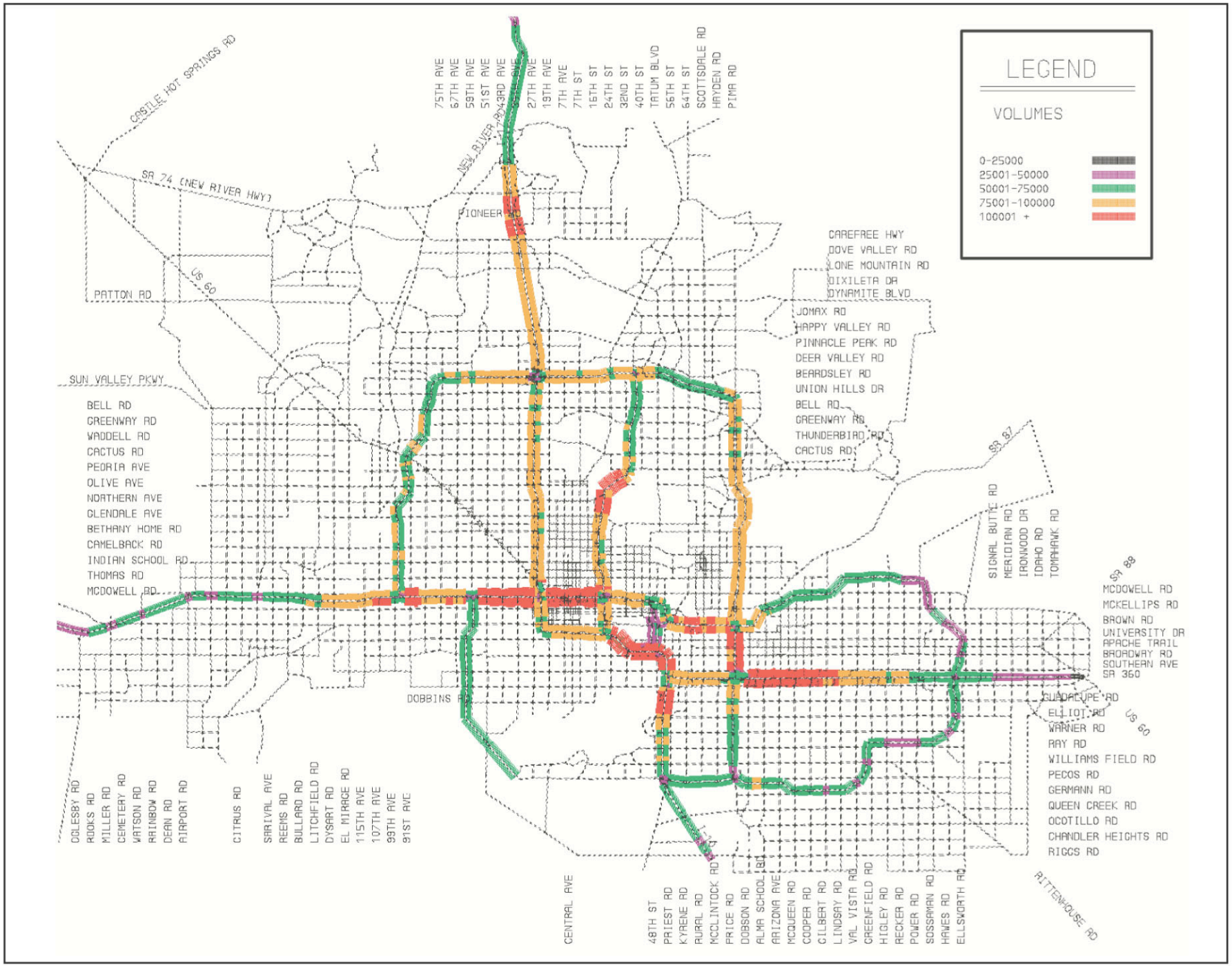
MAG currently projects daily bus and rail passenger miles to decline from 1,725,000 in 2025 to 1,436,000 in 2040. If transit capacity miles remain constant as assumed for this analysis, the number of passenger miles per capacity mile will decrease from 0.17 to 0.14.

6.4 Future Year Roadway Network Performance

6.4.1 2010 Roadway Performance

By 2010, 53% of freeway/expressway VMT and 25% of arterial VMT, as predicted in the MAG model, will occur under congested conditions during the PM peak (Table 6.13). Figure 6-11 displays congested segments on the freeway system; Figure 6-12 shows congested arterial intersections.

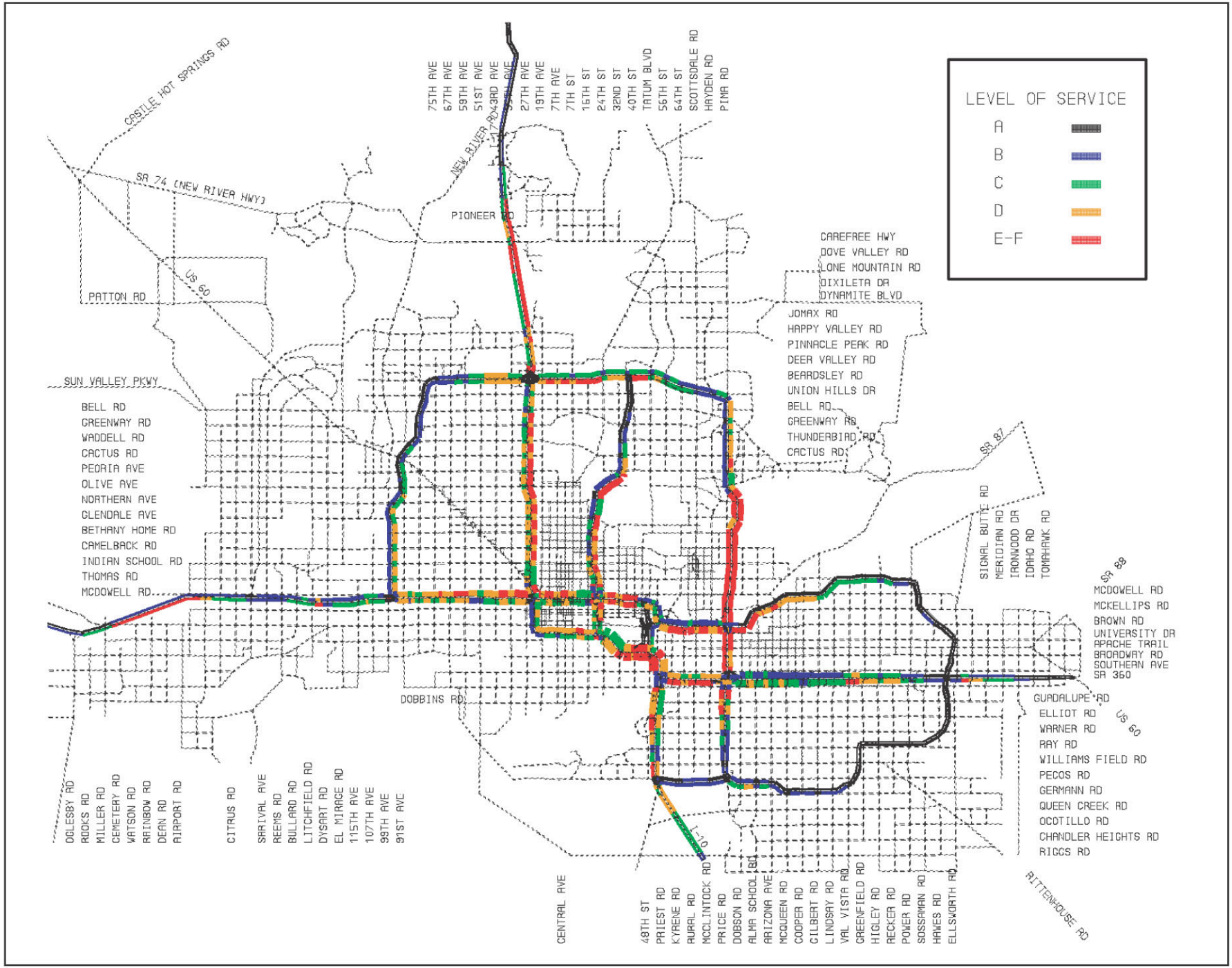
Table 6.13 provides further detail on projected 2010 congestion and average peak period travel speed. The percentage of lane miles experiencing PM peak period congestion will rise to 38% (from 29% today) on freeways and to 12% (from 10%) on arterials. Average peak period speeds will decline from 36 mph today to 32 mph on freeway general purpose lanes, and from 24 to 22 on arterials. Average delay per VMT in the PM peak will increase from 41 seconds today to 52 seconds on freeways and 51 seconds on arterials.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-10

Predicted Year 2040 Average Daily Traffic on Freeways



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-11

Predicted Year 2010 PM Peak Hour Freeway Performance and Level of Service

Table 6.13: Year 2010 PM Peak Period Traffic Congestion and Travel Speed

Roadway Type	VMT		Lane Miles		Average Speed (mph)	Delay/VMT (seconds)
	Congested	Congested as % of Total	Congested	Congested as % of Total		
Freeway & Expressway	3,843,319	53%	699	38%	32 (GPL) 54 (HOV)	52
Arterial	2,644,602	25%	1,117	12%	22	51

Source: MAG and BRW, Inc., July 2001.

6.4.2 2025 Roadway Performance

By 2025, 64% of freeway VMT and 35% of arterial VMT are forecast to experience congestion in the PM peak. Figure 6-13 displays congested segments on the freeway system, while Figure 6-14 shows congested arterial intersections.

Table 6.14 indicates that 51% of freeway lane miles and 20% of arterial lane miles will be congested during the PM peak. During the 2010-2025 period, average PM peak travel speed will fall from 32 to 26 on general purpose freeway lanes and from 22 to 20 on arterials. The average speed on freeway HOV lanes will sharply decline, from 54 in 2010 to 29 in 2025, as these lanes fill up in response to growing congestion in general purpose lanes. Average PM peak hour delay per VMT will rise to 77 seconds on freeways and 68 seconds on arterials.

Table 6.14: Year 2025 PM Peak Period Traffic Congestion and Travel Speed

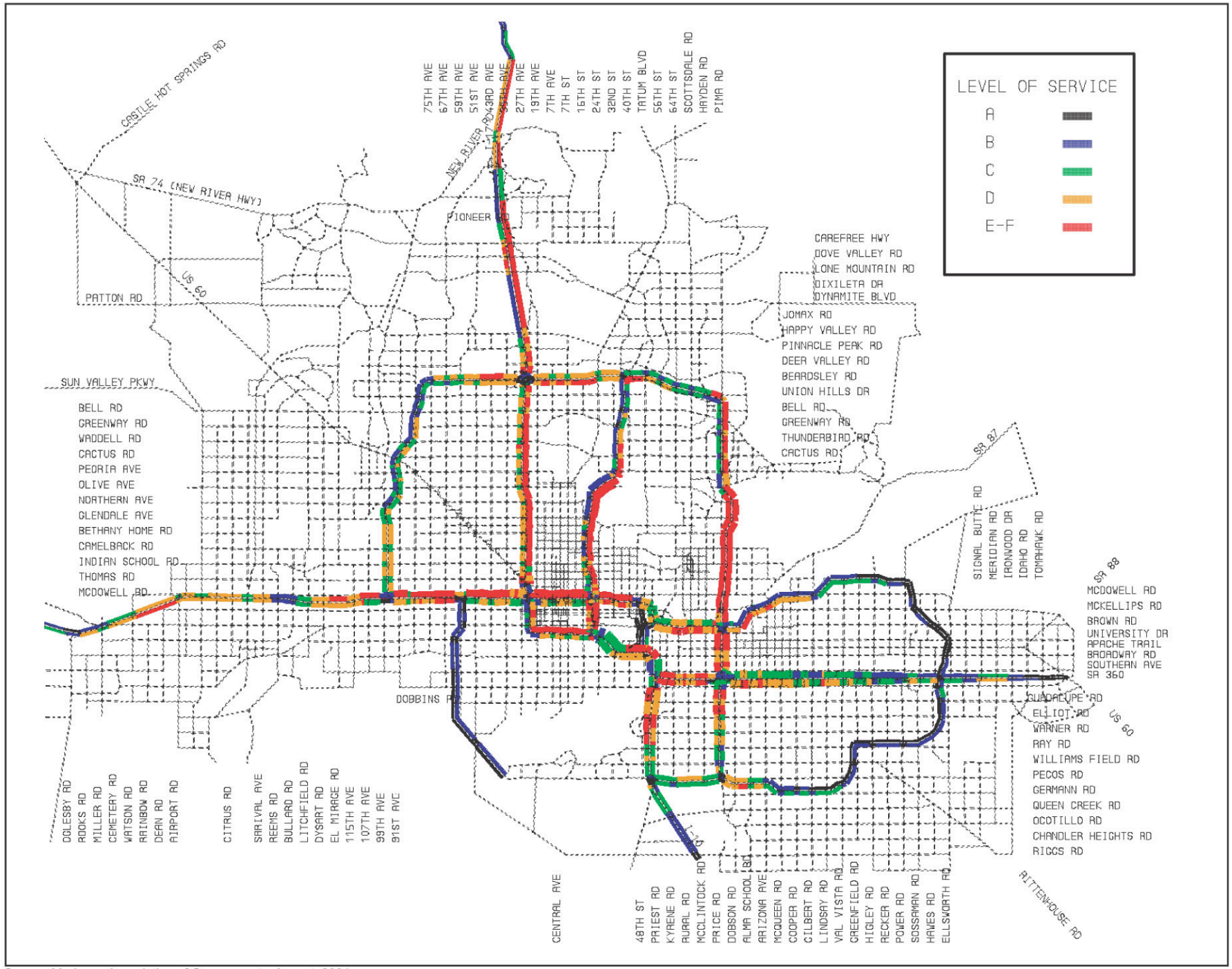
Roadway Type	VMT		Lane Miles		Average Speed (mph)	Delay/VMT (seconds)
	Congested	Congested as % of Total	Congested	Congested as % of Total		
Freeway & Expressway	5,982,934	64%	1,054	51%	26 (GPL) 29 (HOV)	77
Arterial	5,359,157	35%	2,503	20%	20	68

Source: MAG and BRW, Inc., July 2001.

6.4.3 2040 Roadway Performance

By 2040, some 84% of freeway VMT and 60% of arterial VMT will be congested during the PM peak, assuming the addition of no new lane miles or capacity miles after 2025. Figure 6-15 displays congested segments on the freeway system; Figure 6-16 shows congested arterial intersections as projected for the year 2040.

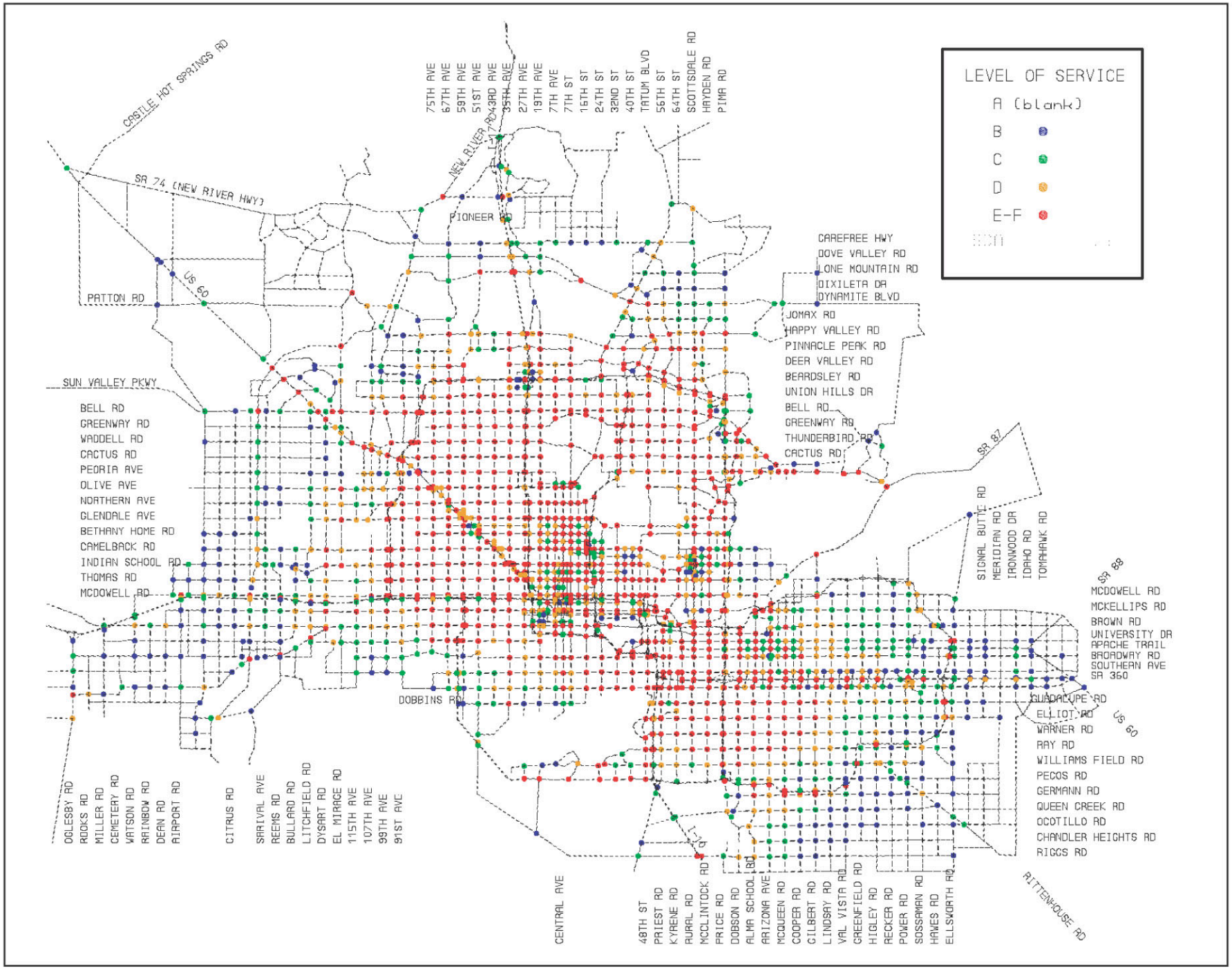
According to the projections in Table 6.15, 68% of the controlled-access lane miles and 42% of arterial lane miles will be congested in the PM peak. By 2040 the average peak period travel speed will decrease to about half of the 2025 level on both freeways and arterials. Freeway HOV lanes will operate at about the same speed as general purpose lanes. From 2025 to 2040, average PM peak period delay per VMT will approximately triple on both the freeway and arterial systems.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-13

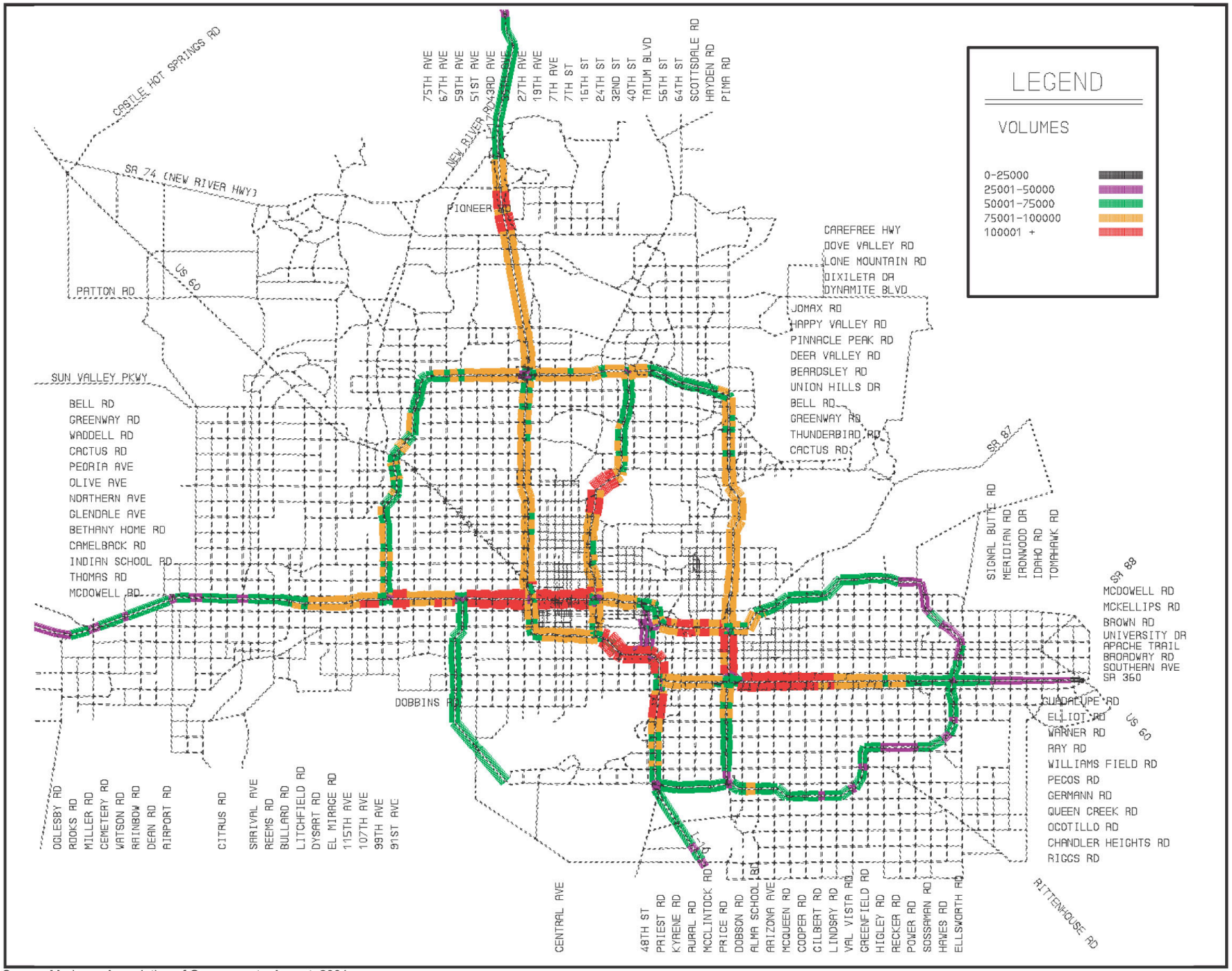
Predicted Year 2025 PM Peak Hour Freeway Performance and Level of Service



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-14

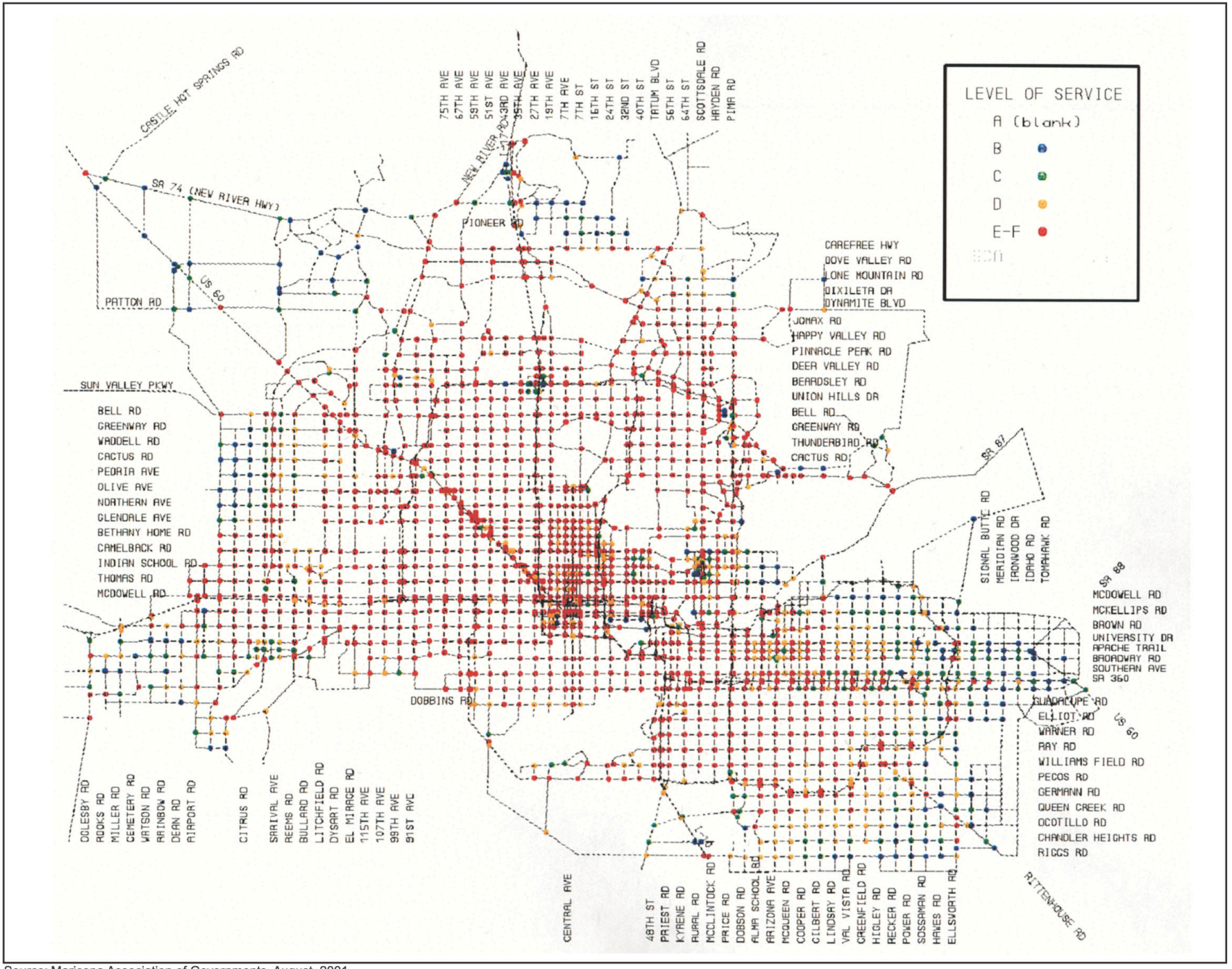
Predicted Year 2025 PM Peak Hour Intersection Performance and Level of Service



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-15

Predicted Year 2040 PM Peak Hour Freeway Performance and Level of Service



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 6-16

Predicted Year 2040 PM Peak Hour Intersection Performance and Level of Service

Table 6.15: Year 2040 PM Peak Period Traffic Congestion and Travel Speed

Roadway Type	VMT		Lane Miles		Average Speed (mph)	Delay/VMT (seconds)
	Congested	Congested as % of Total	Congested	Congested as % of Total		
Freeway & Expressway	8,994,092	84%	1,411	68%	12 (GPL) 13 (HOV)	232
Arterial	12,428,017	60%	5,229	42%	10	232

Source: MAG and BRW, Inc., July 2001.

6.5 Summary of Key Transportation Characteristics, 2001-2040

Table 6.16 displays the percentage growth in PM peak period VMT and capacity miles on the freeway and arterial networks from 2001 to 2010, 2025 and 2040. As shown, the growth in capacity miles will increasingly lag behind the growth in VMT. Between 2001 and 2040, freeway and arterial capacity miles are expected to grow by about 40%, while PM peak VMT is projected to more than double.

Table 6.16: Percent Increase in VMT and Roadway Capacity Miles from Year 2001 Base

Roadway Type	Percent Increase in PM Peak VMT from 2001 Level			Percent Increase in Capacity Miles from 2001 Level		
	2010	2025	2040	2010	2025	2040
Freeway/Expressway	35%	73%	100%	23%	39%	39%
Arterial	24%	79%	142%	10%	41%	41%

Source: MAG, July 2001.

Table 6.17 displays the dramatic decline in roadway travel speeds that will occur over the next 40 years, assuming only implementation of current programs and plans. By diverting traffic from the arterial system, completion of the planned MAG freeway system will postpone most of the decline in arterial speeds. By 2040, however, arterial traffic will move less than half as fast during the PM peak as it does today, while freeway and expressway travel speeds will fall by two-thirds or more in both general purpose and HOV lanes. Again, this assumes no new freeway or arterial lane miles after 2025.

Table 6.17: Average PM Peak Period Travel Speeds (mph), 2001-2040

Roadway Type	2001	2010	2025	2040
Freeway/Expressway (GPL)	36	32	26	12
Freeway/Expressway (HOV)	57	54	29	13
Arterial	24	22	20	10

Source: MAG and BRW, Inc., July 2001.

Projected increases in freeway and arterial congestion are presented in Table 6.18. From 2001 to 2040, the percent of congested VMT during the PM peak will rise from 44% on freeways and 22% on arterials to 84% on freeways and 60% on arterials. Freeway and arterial lane miles operating under congested conditions will also increase dramatically by 2040. In addition, the percent of major (arterial/arterial) intersections operating at LOS E or F will increase from about one-sixth today to 37% by 2025 and 62% by 2040.

Table 6.18: Regional PM Peak Period Traffic Congestion, 2001-2040

Roadway Type	% Congested VMT				% Congested Lane Miles				% Congested Intersections*			
	2001	2010	2025	2040	2001	2010	2025	2040	2001	2010	2025	2040
Freeway/ Expressway	44%	53%	64%	84%	29%	38%	51%	68%	N/A	N/A	N/A	N/A
Arterial	22%	25%	35%	60%	10%	12%	20%	42%	17%	23%	37%	62%

*Arterial/arterial intersections.

Source: MAG and BRW, Inc., July 2001.

7.0 FUNDING ISSUES

7.1 Purpose

MAG member jurisdictions have limited transportation funding to build, operate and maintain roadways, walkways, bicycle facilities, and transit services necessary to meet the needs of the traveling public. With strong population growth anticipated for the MAG planning area, meeting the broad array of transportation needs and overcoming funding shortfalls will be a continued challenge for planners and policymakers well into the future.

The purpose of this chapter is to identify the existing primary funding sources that MAG uses to fund regional transportation improvements and services, and to give a "Status of Regional Transportation" assessment of the revenue estimates through 2025 for these sources.

This chapter describes the main highway, transit, and alternative mode funds from federal, state, and local sources and the various forecasts that have been prepared for these sources by ADOT, MAG, and member jurisdictions. Where forecasts have not yet been prepared, or if the forecasts do not extend through 2025, a trend estimate has been developed. Potential revenue sources currently under consideration by MAG member jurisdictions and the State of Arizona are also documented. Finally, a matrix is presented that lists several potential revenue sources that could be considered within the region, with an assessment of legal status, ease of implementation, public acceptance and other pertinent factors important to decision makers.

It is important to note that this task primarily evaluates current revenue sources and potential measures to enhance revenues, not only measures merely to increase borrowing. This discussion incorporates transportation bonding as indicated in the MAG July 2001 Certification and forecasts. It is important to note that debt service on bonds often makes up a significant portion of the transportation cost flowstream of jurisdictions. Bonding provides benefits for jurisdictions in advancing projects, but reduces the effective purchasing power of transportation revenues due to interest obligations.

This task evaluates funding issues associated with sources that are primarily used for roadway purposes and sources that can be used for alternative modes of travel such as transit, bicycle and pedestrian facilities and programs, Intelligent Transportation Systems (ITS), and other Travel Demand Management (TDM) and Transportation Systems Management (TSM) programs. Many state and federal roadway revenue sources can be used for pedestrian and bicycle facilities. In addition, some transit facilities such as bus pullouts may be constructed using several of these roadway sources. The flexibility of revenue sources to fund various transportation options is a salient concern, with increasing public and political support in Maricopa County for alternate modes demonstrated through recent voter approval of funding for rail and bus transit, pathways and other transportation alternatives.

7.2 Methodology

This chapter has been prepared based upon discussion with MAG member jurisdictions and ADOT staff review of the MAG July 2001 Certification program, and historic Highway User Revenue Fund (HURF) distribution to Maricopa County and its cities and towns through the ADOT Office of Fiscal Planning. ADOT Statewide HURF forecasts and the adopted 1999 MAG Regional Transportation Plan (RTP) were also consulted. Additional data and funding sources have been incorporated through MAG, Valley Metro, ADOT, USDOT, and local jurisdiction websites and staff contacts. The forecasts have been developed using constant year 2001 dollars through 2025 in order to provide a total funding forecast through the planning horizon. ADOT inflation factors were applied to deflate those ADOT revenue forecasts which are provided in current year dollars, and a 3% percent deflator was used in other cases where needed.

The use of constant 2001 dollars is necessary because the timing of expenditures, in terms of identifiable projects for specific fiscal years, is not foreseeable for a 25-year planning horizon. When studies are prepared to compare revenues with needs, the costs of construction projects, other capital costs, and operations and maintenance costs are expressed in constant 2001 dollars.

Where forecasts have been prepared or extended by the consulting team, they have been developed using assumptions that result in "reasonably expected" future revenues, and therefore the forecasts are necessarily conservative. There are several factors that can have negative effects on existing as well as proposed transportation revenues. A supermajority vote requirement exists in the state legislature for increasing revenues (or even adjusting them to keep pace with inflation); there exists potential for negative state and federal transportation legislation; voter initiatives can halt tax increases or eliminate revenue sources such as the state's vehicle license tax (VLT); population and economic growth rates may slow; and technological changes such as increases in fuel mileage can reduce revenues.

However, over the long term Arizona is becoming a larger, more prosperous and more urbanized state, and is the second fastest growing state in the U.S. after Nevada. Long-term quality of life factors will likely require higher per capita investments in transportation. Recent public approval of sales tax increases in Phoenix and Tempe for transit improvements, in Glendale for transit and roadway improvements, and in Scottsdale for transportation capital improvements demonstrates a strong willingness within the region to invest in transportation.

7.3 Identify Current Revenue Sources and Forecasts

Several federal, state, regional, and local funding sources are used for regional transportation facilities and programs in the MAG planning area. This section identifies the primary existing sources used, their current revenue amounts and existing projections.

7.3.1 MAG July 2001 Certification

The primary existing transportation revenues used on the MAG regional freeway system consist of the state HURF, federal Transportation Equity Act for the Twenty-first Century funds (TEA-21), and Regional Area Road Fund (RARF). The ADOT Cash Management Section of the Resource Administration Office, Financial Management Services Group worked in conjunction with MAG to develop the MAG July 2001 Certification. This Certification identifies the funding sources utilized on the MAG freeway system, including recent historical spending amounts, and provides projections through 2025.

In FY 2001-2006, the MAG Certification projects that approximately $3.6 billion will be spent on the MAG freeway system from federal, state, and regional sources. The RARF constitutes the largest source at $1.7 billion, with HURF, federal funds and various loan sources constituting the remainder. The MAG Certification assumes that the RARF 0.5-cent transportation excise tax will not be renewed after its scheduled expiration in 2005. For FY 2007-2016, only $1.4 billion is projected for the MAG freeway system, with the majority funded through the HURF. FY 2017 through 2025 is projected at $473 million, with total 2001-2025 MAG freeway system funds projected at $5.5 billion. The MAG Certification and forecasts through 2025 are presented in Table 7.1.

7.3.2 ADOT HURF Distribution to Maricopa County and Cities and Towns

The ADOT Office of Fiscal Planning prepares year-end reports on distribution of HURF revenues to cities, towns and counties statewide. FY 1994 through 2001 data have been compiled for Maricopa County and incorporated cities and towns within the county. FY 1994-2001 historical data are presented in Table 7.2. The HURF statewide distribution formula and amounts for FY 1999-2001 are summarized in Figure 7-1.

ADOT provides official statewide revenue forecasts through 2010 but not disaggregated projections for individual counties, cities and towns. From 2001 through 2010, ADOT projects that HURF growth will average 4.2% to 4.5% per year before inflation. An average growth rate before inflation of 4.2% is utilized within this analysis to project revenues for Maricopa County and its cities and towns through 2025. ADOT official inflation rates through 2010 and consultant estimates for inflation from 2010 through 2025 are used to adjust projected revenues to constant year 2001 dollars.

Currently, Maricopa County receives roughly 26.5% of total statewide HURF, totaling approximately $276.7 million in FY 2001. Assuming the percentage of HURF revenues distributed to Maricopa County remains constant in the future, approximately $11.6 billion in constant dollars is estimated for Maricopa County and its cities and towns through 2025. Estimated HURF revenues are presented in Table 7.3.

Table 7.1: MAG July 2001 Certification

MARICOPA COUNTY REGIONAL AREA ROAD FUND
REGULAR 15%, SPECIAL 15%, RARF CONST. ACCOUNT, AND BOND FUNDS
CASH FLOW FORECAST
(Constant 2001$ in Thousands)
(As of 7/17/01)

Revenues	Estimates for Fiscal Years			
	Total 2001-2006	**Total 2007-2016**	**Total 2017-2025**	**Total 2001-2025**
Proceeds /1	$446,208	-	$49,624	$495,832
Transportation Excise Tax /2	$1,699,058	-	-	$1,699,058
Highway User Revenues	$394,438	$950,607	$993,036	$2,338,081
Federal Aid /3	$227,127	$341,000	$0	$568,127
Interest Income /4	$46,799	$37,770	$185,696	$270,265
Third Party Billing /5	$22,977	-	-	$22,977
Other Income /6	$61,651	$13,656	$6,300	$81,608
SIB loan PR, Warner Rd. - Frye Rd.	$1,442	-	-	$1,442
SIB loan RM, Country Club - Gilbert Rd.	$25,802	-	-	$25,802
SIB loan SP, Bell Rd. - 101L	$20,060	-	-	$20,060
GAN's loan SM, Santan/I-10 TI, Ph.1,Pecos Rd.	$39,555	-	-	$39,555
GAN's loan RM, Gilbert Rd. -Higley Rd.	$48,085	-	-	$48,085
HELP Loan (BFO,GF,SIB,Hwy loan)	$252,885	-	-	$252,885
GANS Loan	$250,000	-	-	$250,000
Dedicated Highway (No payback)	$130,000	$110,000	-	$240,000
Discretionary xfer to Grand Ave.	$57,000	-	-	$57,000
Mesa City Loan (CC -Gil.)	$41,014	-	-	$41,014
Less Discount factor /7	($163,485)	($25,424)	($761,669)	($950,579)
Total Revenues	**$3,600,616**	**$1,427,609**	**$472,987**	**$5,501,212**

NOTES: RARF bond debt service for FY 1994-2000 reflects transfer not debt service payment.
/1 Proceeds (less 1% issuance costs). Subject to change as revenue projections change.
/2 Based on revenue projections (Nov. 2000).
/3 Assumes a 70/30. (Projects are cash flowed through 2006 and obligation basis, thereafter).
/4 Forecast is on a cash basis and assumes a 5.76% rate with 95% invested.
/5 Represents local funds and state federal funds for projects in the program.
/6 Includes building rent and other income.
/7 Discounts net revenues based on annual expenditure ratios for FY 2002-2008 to FY 2001 dollars.

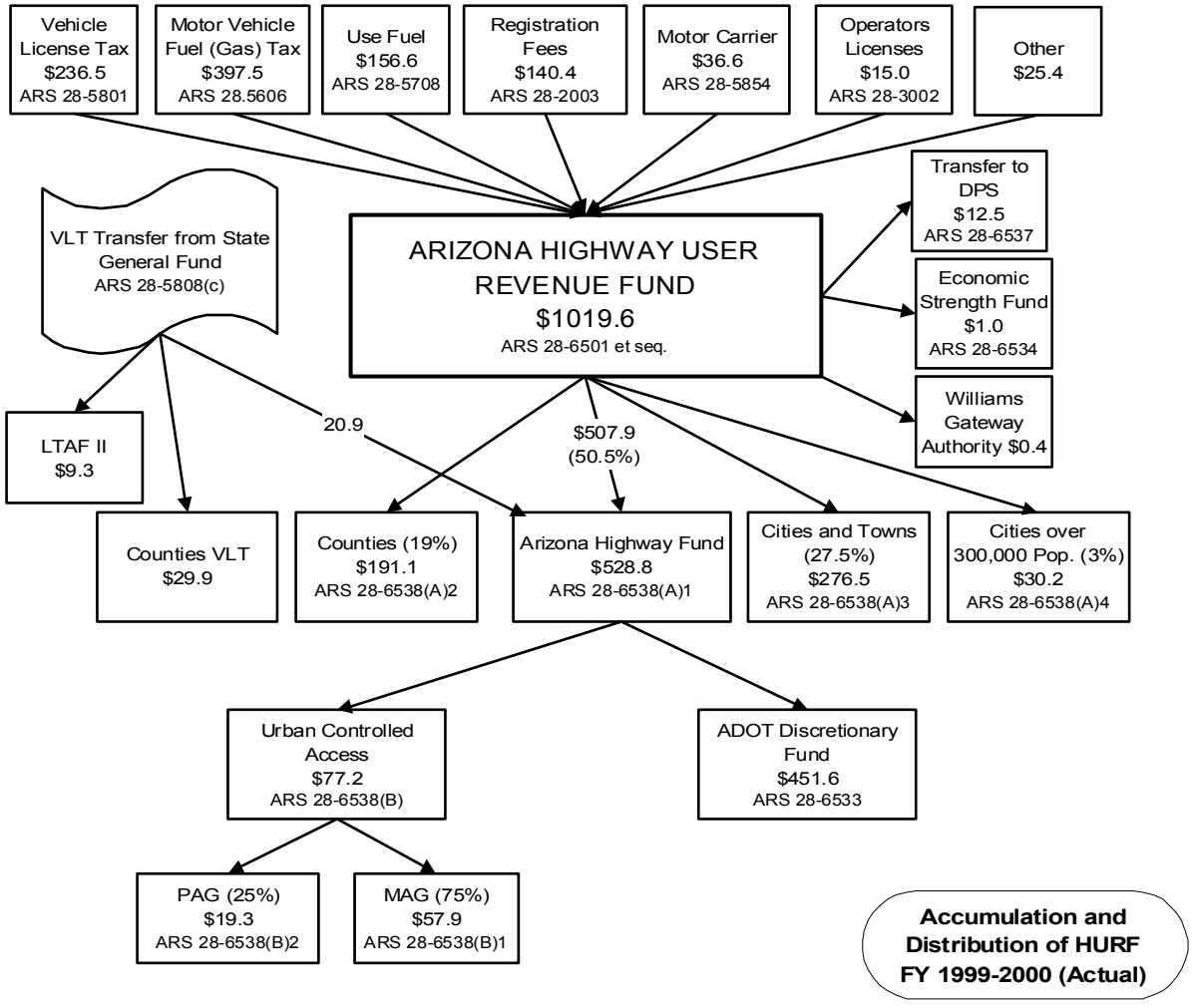
Source: ADOT Financial Management Services.

Table 7.2: FY 1993-94 thru FY 2000-01 HURF Distribution

	1994	1995	1996	1997	1998	1999	2000	2001
Maricopa County	$ 57.7	$63.1	$68.7	$73.7	$67.3	$72.2	$77.0	$78.4
MAG Member Cities & Towns	$ 138.8	$146.2	$158.5	$172.7	$169.1	$187.8	$193.1	$198.4
TOTAL	***$196.5***	***$209.3***	***$227.2***	***$246.4***	***$236.5***	***$260.0***	***$270.0***	***$276.8***

Source: ADOT Financial Management Services.

Figure 7-1: HURF Distribution



Source: ADOT Financial Management Services.

Table 7.3: HURF Revenue Estimate for Maricopa County and Cities and Towns, 2001-2025

(FY 2001-2010 Official ADOT Projections Statewide; FY 2001-2025 Maricopa County Estimates by CLA)
(Current year dollars in Millions except where indicated)

Fiscal Year	Gasoline	Use Fuel	Motor Carrier	Vehicle License Tax	Regist.	Other	HURF Statewide Total	Est. Maricopa County/Cities/ Towns (Assumes 26.5%)	Percent Inflation (1)	Est. Maricopa County/Cities/ Towns (Constant 2001$)
2001	$414.9	$157.6	$36.7	$252.3	$140.2	$41.0	$1,042.7	$276.7	0.00	$276.7
2002	$424.0	$156.5	$37.4	$281.9	$139.7	$42.9	$1,082.4	$287.2	3.41	$277.4
2003	$434.5	$169.9	$38.1	$304.2	$142.2	$44.2	$1,133.1	$300.7	3.38	$290.5
2004	$447.0	$176.9	$39.2	$327.7	$146.5	$45.6	$1,182.9	$313.9	3.38	$303.3
2005	$459.3	$184.4	$40.3	$353.0	$151.0	$47.1	$1,235.1	$327.7	3.38	$316.7
2006	$474.6	$190.9	$41.6	$378.7	$156.0	$48.6	$1,290.4	$342.4	3.38	$330.8
2007	$489.3	$199.0	$43.1	$407.7	$161.5	$50.2	$1,350.8	$358.4	3.38	$346.3
2008	$503.0	$206.2	$44.4	$436.3	$166.6	$51.7	$1,408.2	$373.7	3.38	$361.0
2009	$517.2	$213.6	$45.9	$469.0	$172.2	$53.4	$1,471.3	$390.4	3.38	$377.2
2010	$529.4	$221.9	$47.3	$503.5	$177.6	$54.9	$1,534.6	$407.2	3.38	$393.4
2011							$1,599.1	$424.3	3.38	$410.0
2012							$1,666.2	$442.1	3.38	$427.2
2013							$1,736.2	$460.7	3.38	$445.1
2014							$1,809.1	$480.0	3.38	$463.8
2015							$1,885.1	$500.2	3.38	$483.3
2016							$1,964.3	$521.2	3.38	$503.6
2017							$2,046.8	$543.1	3.38	$524.8
2018							$2,132.7	$565.9	3.38	$546.8
2019							$2,222.3	$589.7	3.38	$569.8

Table 7.3 (continued)

Fiscal Year	Gasoline	Use Fuel	Motor Carrier	Vehicle License Tax	Regist.	Other	HURF Statewide Total	Est. Maricopa County/Cities/ Towns (Assumes 26.5%)	Percent Inflation (1)	Est. Maricopa County/Cities/ Towns (Constant 2001$)
2020							$2,315.6	$614.5	3.38	$593.7
2021							$2,412.9	$640.3	3.38	$618.6
2022							$2,514.2	$667.2	3.38	$644.6
2023							$2,619.8	$695.2	3.38	$671.7
2024							$2,729.9	$724.4	3.38	$699.9
2025							$2,844.5	$754.8	3.38	$729.3
TOTAL 2001-2025										***$11,605.5***

NOTE: FY 2001 HURF estimate based on August 2000 Forecast.
FY 2002-2010 HURF estimate based on November 2000 Official Forecast.
The DPS/ESP includes an additional $2.5 million for DPS in FY 2001 per HB 2004 (1999 legislature).
The DPS/ESP includes $5.771 million in FY 2001 for the Regional Transportation Center in Prescott that will be distributed to the State Highway Fund and DPS per HB 2213 (1999 legislature).
(1) Inflation forecasts 2001-2006 are official ADOT forecasts.
Years 2007-2017 are ADOT planning forecasts. Years 2018-2025 are CLA estimates.

Source: ADOT Financial Management Services, April 2001.

7.3.3 Cities of Phoenix and Tempe Transportation Excise Tax

Phoenix and Tempe citizens have recently approved transportation excise taxes dedicated to transit purposes. In 1997, Tempe voters approved a 0.5-cent sales tax for transit, and in 2000 Phoenix voters approved a 0.4-cent sales tax for a program known as Transit 2000. Both cities will use a portion of their transit tax to fund construction of a light rail system.

Phoenix and Tempe planners have prepared revenue forecasts for their transportation excise taxes. The City of Phoenix has prepared forecasts through year 2020, ranging from a low of $93.0 million in 2001 to a high of $218.1 million in 2019. The consulting team has estimated revenues for 2021-2025 for the city at a constant $210.0 million per year (assuming that Phoenix voters agree to extend the tax beyond its 2020 expiration). Total estimated Phoenix transit tax revenues are approximately $4.0 billion through 2025. The City of Tempe estimates that approximately $27.9 million in transit tax revenues will be received in 2001. The City indicated that it expects this revenue stream to continue into the future at approximately this annual level. Total estimated Tempe transit tax revenues are approximately $697.5 million through 2025. The estimated Phoenix and Tempe transit tax revenues are presented in Table 7.4.

Table 7.4: Cities of Phoenix & Tempe Transportation Excise Tax Estimate, 2001-2025 (Constant 2001 Dollars in Millions)

Fiscal Year	Tempe Est. Transit Sales Tax Revenues	Phoenix Est. Transit Sales Tax Revenues
2001	$27.9	$93.0
2002	$27.9	$93.1
2003	$27.9	$97.9
2004	$27.9	$102.9
2005	$27.9	$108.2
2006	$27.9	$113.8
2007	$27.9	$119.6
2008	$27.9	$125.7
2009	$27.9	$132.2
2010	$27.9	$139.0
2011	$27.9	$146.1
2012	$27.9	$153.6
2013	$27.9	$161.5
2014	$27.9	$169.8
2015	$27.9	$178.5
2016	$27.9	$187.7
2017	$27.9	$197.3
2018	$27.9	$207.4
2019	$27.9	$218.1
2020	$27.9	$211.3
2021	$27.9	$210.0
2022	$27.9	$210.0
2023	$27.9	$210.0
2024	$27.9	$210.0
2025	$27.9	$210.0
TOTAL 2001-2025		**$4,006.7**

Phoenix forecasts are prepared through 2020. CLA estimates are utilized for 2021-2025

Source: City of Tempe Transit Department and City of Phoenix Public Transit Department.

7.3.4 City of Scottsdale Transportation Privilege Tax Fund

In 1989, City of Scottsdale voters approved a 0.2-cent privilege tax dedicated to transportation improvements. Revenues from the transportation privilege tax are deposited into the Transportation Privilege Tax fund. In fiscal year 2000, a portion of the transportation privilege tax revenues was budgeted to fund transit operations, which in that year included expanded transit service in the City. In fiscal year 2002, Scottsdale City Council adopted a financial policy to clarify the intent of the transportation privilege tax. The intent of the 1989 ballot was to provide funding for transportation capital improvements, such as streets and highways. In fiscal year 2000, $16,029,000 was collected and deposited into the fund. The fund is projected to grow at an estimated 2 percent annually, due to the slowdown in Scottsdale privilege tax collections. (See Table 7.5, assumes 2.00% annual increase in collections and 3.38% annual loss of purchasing power.)

Table 7.5: City of Scottsdale Transportation Privilege Tax Fund Estimate, 2001-2025 (Constant 2001 Dollars in Millions)

Fiscal Year	Scottsdale Est. Transportation Sales Tax Revenues
2001	$16.2
2002	$16.0
2003	$15.7
2004	$15.5
2005	$15.3
2006	$15.1
2007	$14.8
2008	$14.6
2009	$14.4
2010	$14.2
2011	$14.0
2012	$13.8
2013	$13.6
2014	$13.4
2015	$13.2
2016	$13.0
2017	$12.8
2018	$12.6
2019	$12.5
2020	$12.3
2021	$12.1
2022	$11.9
2023	$11.8
2024	$11.6
2025	$11.4
2001-2025	**$341.9**

MAG estimates for 2001-2025.

7.3.5 City of Glendale Transportation Excise Tax

The City of Glendale recently enacted a ½-cent local option sales tax dedicated entirely to transportation purposes, and is also supporting augmentation of existing revenue sources in order to meet anticipated transportation needs. The transportation excise tax, which was approved by Glendale voters in November 2001, will generate an estimated $17.4 million per year. Revenues will be used primarily for transit improvements, including the Glendale portion of the planned regional light rail system, but also for roadway, pedestrian, and bicycle improvements. The total forecast revenues from the transportation excise tax are $580.2 million through 2025. New revenues will also be generated from fares when additional bus and light rail service is implemented.

7.3.6 Local Transportation Assistance Funds (LTAF I and II)

The LTAF is derived from lottery revenues and from a transfer from the State VLT. The LTAF is composed of two funds, LTAF I and LTAF II. LTAF I funds may be used for roadway, transit, pedestrian and bicycle facilities in jurisdictions with under 300,000 residents population, while LTAF II funds are now restricted to transit purposes in all Arizona jurisdictions.[1] In cities of over 300,000 people, LTAF I must also be used for transit.

LTAF I funds are assumed to be reduced in purchasing power due to inflation, as current legislation allows for a maximum of $23.0 million in current year dollars to be distributed statewide on an annual basis. Approximately $16.2 million in LTAF I funds are distributed to MAG member jurisdictions per year, with approximately $271.6 million projected for the region in LTAF I funds through 2025.

The LTAF II was created when the 1998 legislature passed HB 2565 to provide additional statewide transit and transportation funding to incorporated cities and towns as well as the counties. LTAF II funds totaled $18.0 million statewide in FY 2000, made up of $11.2 million in VLT transfer funds and $6.8 million in Powerball funds. ADOT administers the LTAF II and the State Treasurer's office distributes the funds to the Regional Public Transportation Authority (RPTA), Metropolitan Planning Organizations (MPOs) outside Maricopa County, and cities and counties not represented by an RPTA or MPO.

The distribution of VLT monies to LTAF II is effective through September 30, 2003. For the purposes of this study, LTAF II funds are assumed to continue beyond 2003 to keep pace with inflation. Approximately $5.9 million is distributed to MAG-member jurisdictions per year in LTAF II funds, with approximately $142.3 million estimated over the period 2001-2025. Total LTAF I and II funds are estimated at $414.0 million for Maricopa County through 2025, as shown in Table 7.6.

[1] SB 1556, enacted in the 2000 session, requires LTAF II monies to be used for public transit purposes including operating and capital purposes for all counties, cities and towns, except that any jurisdiction that receives less than $2,500 may use it for general transportation purposes.

Table 7.6: LTAF I and II Estimate for Maricopa County, 2001-2025
(Constant 2001 Dollars in Millions)

Year	LTAF I	LTAF II	Total LTAF I & II
2001	$16.2	$5.9	$22.1
2002	$15.7	$5.9	$21.6
2003	$15.2	$5.9	$21.2
2004	$14.8	$5.9	$20.7
2005	$14.3	$5.9	$20.3
2006	$13.9	$5.9	$19.8
2007	$13.5	$5.9	$19.4
2008	$13.1	$5.9	$19.0
2009	$12.7	$5.9	$18.6
2010	$12.3	$5.9	$18.2
2011	$11.9	$5.9	$17.9
2012	$11.6	$5.9	$17.5
2013	$11.2	$5.9	$17.2
2014	$10.9	$5.9	$16.8
2015	$10.6	$5.9	$16.5
2016	$10.3	$5.9	$16.2
2017	$10.0	$5.9	$15.9
2018	$9.7	$5.9	$15.6
2019	$9.4	$5.9	$15.3
2020	$9.1	$5.9	$15.0
2021	$8.8	$5.9	$14.7
2022	$8.5	$5.9	$14.5
2023	$8.3	$5.9	$14.2
2024	$8.0	$5.9	$14.0
2025	$7.8	$5.9	$13.7
2001-2005	**$271.6**	**$142.3**	**$414.0**

7.4 Potential New Revenue Sources

The Governor's Transportation Vision 21 Task Force was convened in 1999 to develop a long-range multimodal transportation vision for Arizona's transportation future. The mission statement of the Task Force is to evaluate needs and recommend funding strategies to meet those needs for all modes of transportation. The Task Force is not limited to state facilities, but is incorporating and planning for all levels including local jurisdictional needs.

The Task Force evaluated a large selection of potential funding sources, including increased gas tax, gas tax indexed to inflation, vehicle miles traveled tax, BTU/energy taxes, motor fuels sales tax, general statewide sales tax surcharge, personal income tax surcharge, property tax increase for transportation, and exactions/developer impact fees. The Task Force has recently reduced the sources to be considered for implementation to three; increases in the gas and use fuel taxes, establishment of a statewide development impact fee, and levying of a sales tax for transportation.

It is the stated intent of the Task Force to comprehensively address multimodal needs, and the Task Force will attempt to arrange its revenue package recommendations to include spending on motorized and non-motorized forms of transportation. The Vision 21 final report was published in December 2001.[2] Its major recommendations are as follows:

- Require performance-based planning and programming.
- Develop and adopt a long-range, statewide, multimodal transportation plan.
- Coordinate land use planning and transportation planning.
- Establish comprehensive financial management.
- Establish urban regional transportation and land use districts.
- Strengthen the Arizona Transportation Board.
- Increase dedicated transportation revenues.
- Prioritize system preservation.
- Prioritize congestion relief and commuter services.
- Implement immediate and obvious system improvements.

7.5 Potential New and Augmented Revenue Sources

7.5.1 New and/or Augmented Revenue Sources

There are several potential new and/or augmented revenue sources that can be considered within the region for transportation purposes. Some of the sources would require state legislative action, while others could be implemented at the local level. A matrix of potential revenue sources (Table 7.7) includes basic descriptions of the sources, legal status, and other factors.

[2] Source: Vision 21 Governor's Transportation Task Force Newsletters, March 2000 through January 2001.

Table 7.7: Potential New or Augmented Transportation Revenues

Source	Type	Description	Legal Authority	Revenue Potential	Savings Potential	Forecasting Basis	Public Acceptance	Equity	Applicability to Different Modes	Ease of Implementation	Agency Experience
Toll Roads	User Fee	New toll roads	ARS	Low	N/A	Project Specific	Low	Moderate	Limited	Low	Low
Traffic Enforcement	User Fee	Increased traffic fines	ARS	Low	N/A	Extrapolation	Moderate	High	Limited	High	Low
Utility R/W Fees	User Fee	Charge fair market franchise fees	ARS	Moderate	N/A	Franchise Specific	High	High	Limited	Moderate	Moderate
Permit and Inspection Fees	User Fee	Full cost recovery	ARS	Low	N/A	Extrapolation	Moderate	High	Limited	High	High
Transportation Property Tax	Property Tax	25 cents per $100 assessed	ARS	Moderate	N/A	County Primary Assessed	Moderate	Moderate	High	Moderate	Low
Improvement Districts	Property Tax	More IDs	ARS	Moderate	N/A	Sub-area Specific	Moderate	Moderate	Moderate	Moderate	Limited
General Funds	Property Tax	Transfer some costs to General Fund	ARS	Moderate	N/A	Accounts Transferred	Low	Low	Moderate	Low	Low
Flood Control District Funds	Property Tax	Use FCD funds for roadway drainage	ARS	Low	N/A	Drainage Costs	Moderate	High	Moderate	High	Moderate
Development Fees	Private Sector	Implement or increase impact fees	ARS	Moderate	N/A	Prior Studies	High	Low	High	Low	Low
Exactions	Private Sector	Full mitigation cost recovery	Case Law	Low	N/A	Land Use Plans	High	Moderate	Limited	Moderate	Moderate
Community Facility Districts	Private Sector	Pre-development ID	ARS	Low	N/A	Sub-area Specific	High	Moderate	Limited	Moderate	Low
Sales Tax	Sales Tax	Implement "discretionary" or voter approved transportation 1/2 cent tax	Not allowed in Maricopa County	High	N/A	Population	Low	Low	High	Low	Low
Grants	Other	Federal, state, private grants	N/A	Low	N/A	Lump Sum	High	Moderate	Low	Moderate	Moderate
Federal Funds	Other	Seek more federal funds and demonstration projects	N/A	Moderate	N/A	Lump Sum	High	Moderate	Moderate	Moderate	Moderate

Table 7.7 (continued)

Source	Type	Description	Legal Authority	Revenue Potential	Savings Potential	Forecasting Basis	Public Acceptance	Equity	Applicability to Different Modes	Ease of Implementation	Agency Experience
Special Allocations	Other	From state legislature	N/A	Low	N/A	Lump Sum	High	Moderate	Low	Moderate	Moderate
Contributions	Other	Establish non-profit corporation	N/A	Low	N/A	Lump Sum	Low	Low	Low	Low	Low
Enterprise Funds	Other	Full cost recovery for all services	N/A	Low	N/A	Lump Sum	Moderate	Moderate	Low	Moderate	Low
Turnbacks	Other	Shed extraterritorial roadways	N/A	N/A	Moderate	Lump Sum	Moderate	Low	Moderate	Low	Low
Growth Management	Other	Strategically manage new growth	ARS	N/A	Moderate	Lump Sum	Moderate	Moderate	Moderate	Moderate	Moderate
Travel Reduction	Other	Carpool, vanpool, telecommute options	ARS	N/A	Low	Lump Sum	Moderate	Moderate	Moderate	Moderate	Moderate
Gas/Use Fuel Tax	User Fee	Increase in gas/use fuel tax	New	High	N/A	VMT & Rate	Low	Moderate	Limited	Moderate	Moderate
Gas/Use Fuel Tax (Indexed)	New Source	Index gas/use fuel tax to inflation	New	High	N/A	VMT & Rate	Low	Low	Limited	Low	None
Sales Tax	New Source	Establish transportation sales tax	New	High	N/A	Population	Low	Moderate	Moderate	Moderate	Moderate

Source: Curtis Lueck & Associates Notes: ARS = Arizona Revised Statutes.

7.5.2 Potential Changes in Future Revenues

There are several potential changes in future revenues, with revenues more likely to decrease than increase in real purchasing power. Following is a discussion of some of these possible changes.

Potential negative changes include downturns in the economy at local as well as national levels; slowing of growth or growth management requirements that reduce growth rates; legislative adjustments or voter initiatives to drastically reduce or eliminate the VLT;[3] and technological changes such as strong increases in purchases of hybrid gas-electric vehicles or compressed natural gas vehicles that reduce the HURF and VLT generated per vehicle (the VLT is waived for qualifying vehicles). Downturns in the economy will likely result in reduced revenues from the transportation sales tax as well as reduced contributions from development interests. At the state level, it is difficult to increase revenues such as the gas tax due to a two-thirds or "supermajority" requirement for the legislature to raise taxes.

It is also possible that some future trends may have positive effects on transportation revenues. Population growth rates could increase in the region, depending on economic and other circumstances in other parts of the country. It must be recognized, however, that higher population growth rates will also increase transportation needs. At the local, state, and federal levels it is possible for new legislation to increase transportation revenues, as evidenced by local MAG jurisdiction initiatives to increase transportation revenues and by the strongly increased federal surface transportation program funding over the past ten years.

Finally, at either a regional or state level, increasing the gas tax by a small amount and then indexing it to inflation would maintain the purchasing power of this revenue source at least at current levels. This is one of the funding recommendations currently under consideration by the Governor's Transportation Vision 21 Task Force.

Thus many possible changes could result in major shifts in revenues. It is probably safe to say that future revenues could vary by up to (plus or minus) 40% from current forecasts if one or more major changes occur.

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[3] The Arizona legislature has reduced the VLT several times over recent legislative sessions. A voter initiative to repeal the VLT was attempted for fall, 2000. However, sufficient signatures were not received to place the initiative on the ballot. The initiative supporters planned to pursue the initiative for the fall 2002 ballot.

8.0 STATUS OF REGIONAL TRANSPORTATION SUMMARY

This chapter summarizes key projected trends (transportation and socioeconomic) for the years 2001 through 2040. The following characteristics and measures are summarized in Table 8.1:

- *Socioeconomic Characteristics*: Population, households, and employment
- *Travel Demand Measures*: Daily person trips, PM peak period VMT by functional class, and daily transit passenger miles
- *Transportation Supply Measures*: Roadway capacity miles by functional class, daily capacity miles of fixed route transit service, and bikeway miles
- *Performance Measures*: Average PM peak period speed for the controlled-access and arterial roadway systems, congested PM peak VMT, congested PM peak lane miles, freeway and expressway delay per VMT during the PM peak, and number of congested intersections. Transit performance is represented by passenger miles per capacity mile of service.

Table 8.1: Key Projected Trends, 2001-2040

Socioeconomic Characteristics	Year			Percent Growth	
	2001	2025	2040	2001-2025	2001-2040
Population	3,072,000*	4,948,000	6,296,000	61%	105%
Households	1,133,000*	1,866,000	2,381,000	65%	110%
Employment	1,483,000*	2,400,000	2,896,000	62%	95%
Demand Measures					
Daily Person Trips	12,962,000	21,161,000	26,518,000	63%	105%
PM Peak VMT—Freeway & Expressway	5,379,000	9,319,000	10,742,000	73%	100%
PM Peak VMT—Arterial	8,535,000	15,246,000	20,628,000	79%	142%
Daily Transit Passenger Miles	568,000	1,725,000	1,436,000	204%	153%
Supply Measures					
Capacity Miles—Freeway & Expressway	31,210,000	43,393,000	43,393,000	39%	39%
Capacity Miles—Arterial	69,790,000	98,659,000	98,659,000	41%	41%
Daily Transit Capacity Miles	5,154,000	10,082,000	10,082,000	96%	96%
Bikeway Miles	1,963	3,353	3,353	71%	71%

Table 8.1 (continued)

Socioeconomic Characteristics	Year			Percent Growth	
	2001	2025	2040	2001-2025	2001-2040
Performance Measures					
Average PM Peak Period Speed--Freeway & Expressway (GPL)	36 mph	26 mph	12 mph	-28%	-67%
Average PM Peak Speed—Freeway & Expressway (HOV)	57 mph	29 mph	13 mph	-49%	-77%
Average PM Peak Speed—Arterial	24 mph	20 mph	10 mph	-17%	-58%
Average PM Peak Delay per VMT—Freeway & Expressway	41 seconds	77 seconds	232 seconds	88%	466%
Average PM Peak Delay per VMT—Arterial	41 seconds	68 seconds	232 seconds	66%	466%
Congested PM Peak VMT—Freeway & Expressway	2,352,000	5,983,000	8,994,000	154%	282%
Congested PM Peak VMT--Arterial	1,878,000	5,359,000	12,428,000	185%	562%
Congested Lane Miles—Freeway & Expressway (PM Peak)	437	1,053	1,411	141%	223%
Congested Lane Miles—Arterial (PM Peak)	844	2,504	5,227	197%	519%
Congested Intersections (PM Peak)	326	829	1,393	154%	327%
Transit Passenger Miles/Capacity Mile	0.11	0.17	0.14	55%	27%

*Year 2000. Population and households based on U.S. Census counts. Other socioeconomic data based on adopted MAG projections.
N/A = not available.
Note: Forecasts based on current version of MAG model that assumes no new freeways, arterials or transit service after 2025.

Sources: MAG and RPTA, August 2001.

From 2001 to 2040, regional population and employment will approximately double, while the number of person trips is projected to grow by 105%. Freeway/expressway VMT in the PM peak will grow at roughly the same rate as population and households, while growth in arterial VMT will far outstrip population growth. Regional transit boardings are forecast to double over the next 39 years.

While total freeway and arterial VMT will grow considerably faster than population and employment, the differences between the growth rates in travel demand and miles of transportation facilities are projected to be even more dramatic. According to current regional plans and revenue projections, total freeway and arterial capacity miles will

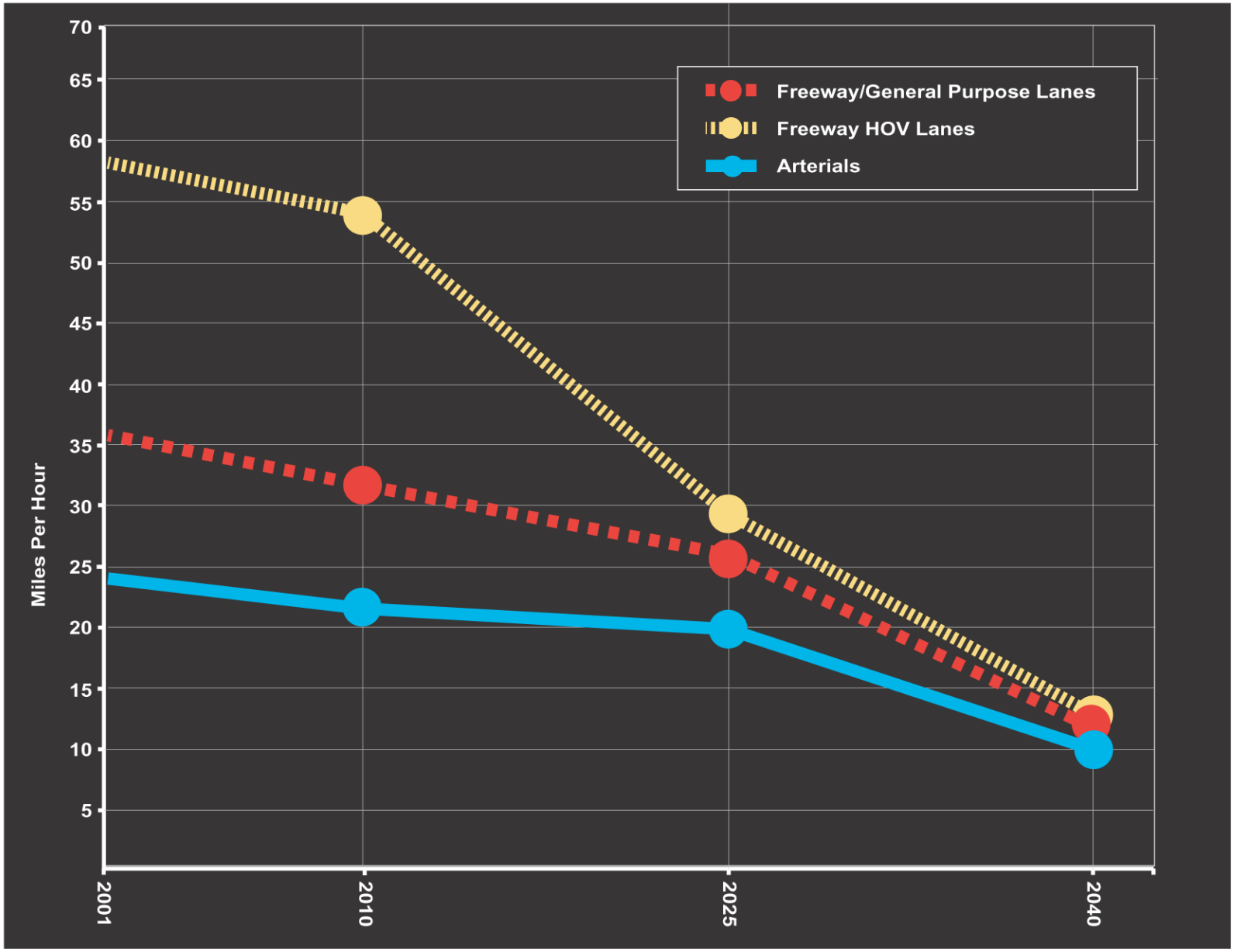
increase 41% by 2025, while PM peak VMT on these systems will increase 77%. If additional capacity is not provided after 2025, VMT will grow about three times faster than capacity miles from 2001 to 2040.

As a result of the growing gap between travel demand and the capacity of the system to meet this demand, each of the system performance measures will substantially worsen between now and 2040. Compared to 2001, the average PM peak period travel speed on freeway general purpose lanes will decline 28% and 67%, respectively, by 2025 and 2040 (Figure 8-1). For freeway HOV lanes these figures are 49% and 77%; for arterials, they are 17% and 58%. Congested PM peak VMT will increase by 154% and 282% on freeways, and 185% and 562% on arterials. The number of congested intersections will rise 154% by 2025 and 327% by 2040. As noted previously, these figures assume no freeway or arterial capacity increases beyond 2025.

Figure 8-2 graphically compares the projected percentage growth in population, capacity miles, VMT and congested VMT from 2000 to 2040. Only freeways and arterials are included. Both population and total VMT will grow faster than the planned addition in roadway capacity miles. The VMT growth rate is higher than the population growth rate, although the difference is moderate and both rates are nearly linear through the 39-year planning period. Congested VMT, however, will grow much faster and at a non-linear rate. With no capacity additions between 2025 and 2040, the regional roadway network will approach saturation by the latter year, with an average PM peak travel speed of 10 to 13 mph on both freeways and arterials.

Table 8.2 shows how travel mode split, the incidence of work versus non-work trips, and average trip length are forecast to change between 2001 and 2040. As the region expands, the average trip length will increase from 7.4 to 8.7 miles, fueling an increase in regional VMT (Table 8.1). Based on current forecasts, changes in mode split and in the division between work and non-work trips will be minimal. Similarly, the forecasts do not indicate any trends toward increased telecommuting or other trip reduction measures that would reduce the proportion of work trips below today's percentage. In other words, the number of work trips will grow about as fast as the total number of trips. Similarly, the percentage of single-occupant vehicle trips is forecast to decline only from 46% to 45% over the next 39 years.

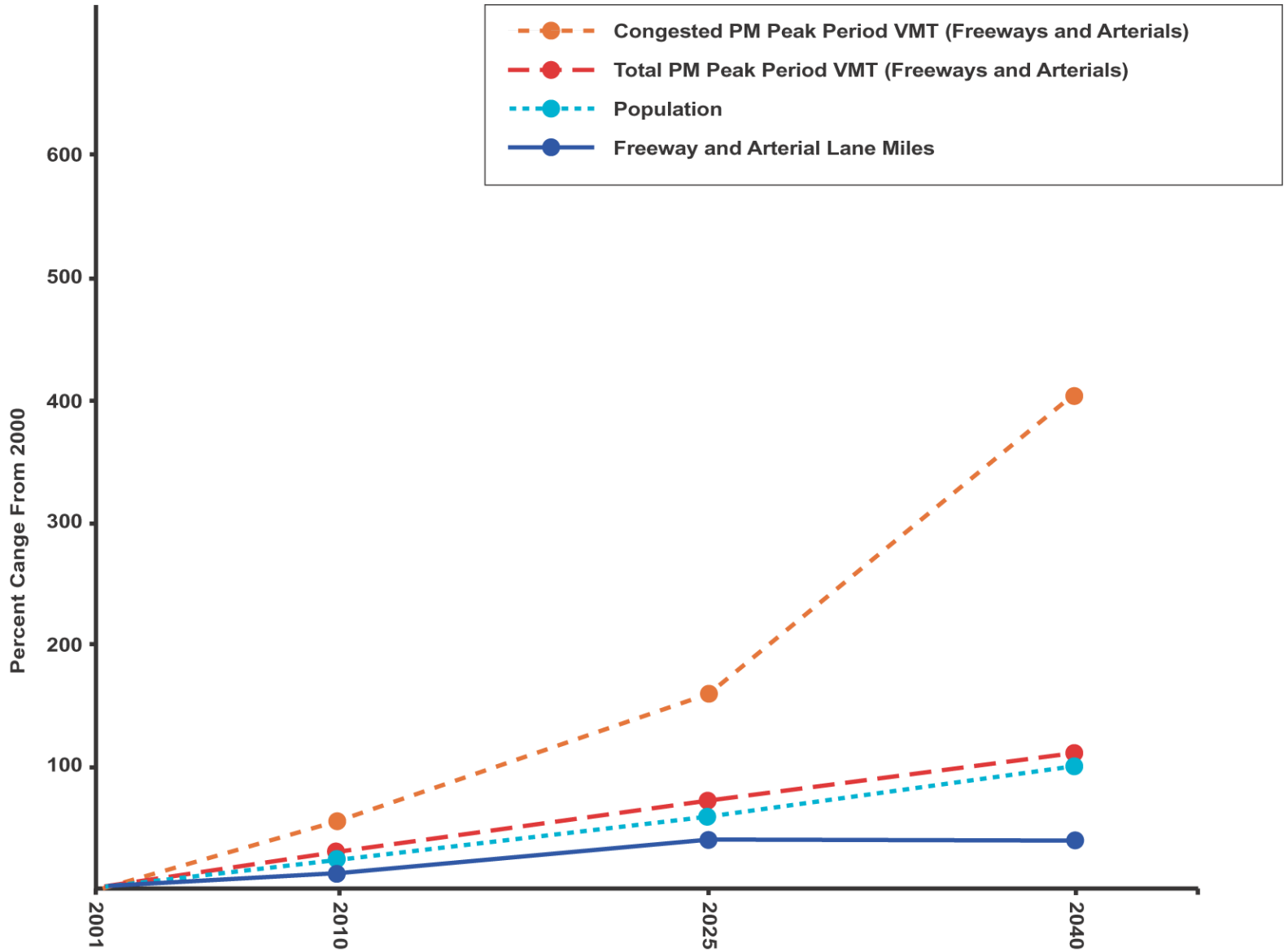
Table 8.3 reports several composite indices derived from the data in Table 8.1 for the years 2001, 2025 and 2040. Over the 39-year period, the number of daily trips per person will remain virtually constant. On the other hand, PM peak period VMT per person will increase between 2001 and 2025, as will VMT per capacity mile. The former will level off between 2025 and 2040 while the latter continues to rise, reflecting an assumption of no growth in capacity after 2025 used in this analysis. Meanwhile, congested PM peak VMT as a percentage of total VMT will more than double, from 30% to 68%. The number of transit passenger miles per person is projected to nearly double by 2025, and then decline during the next 15 years. Year 2040 transit capacity miles per capita and bikeway miles per capita are not expected to differ much from today's levels.



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 8-1

Average PM Peak Hour Roadway System Speed
2001-2004



Source: Maricopa Association of Governments, August, 2001.
URS/BRW August, 2001.

Figure 8-2

Proportionate Growth in Population, Roadway Lane Miles and Vehicle Miles Traveled 2001-2040

Table 8.2: Travel Characteristics of Phoenix Metropolitan Area, 2001-2040

Characteristic	2001	2025	2040
Daily Mode Split (%)			
Single Occupant	46%	46%	45%
Carpool/HOV	33%	34%	35%
Transit + Non-Motorized*	1%	1%	1%
Other^	20%	19%	19%
Daily Person Trips (%)			
Work	29%	30%	29%
Non-Work	71%	70%	71%
Average Trip Length (miles)			
Work	12.5	14.1	14.2
Non-Work	5.7	6.2	6.5
Total	7.4	8.4	8.7

*Work trips only.
^Includes Sky Harbor, truck, external-internal and external-external trips

Source: MAG, August 2001.

Table 8.3: Composite Indices, 2001-2040

Index	2001	2025	2040
Daily Trips/Person	4.2	4.3	4.2
Freeway & Arterial Capacity Miles/1,000 Persons	31,841	27,712	22,237
Weekday PM Peak VMT/Person	4.5	5.0	5.0
PM Peak VMT/Capacity Mile (Freeway & Arterial)	0.14	0.17	0.22
Congested/Total PM Peak VMT (Freeway & Arterial)	30%	46%	68%
Daily Transit Passenger Miles/1,000 Persons	185	349	228
Daily Capacity Miles of Transit Service/Person	1.7	2.0	1.6
Bikeway Miles/1,000 Persons	0.6	N/A	0.5

Sources: MAG and RPTA, August 2001.