Interstate 10 – Hassayampa Valley Roadway Framework Study

Chapter 1

Overview

September 2007

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

Prepared by

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1.1 Background and Purpose

The Interstate 10-Hassayampa Valley Roadway Framework Study is the first of several long-range planning studies that the Maricopa Association of Governments (MAG) will conduct in developing areas of Maricopa County—and in some cases, adjacent counties. The purpose of these studies is to initiate the transportation planning process in areas that are expected to experience intense growth in population and employment over the next 30 to 50 years. MAG and its partners are beginning broad-brush planning in advance of growth that will transform much of central Arizona from open desert to new communities. Figure 1-1 shows how the Roadway Framework Studies are intended to fit into the larger regional transportation planning process.

This study covers approximately 1,400 square miles in Maricopa County, bounded generally by State Route (SR) 303L on the east, the 459th Avenue section line on the west, the SR-74 alignment on the north, and the Gila River on the south. Several topographical features act as barriers to travel, especially the White Tank Mountains in the eastern portion of the study area. West of this mountain range, however, a great deal of developable land exists. Over 100 entitlements have been granted for master-planned communities and other residential and commercial developments, mostly in the Town of Buckeye, City of Surprise and unincorporated Maricopa County. Table 1.1 summarizes the magnitude of anticipated growth, from 2005 to 2030 (the latest year for which MAG has approved traffic forecasts) and to Buildout (perhaps 50 or more years in the future). At Buildout, Buckeye and Surprise expect to be among the five largest cities in Arizona..

Table 1.1 Summary of Hassayampa Valley Study Area Socioeconomic Projections

Scenario (Year)	Dwelling Units	Population	Employment (jobs)
2005	55,000	131,000	57,000
2030	394,000	936,000	388,000
Buildout Assumptions	1,094,000	2,778,000	1,047,000

Source: MAG, 2007. "Buildout" refers to an unspecified future date when development in the study area will have reached its hypothetical maximum. MAG does not forecast or model Buildout conditions, but uses reasonable assumptions based on information provided by its member jurisdictions.

Much of the impetus for this one-year study arose from the need to preserve Interstate 10—currently the only freeway serving the area—as a vital corridor for moving people and goods across the United States, as well as between metropolitan Phoenix and the ports of southern California. Both the Federal Highway Administration (FHWA) and the Arizona Department of Transportation (ADOT) are concerned that, without an adequate network of high-capacity roadways serving the study area, I-10 will eventually become too congested to provide for efficient interstate commerce and travel.. To address these concerns, FHWA will no longer approve a distance of less than two miles between consecutive traffic interchanges (TIs) on the Interstate system.

1.2 Objectives of the Study

- To lay out a conceptual network of north-south and east-west roadways, varying in functional classification, that will provide access throughout the study area and preserve I-10 as an interstate travel and freight corridor;
- To identify potential traffic interchange locations on I-10 and proposed high-capacity roadways;
- To develop priorities for the next steps leading to ultimate construction of the proposed roadway network, regional connections and future I-10 interchanges;
- To study opportunities for alternative transportation modes;
- To evaluate funding options, and assess the capacity of existing and potential sources of funding; and
- To specify future corridors in which right-of-way should be preserved now.

1.3 Study Oversight and Review

Two groups of agency stakeholders played important guidance and oversight roles throughout the study. The **Funding Partners** group represented the following agencies, besides MAG, that provided financial support for the study:

- ADOT
- City of Goodyear
- City of Surprise
- Maricopa County Department of Transportation (MCDOT)
- Town of Buckeye

The Funding Partners met approximately monthly to discuss progress, review interim products and help MAG make decisions about the course of the study.

The **Study Review Team** (SRT) was a larger group that acted as a sounding board and forum for discussion of progress at key milestones. The SRT met six times and provided valuable perspectives from a wide range of agencies and jurisdictions:

- ADOT (including several units other than those represented at Funding Partners' meetings)
- Arizona State Land Department
- City of Glendale
- City of Goodyear
- City of Surprise
- Federal Highway Administration
- Flood Control District of Maricopa County
- Luke Air Force Base
- MCDOT
- Town of Buckeye
- U.S. Bureau of Land Management

1.4 Stakeholder Outreach Activities and Participation Opportunities

Community outreach was a vital part of this study, and consumed a large share of the resources devoted to the project. MAG developed the conceptual high-capacity roadway framework through extensive interaction with stakeholders. Over a period of approximately 14 months, MAG and its consultants (collectively, the study team) conducted more than 130 meetings with various stakeholders either one-on-one or in groups, including agency representatives, property owners, developers, homebuilders, community organizations and others. As the process unfolded and a conceptual roadway framework was defined, the study team met with some stakeholders more than once. Appendix A contains a list of the stakeholder meetings in chronological order.

MAG's community outreach consultant developed a database of interested individuals and expanded it throughout the project. This database was used to generate a list of recipients for event invitations. The most important events were a series of four community/development forums held in May 2006, July 2006, February 2007, and July 2007. These forums, held in or near the study area, typically attracted an attendance of over 100 people. Their purpose was to present progress on the study, to answer questions and to obtain input. At the early forums, the input from stakeholders focused on general issues, concerns, strengths, weaknesses, opportunities and threats. One of the earlier forums divided participants into small groups to sketch out their ideas for future transportation corridors. The third forum, which presented the alternative transportation networks and their evaluation, was followed by a community open house consisting of a PowerPoint presentation and open discussion. The recommended high-capacity roadway network and implementation program were presented at the last forum in Buckeye for public review and final comment.

Appendix B documents comments received during the study from Funding Partners, the Study Review Team and members of the community. These comments were received orally, through written and electronic correspondence, and on comment cards distributed at the forums.

A coordination meeting with environmental resource agencies was held midway through the study, in late January 2007. The following agencies were invited:

- ADOT Environmental Planning Group
- Arizona Department of Environmental Quality
- Arizona Department of Water Resources
- Arizona Game & Fish Department
- Arizona State Historic Preservation Office
- Arizona State Land Department
- Flood Control District of Maricopa County
- MCDOT Environmental Planning
- Maricopa County Parks
- U.S. Bureau of Land Management
- U.S Fish & Wildlife Service

Elected officials of affected jurisdictions, especially the Funding Partners, were briefed at important junctures. Public information media included a project newsletter and a frequently updated page on the MAG website.

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Chapter 2

Future Land Use, Development and Environmental Conditions

September 2007

Prepared for

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2.1 Introduction

This report presents an inventory and analysis of land use issues and related findings of studies that are pertinent to the development of the Interstate 10-Hassayampa Valley Roadway Framework Study (the "Hassayampa Study"). Previous and current planning studies were gathered from the municipalities and agencies coordinating the studies.

The project area extends from approximately SR-74 on the north to the Gila River on the south and from 459th Avenue on the west to SR-303L on the east, covering an area of roughly 1,430 square miles (Figures 2-1 and 2-2).

Figure 2-3 depicts the boundaries of all the jurisdictions and their municipal planning areas (MPA) within the study area, as well as generalized land ownership. An MPA is defined as the geographic area in which the jurisdictional planning process must be carried out. It includes, but is not necessarily limited to, the incorporated territory of the city or town. Four municipalities have planning authority over their incorporated areas: the Town of Buckeye, City of Surprise, City of Goodyear, and City of Glendale, with Maricopa County having planning and zoning authority over the unincorporated areas. Within these unincorporated areas, the county has planning authority over privately owned land as well as land owned by the Arizona State Land Department (ASLD). Approximately one-third of the study area is not under any local planning jurisdiction, but under control of the federal Bureau of Land Management (BLM).

Much of the BLM land is located west of the Buckeye MPA. BLM-designated lands are under an extra layer of federal protection, meaning that any transportation infrastructure planned for this area will have to go through an added level of review. Much of the eastern half of the study area is in the planning areas of Buckeye, Surprise, Goodyear, and Glendale. Transportation infrastructure planned for an MPA should be compatible with the city's or town's land use and transportation plans.

2.2 Study Area Land Use Issues

This section presents an inventory of land use issues and implications that are pertinent to the development of this Study. The inventory resulted in a series of detailed maps that have been included in this chapter, along with descriptive text, under the following categories:

- Population and Employment
- Revised Buildout Study Area Socioeconomic Forecasts and East Valley Comparison
- Environmental Context
- Existing Land Use
- Future Land Use
- Public Land Management
- Master-Planned Communities

2.2.1 Population and Employment

Population and employment statistics from the 2003 MAG publication, "Interim Projections of Population, Housing, and Employment by Municipal Planning Area and Regional Analysis Zone" show the study area to have 30,076 dwelling units and 34,411 jobs in the year 2000. Current MAG projections show these numbers increasing to 394,000 dwelling units and 388,000 jobs in the year 2030.

Figure 2-1 Study Area

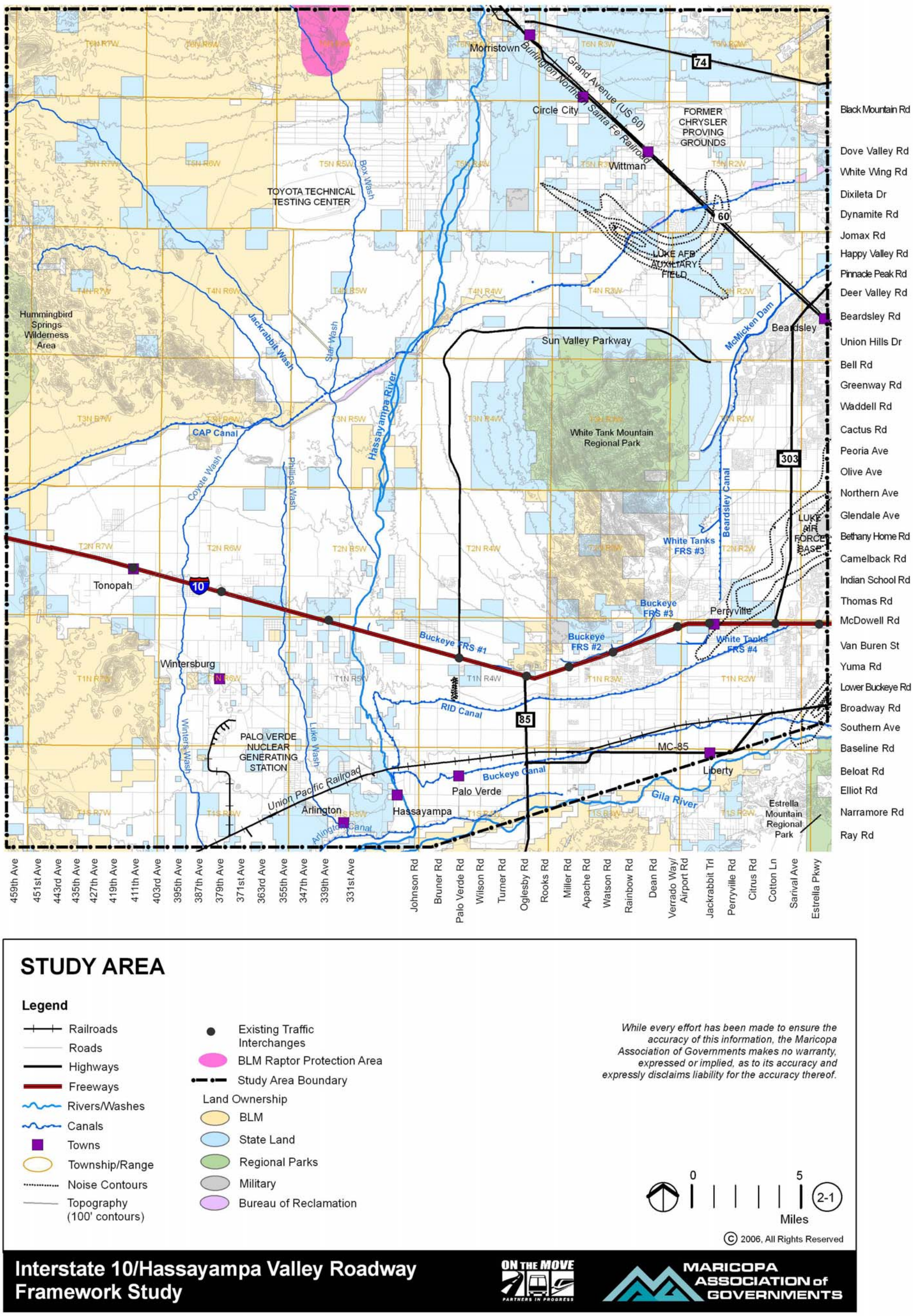


Figure 2-2 Study Area with Aerial Base

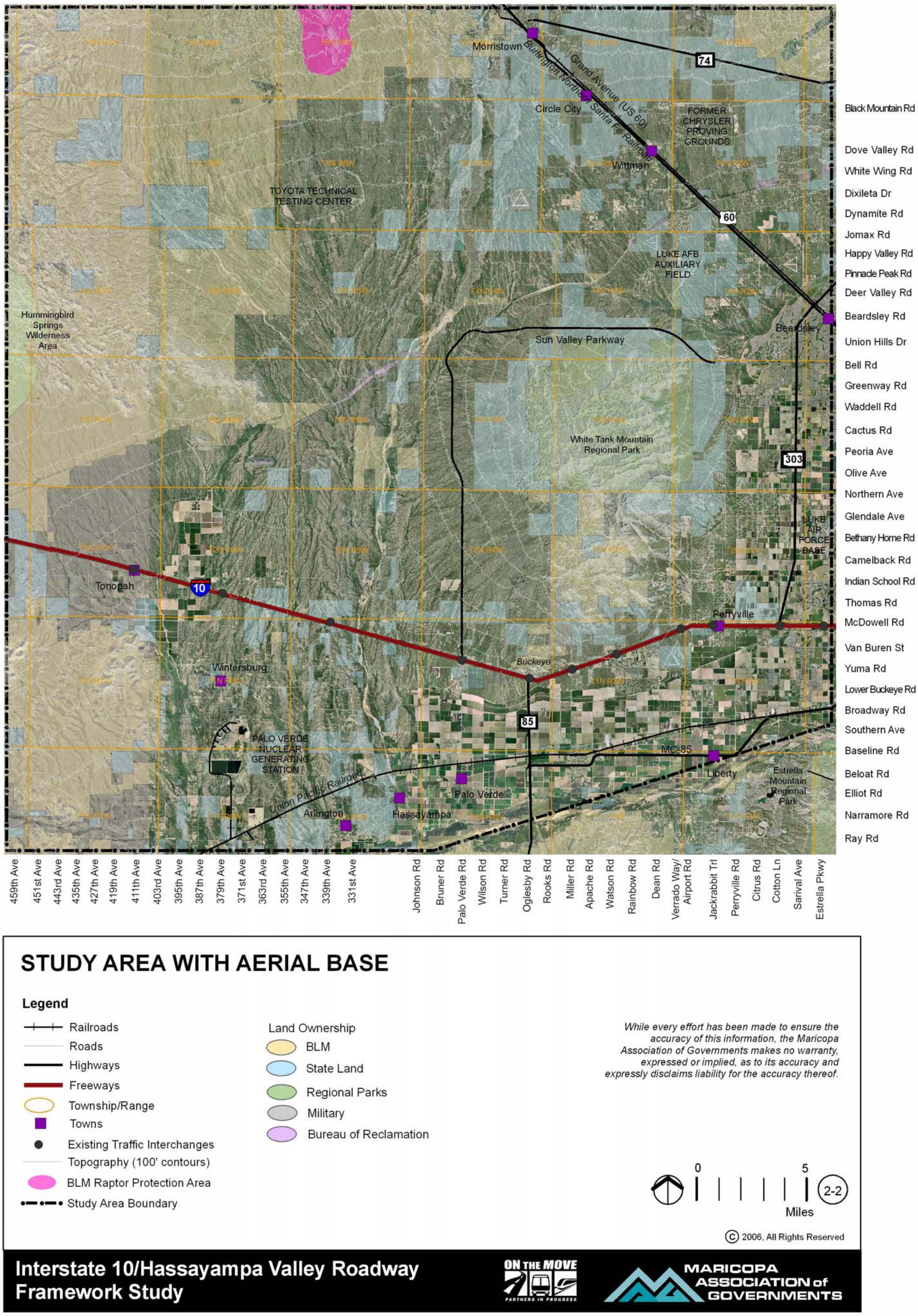
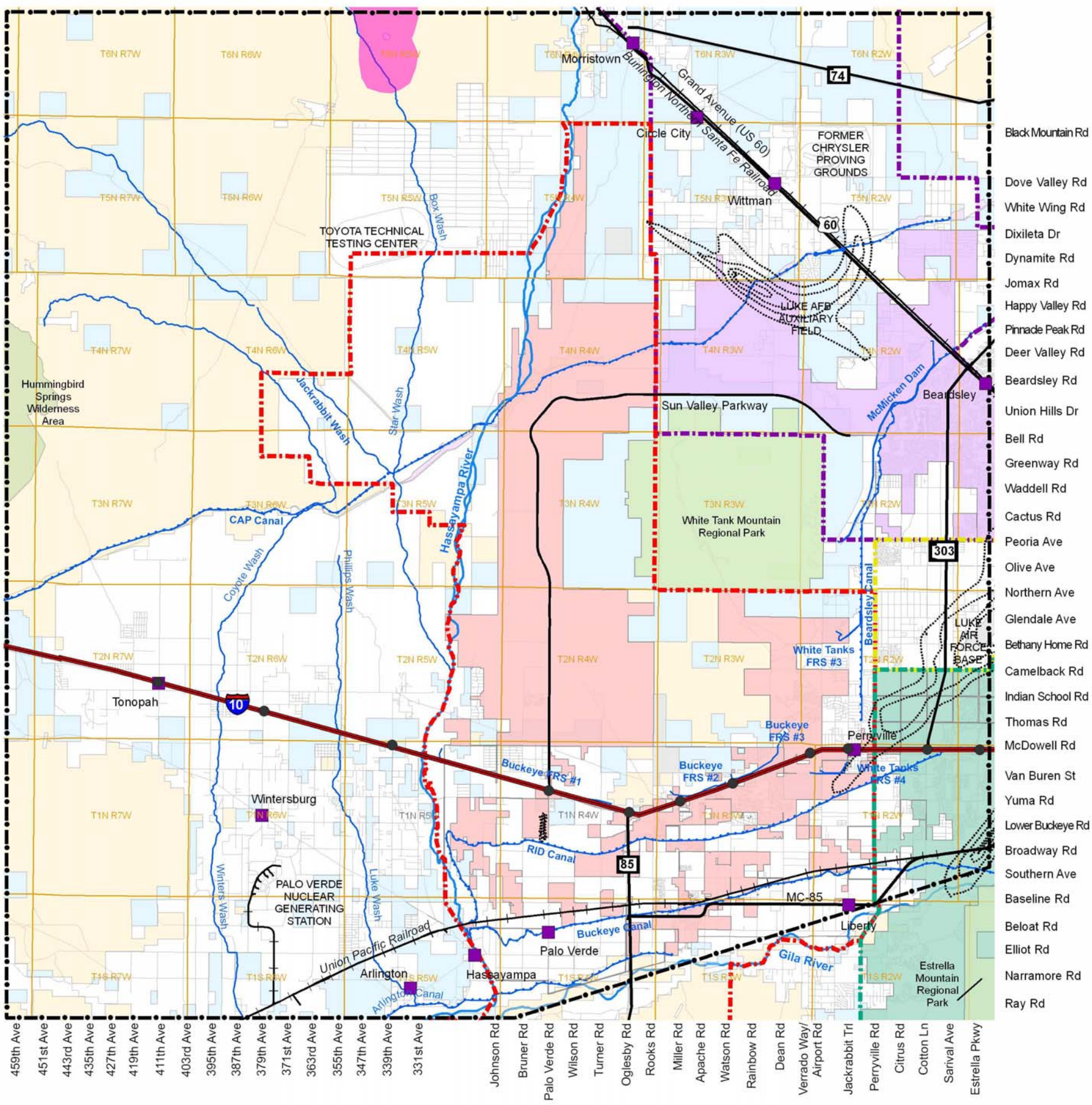


Figure 2-3 Jurisdictions and Planning Areas



Figures 2-4 through 2-7 illustrate the year 2030 projections. Population densities will be highest within the city and town MPA boundaries, especially adjacent to high-capacity transportation corridors like I-10, US-60, SR-303L, SR-74, SR-85, and the Sun Valley Parkway. Densities are projected to remain low near the Luke Air Force Base Auxiliary Field, the White Tank Mountains, and west of the Town of Buckeye, where much of the land belongs to the BLM and is not available for residential development.

Year 2030 employment will be generally much more concentrated than housing, with employers located along transportation corridors such as I-10, US-60, SR-303L, and SR-85, as well as near the Luke Air Force Base Auxiliary Field and in scattered employment pockets in the Buckeye MPA. These pockets in the Buckeye area can be attributed to the high–density, mixed-use town center developments proposed in many master planned communities, such as Sun Valley South, Douglas Ranch, and (in unincorporated Maricopa County) Belmont. Again, densities will remain low in the BLM land west of the Buckeye MPA.

2.2.2 Revised Buildout Study Area Socioeconomic Forecasts and East Valley Comparison

As part of its update of the Regional Transportation Plan, MAG is preparing revised population and employment forecasts for the entire region. The first step in preparing these projections is to establish Buildout population and employment estimates. To support this study, MAG "fast–tracked" development of Buildout socioeconomic estimates for jurisdictions within the study area. The study is using Buildout population and employment forecasts to identify the transportation infrastructure needed to satisfy the region's long-range travel demand.

The Buildout analysis is based primarily on the current general and comprehensive plans of MAG member agencies: the Town of Buckeye, City of Surprise, City of Goodyear, City of Glendale, City of Peoria, and Maricopa County. These general plan estimates have been enhanced by information on current land use and development. State trust lands cover much of the study area. The ASLD works with the above jurisdictions to develop and agree on conceptual development plans that are reflected in each general plan.

MAG's analysis projects a Buildout population of 2.778 million people, with 1.047 million jobs (one job for every 2.65 residents) in the study area. To confirm that this Buildout dataset adequately accounts for expected future development, the study team performed a reasonableness check that compared the MAG Buildout land use projections for the study area with MAG year 2030 population projections for portions of the East Valley. The study team believes that the MAG year 2030 forecast for the East Valley area represents full Buildout of this portion of the MAG region. These projections for the East Valley can therefore be directly compared with the long-range Buildout forecast that MAG recently developed for the Hassayampa study area.

The purpose of this socioeconomic data comparison is to confirm that the recently developed general plan Buildout dataset will generate reasonable long-range travel demand forecasts for the study area. This land use comparison provides a point of reference between the Hassayampa study area and a portion of the MAG region under Buildout conditions, as represented by the MAG 2030 projections for the East Valley.

Within the Phoenix metropolitan area, the East Valley communities of Chandler, Gilbert, Guadalupe, Mesa, Queen Creek and Tempe are mature or maturing cities that are already approaching Buildout or expect to reach it in the near- to mid-term. At Buildout, the Hassayampa study area land use intensity is expected to be similar to what is seen now (2006) in these East Valley cities and towns.

Figure 2-4 Build Out Total Population

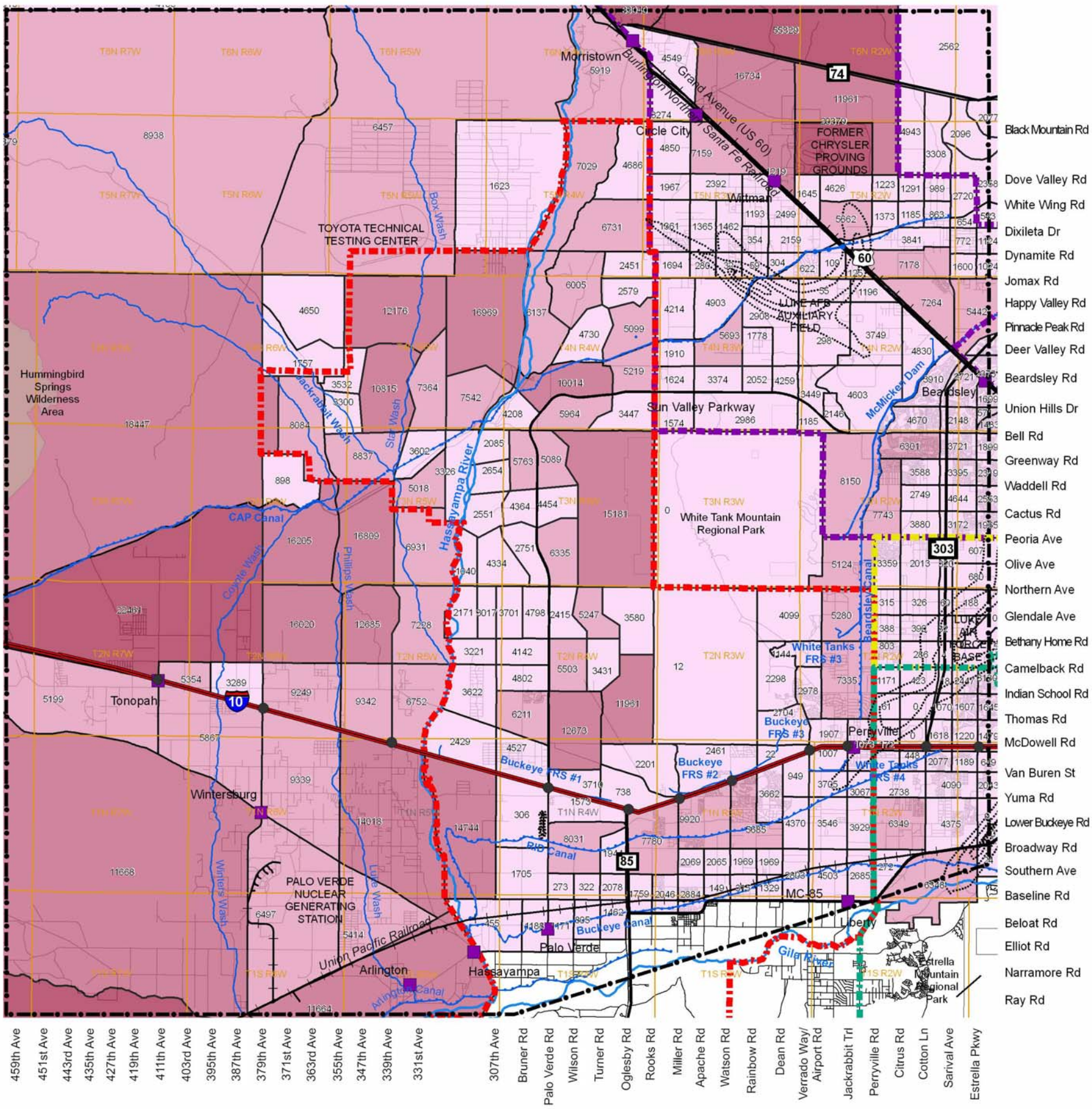


Figure 2-5 Build Out Population Density

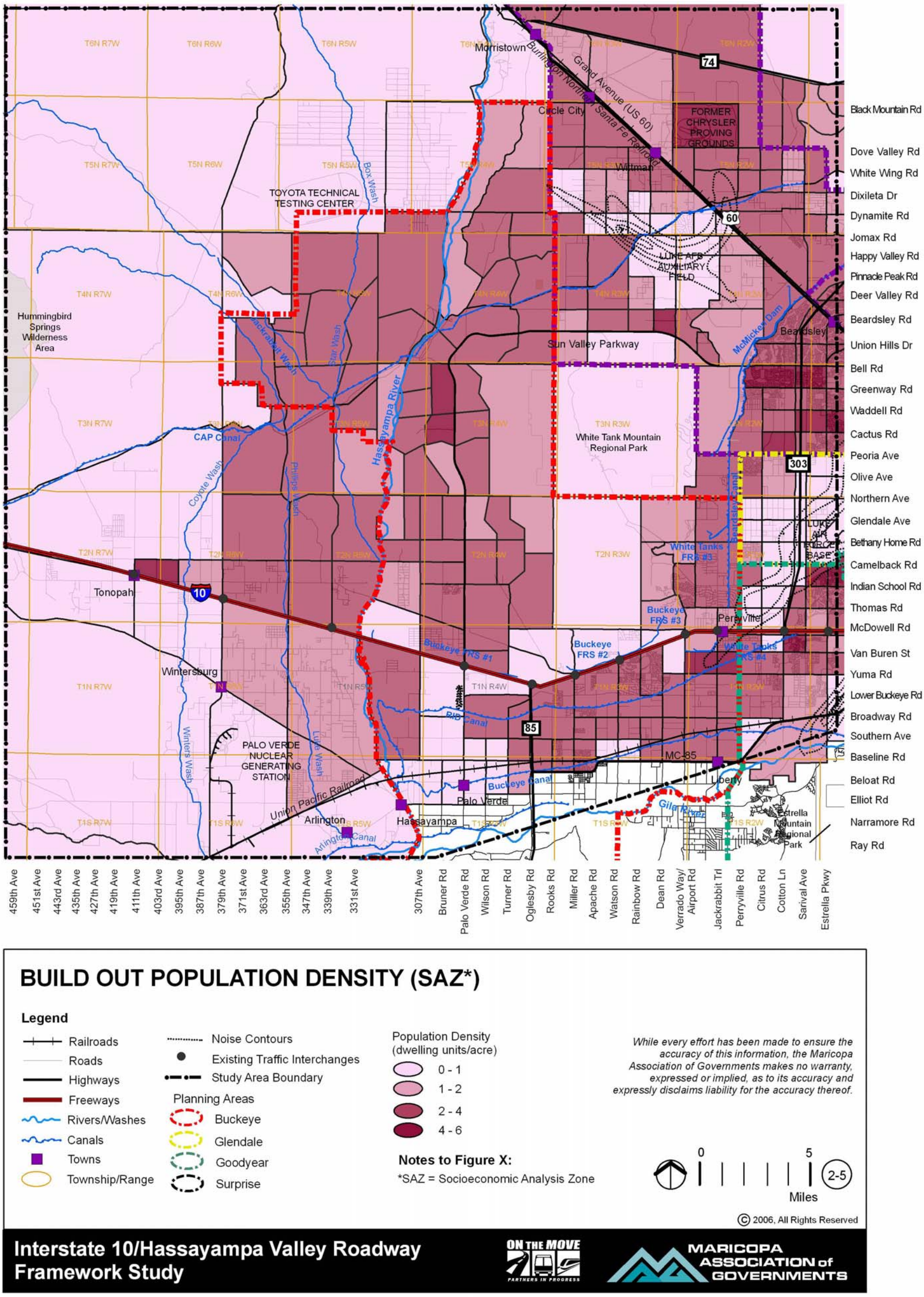


Figure 2-6 Build Out Total Employment

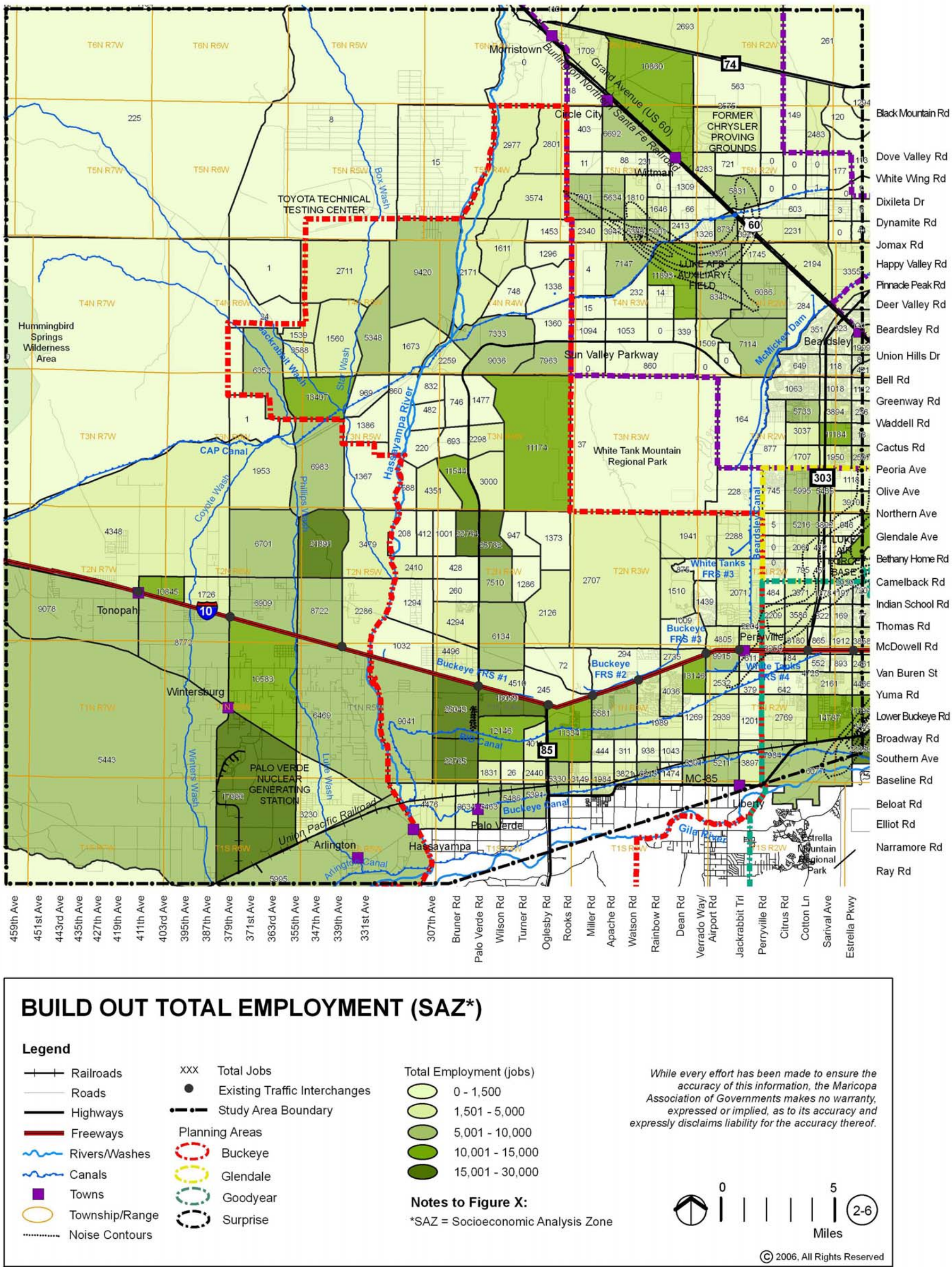
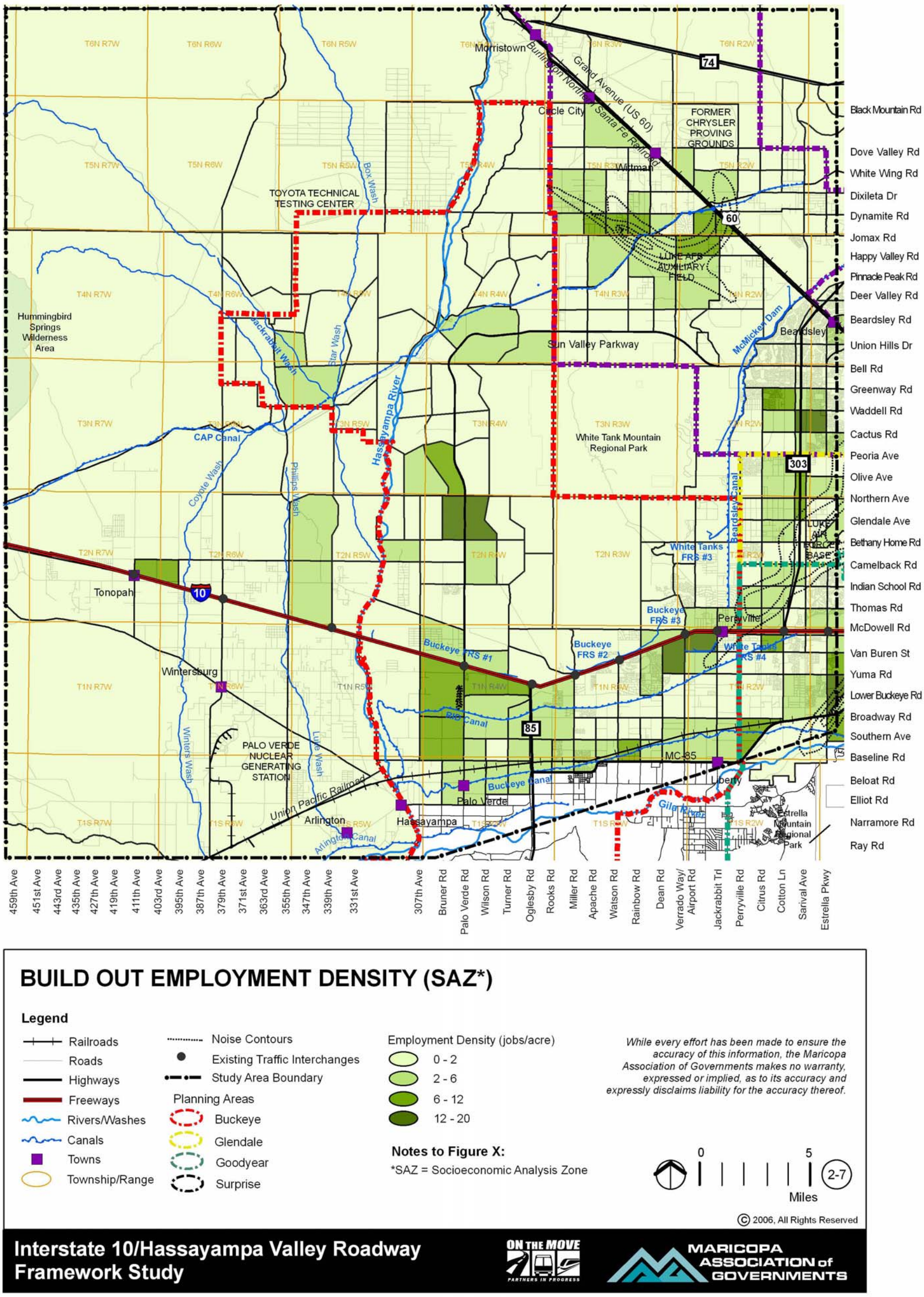


Figure 2-7 Build Out Employment Density



The Hassayampa study area is a mosaic of public and private land ownership. State Trust Lands held by the ASLD may eventually transfer to private interests, through either sale or lease, for residential and commercial development. On the other hand, federal lands, such as those managed by the BLM, are unlikely to transfer. Figure 2-8 shows a map of study area land ownership patterns in the Hassayampa study area. Figure 2-9 shows a similar map of land ownership patterns in the East Valley comparison area. Table 2.1 provides a breakdown of land ownership by acreage, both within the study area and in the East Valley.

Table 2.1 Existing Land Ownership Summary

Land Category	I-10/Hassayampa Valley Study Area		East Valley	
	Acres	Pct Total	Acres	Pct Total
Bureau of Land Management	263,631	29%	1,343	1%
Bureau of Reclamation	918	0%	1,480	1%
County	46	0%	1,454	1%
Local and State Parks	29,200	3%	4,163	2%
Military	1,977	0%	2	0%
Private Lands	460,375	50%	235,523	95%
State Trust Lands	163,201	18%	3,950	2%
State Wildlife Area	42	0%	40	0%
U.S. Fish & Wildlife Service	-	0%	6	0%
Total	**919,390**	**100%**	**247,961**	**102%***

*Percents do not add precisely to 100 due to rounding.

Source: Arizona State Land Department, Arizona Land Resource Information System (ALRIS), 1988.

Significant differences exist between the distribution of land ownership in the East Valley and in the Hassayampa Valley. The vast majority of land in the East Valley is privately owned, but half the land in the Hassayampa Valley is publicly held, primarily by BLM and ASLD. However, land ownership in the East Valley may have been distributed differently several decades ago when the area was mostly undeveloped.

The study team prepared a comparison of land use intensity at Buildout between the study area and the East Valley. Table 2.2 includes both private and state lands (most of which are likely to develop someday) in the universe of total developable land. The average general plan Buildout density of dwelling units (DU) for the Hassayampa study area is 1.75 per (net) acre. This is 24 percent lower than the 2.31 dwelling units per acre in the MAG year 2030 East Valley data. The Hassayampa Valley Buildout employment density, in jobs per net acre, is well under half of that projected for 2030 Buildout conditions in the East Valley.

Figure 2-8 I-10/Hassayampa Study Area Land Ownership

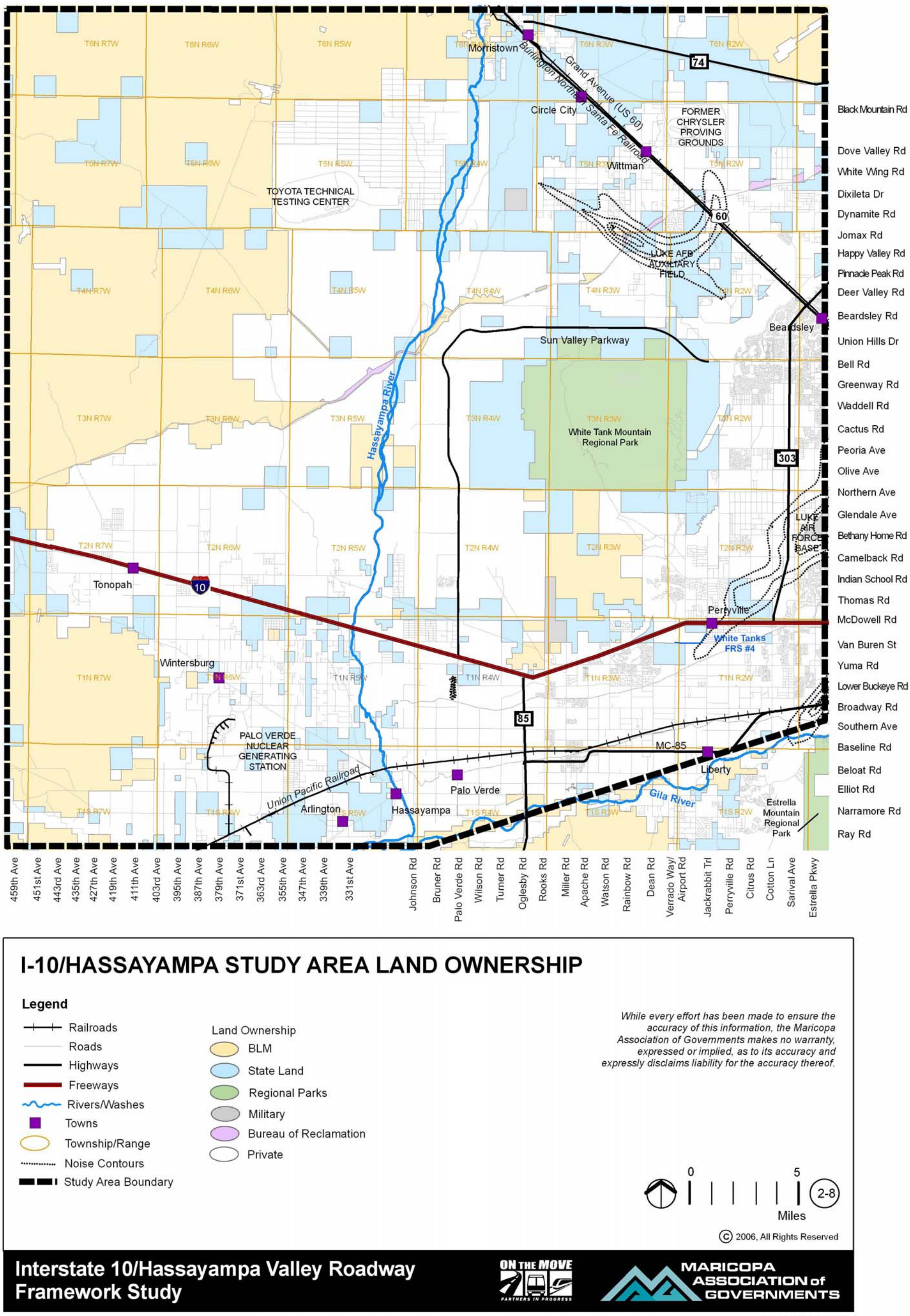


Figure 2-9 Phoenix East Valley Land Ownership

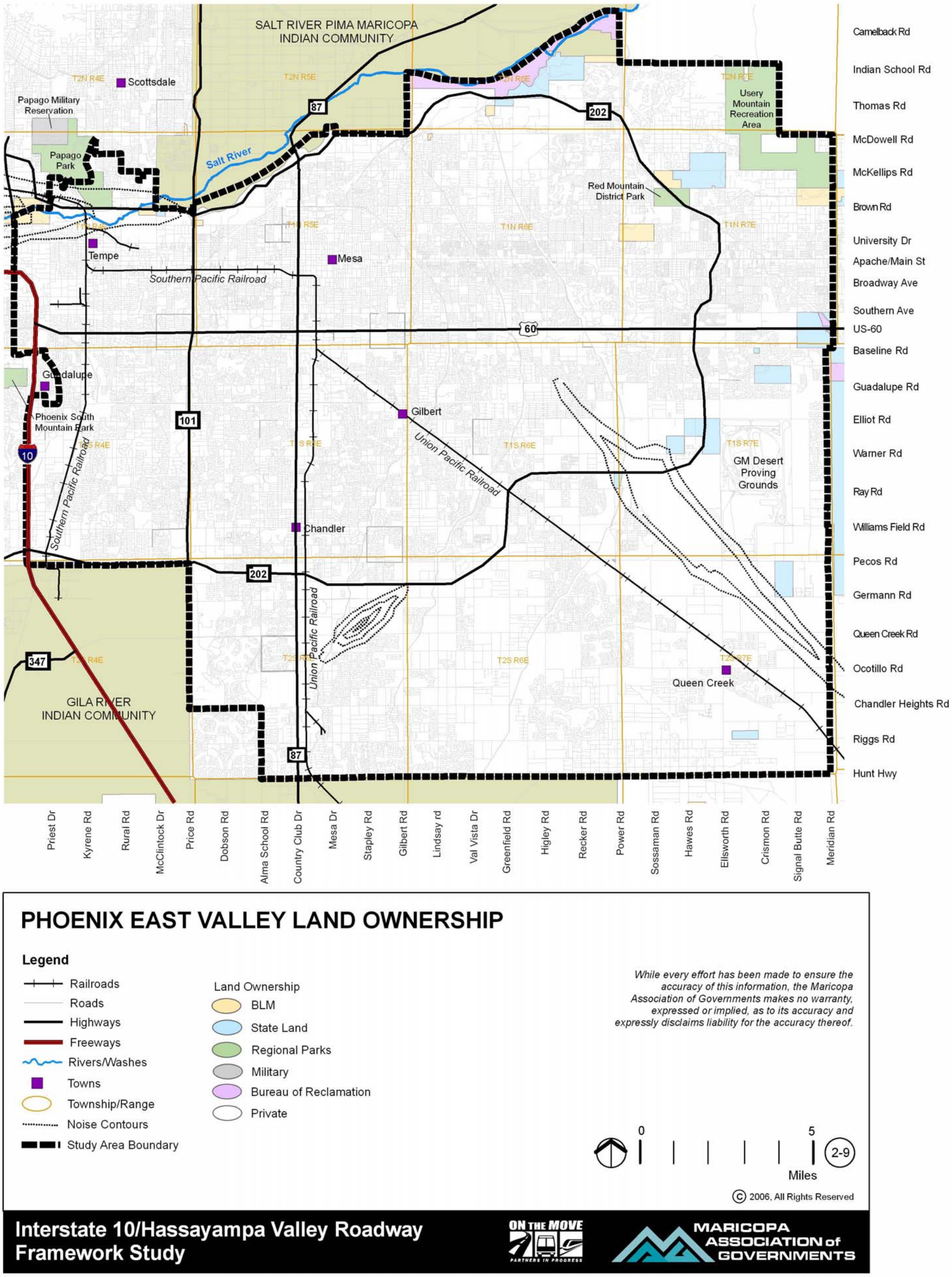


Table 2.2 I-10/Hassayampa Socioeconomic Data Comparison Land Use Summary with Private and State Land Holdings

Analysis Area	Gross Acres	Net Acres	POP	DU	DU/Net Acre	EMP	EMP/DU
I-10/Hassayampa Study Area (Buildout)	919,000	624,000	2,778,000	1,094,000	1.75	1,047,000	0.96
East Valley (2030)	248,000	239,000	1,512,000	552,000	2.31	899,000	1.63

Notes:

Gross acres represents the total land area of each analysis area. Net acres in both the study area and the East Valley are based on the sum of private and state lands from the ALRIS database.

Sources: MAG Buildout population and employment estimate for the I-10/Hassayampa Valley Study Area, September 2006; MAG 2030 population and employment estimates, July 2003 for the East Valley area.

According to the table, the East Valley Buildout population density (per net developable acre) is 42 percent higher than the Buildout density projected for the Hassayampa study area. The general plan Buildout scenario in the Hassayampa Valley region represents the initial vision for future urbanization, however, and could change in future decades as urban densification continues. To put this in context, the East Valley has had decade upon decade of general plan revisions and updates, rezonings, redevelopment, and infill development, which have shaped and will continue to shape land use.

Another key item is the projected jobs per dwelling unit. As shown in Table 2.2, the latest Buildout projections show employment per dwelling unit in the study area to be only 59 percent of that projected for the East Valley in 2030. However, a socioeconomic sensitivity analysis could be conducted to determine how a more favorable jobs/housing balance (i.e., a higher ratio) would affect the number of trips leaving the region, and ultimately the number of lanes needed on key regional, high-capacity facilities. The results of the jobs/housing balance sensitivity analysis could also affect anticipated infrastructure investment levels.

The MAG Buildout projections for the Hassayampa area reflect the low population and employment densities of initial suburban development. These densities are considerably lower than those projected for the East Valley in 2030. The East Valley projects reflect historic development trends and include the effects of full urbanization. In contrast, the initial set of MAG Buildout projections for the Hassayampa Valley reflect a mixture of rural and early-stage suburban development. Thus, as the Hassayampa Valley matures, and as general plans are revised and updated in future decades, population estimates are expected to be raised to reflect continuing and denser urbanization.

While this analysis indicates that the Hassayampa Valley at Buildout will be less densely developed and have fewer jobs per household than the East Valley, at least initially, the potential impact to regional transportation infrastructure needs could be offset by an improved subregional employment balance (i.e., more jobs per household in the study area). An improved jobs/housing balance would result in an increased level of trip capture within the Hassayampa Valley, thereby potentially reducing the needed lane miles of new regional highways.

2.2.3 Environmental Context

The study area includes such significant environmental features as topography, cultural resources, natural resources, drainage, and public utilities. These features are illustrated in Figures 2-10 through 2-15.

Figure 2-10 Environmental Context

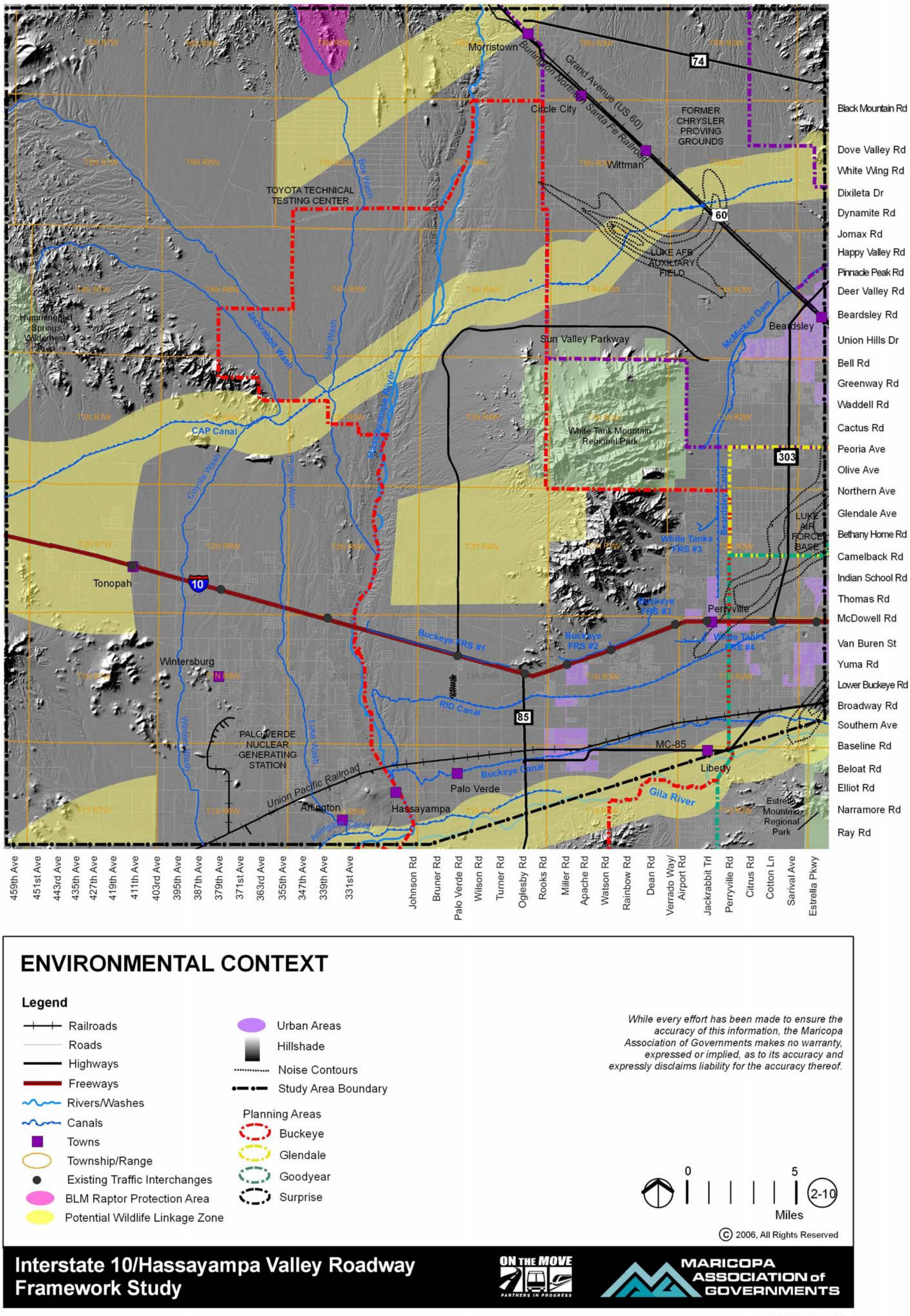


Figure 2-11 Drainage Features

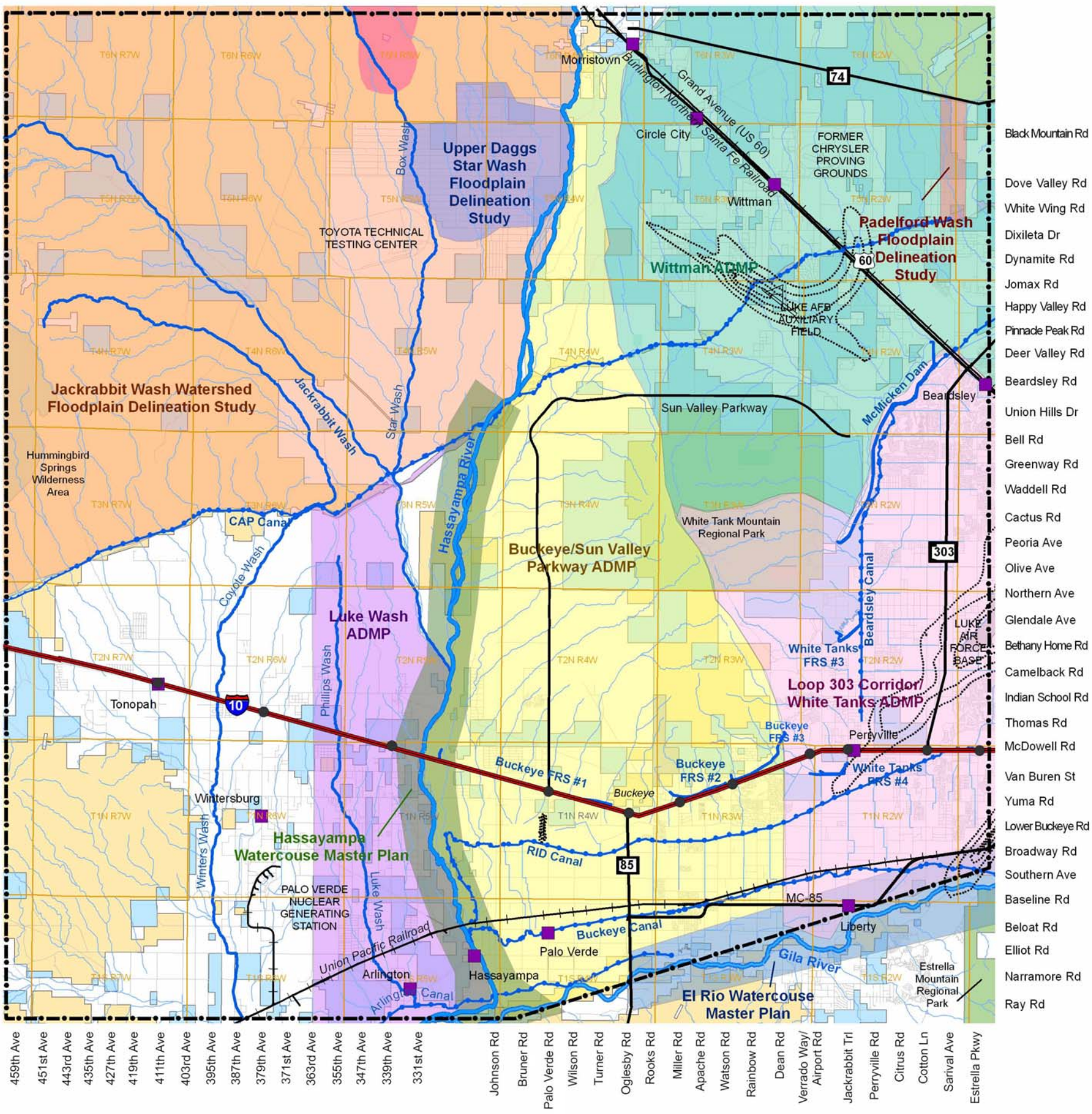


Figure 2-12 Recreational Opportunities

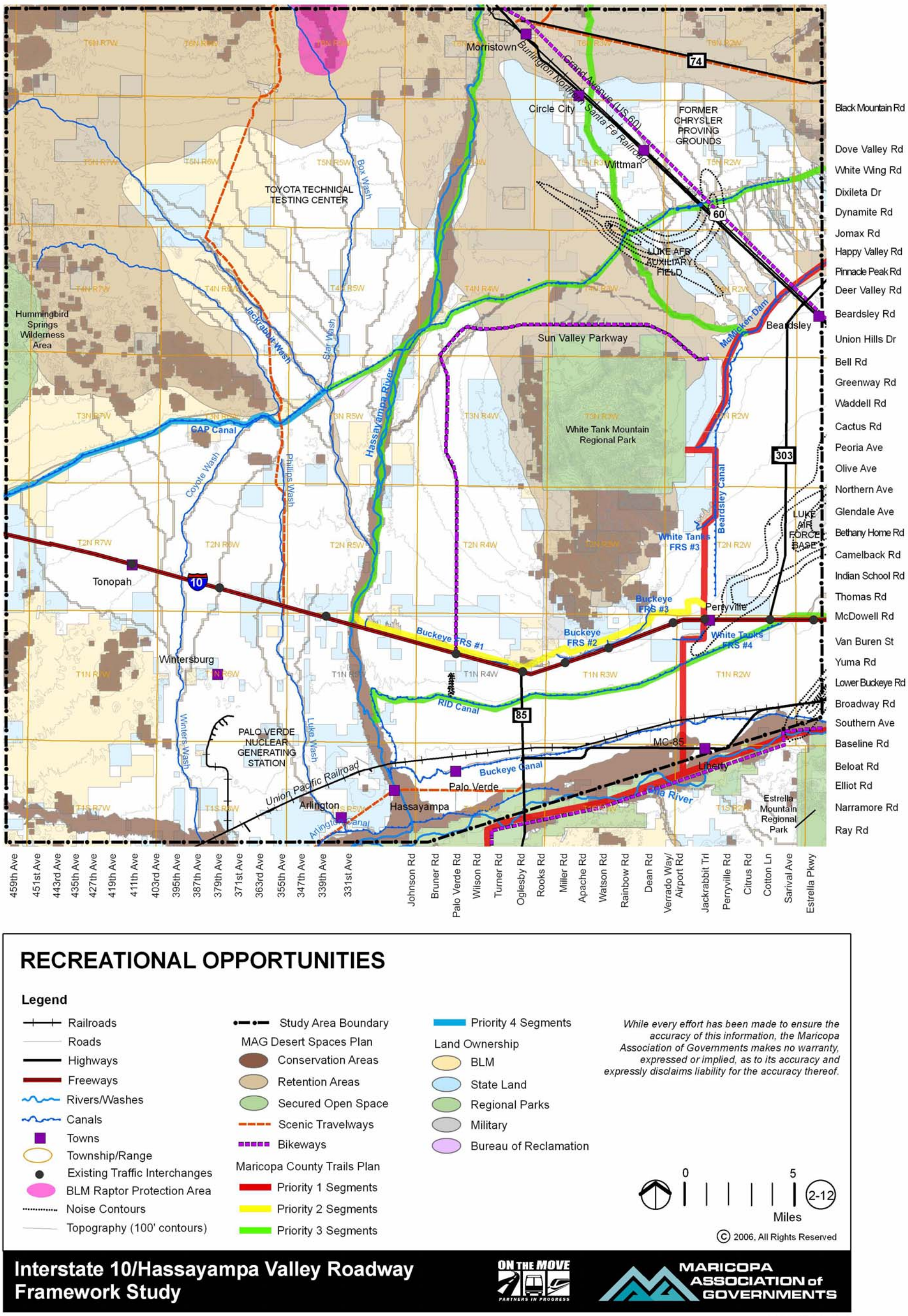


Figure 2-13 Palo Verde Nuclear Generating Station Emergency Planning

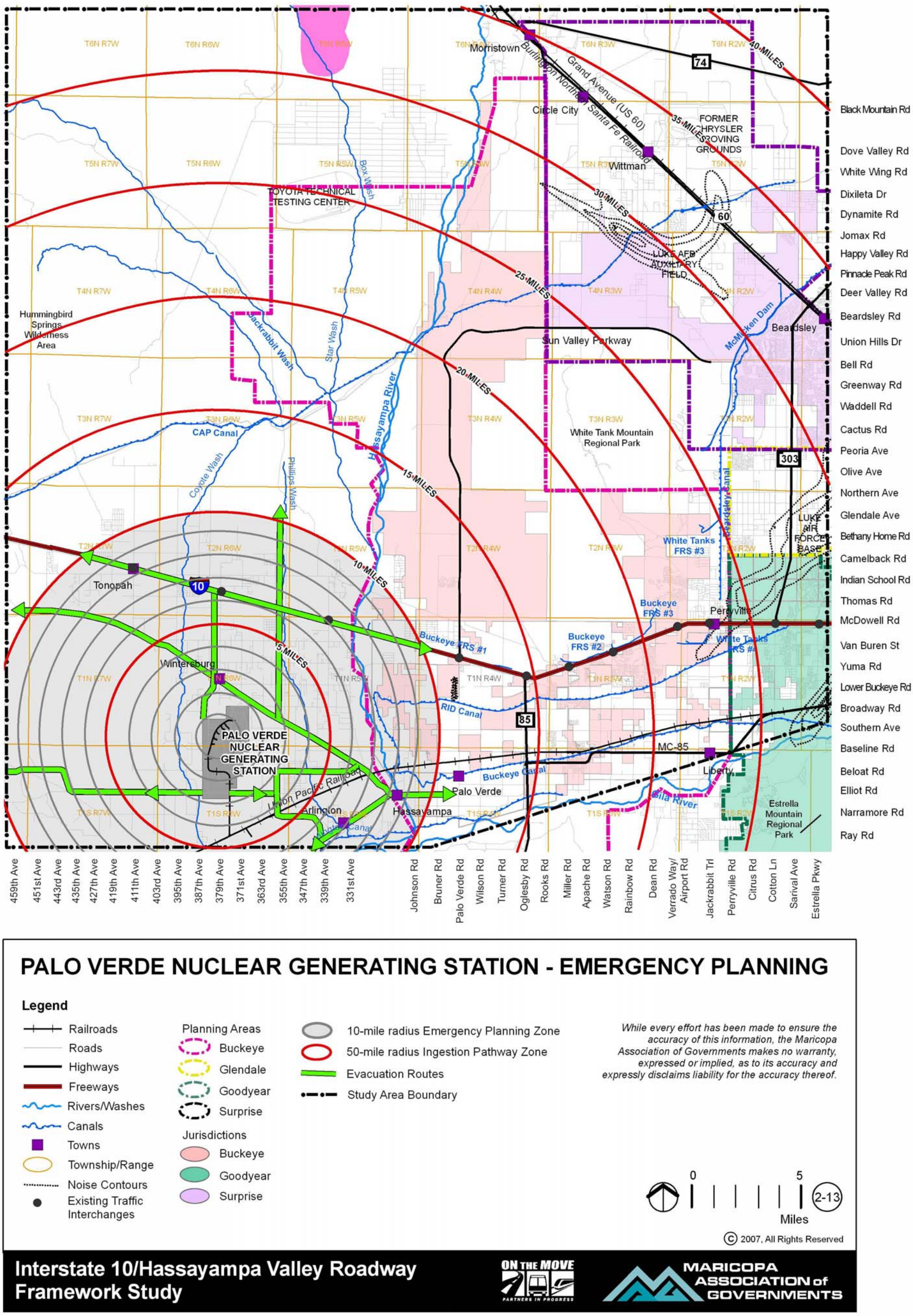


Figure 2-14 Air Quality Nonattainment Area Boundaries

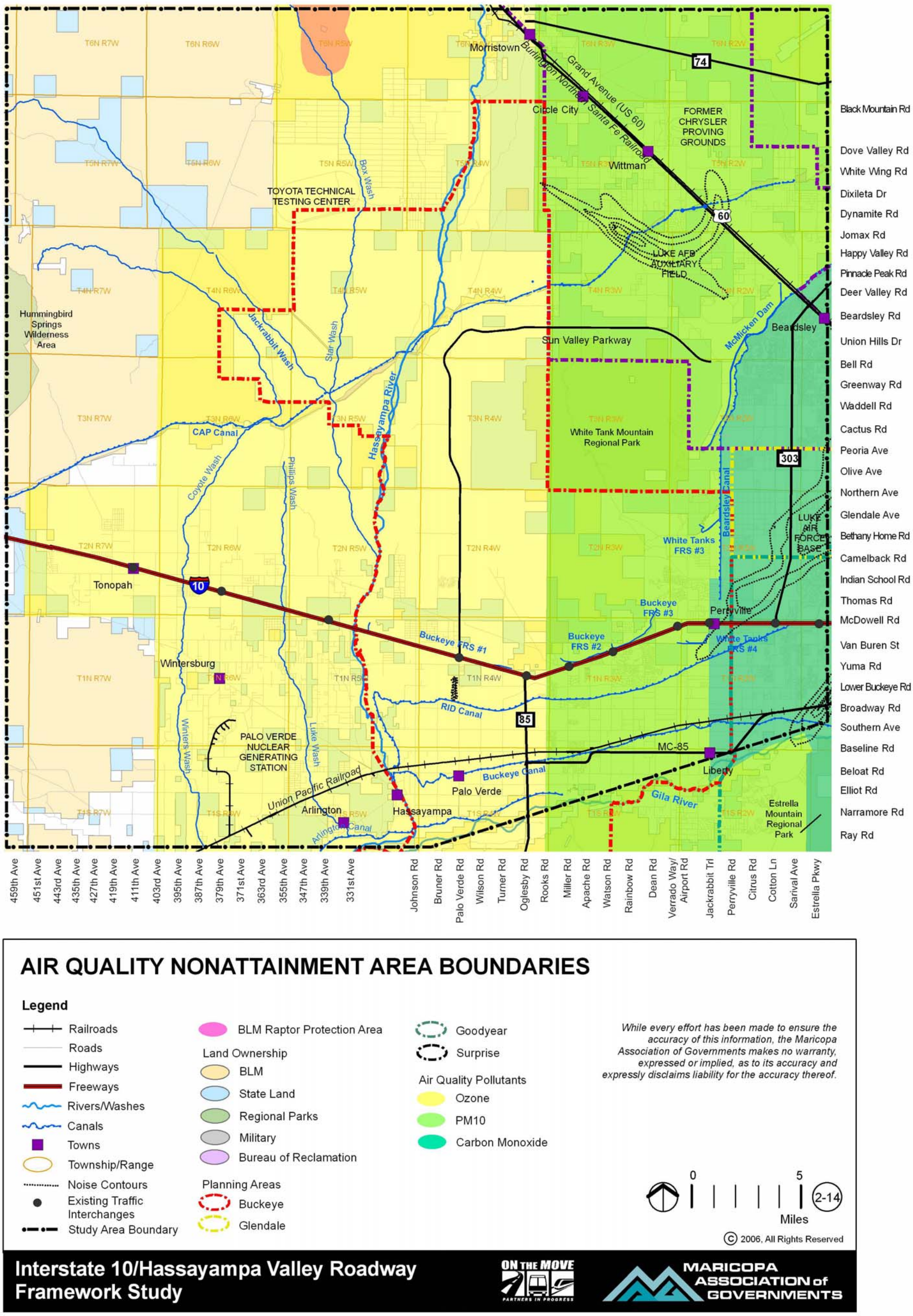
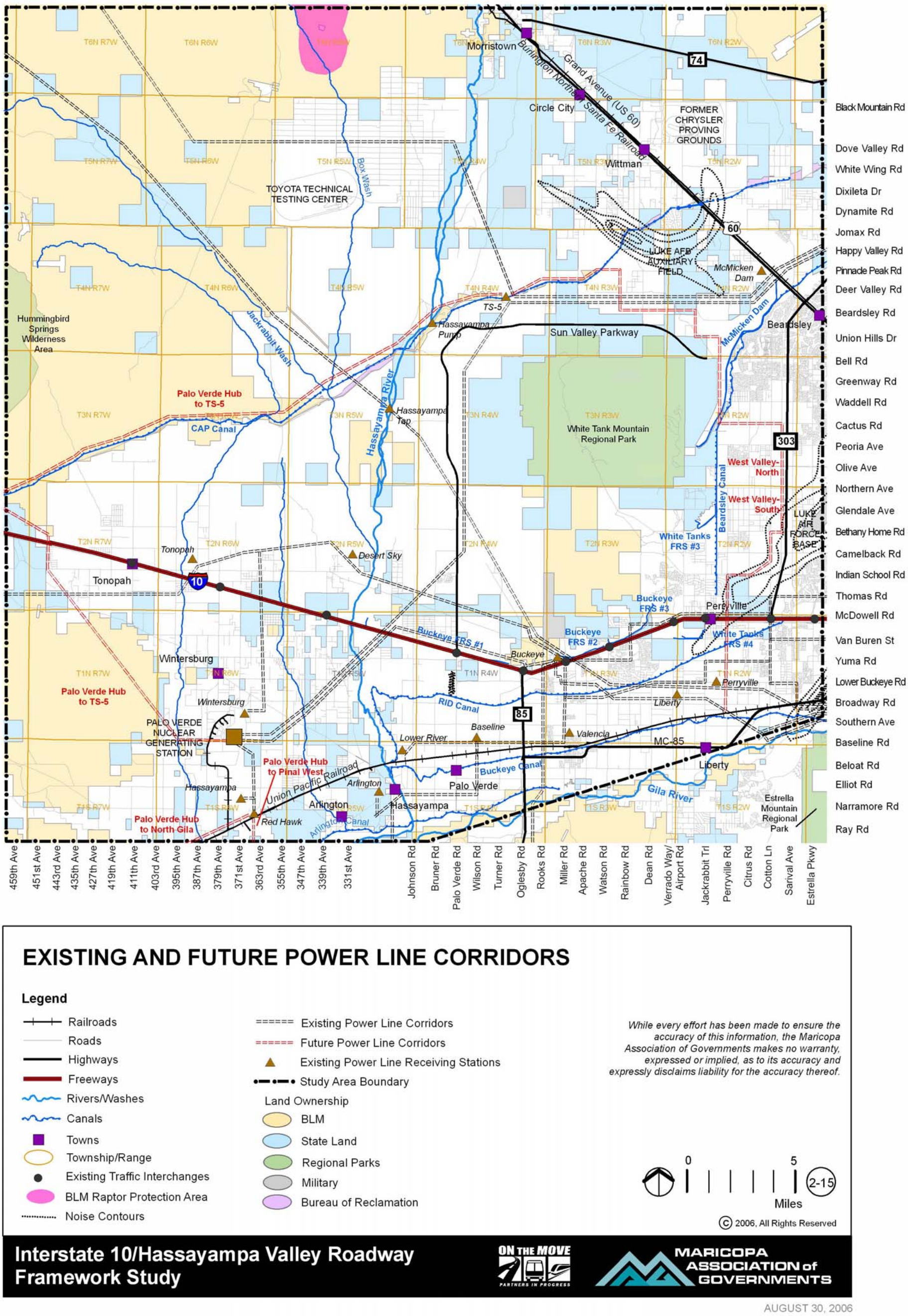


Figure 2-15 Existing and Future Power Line Corridors



The environmental features outlined below are based on readily available information that has not been field-verified. This information was obtained from various sources such as public agencies, municipalities, and web pages and databases based on Geographic Information Systems (GIS). On-site "ground truthing" and field investigation are recommended at the Corridor Improvement Study and Design Concept Report levels, to verify these environmental considerations.

Natural Resources

Figure 2-10 illustrates the existing environmental conditions of the study area. To begin with, this map shows the jurisdictions and urbanized areas. As described above, the study area is composed of (portions of) the Town of Buckeye, City of Surprise, City of Goodyear, City of Glendale, and unincorporated Maricopa County. Urbanized area is defined by the U.S. Census Bureau as the collective combination of urban areas and urban clusters, referring to a geographic area consisting of a central core and adjacent territory that contains at least 50,000 people, generally with an overall population density of at least 1,000 per square mile. Urban clusters, generally found at the edge of the urbanized area, are based on census block and block group density, do not coincide with official municipal boundaries, and need not be adjacent to the urban area boundary. The Phoenix urbanized area currently extends west across SR-303L and north of Bell Road as far as McMicken Dam. Downtown Buckeye is an urban cluster that spans MC-85 between Rooks and Watson roads.

Several topographic features stand out on the landscape. White Tank Mountain Regional Park, the largest unit of the Maricopa County park system, is located entirely within the study area. The highest peak in the White Tank Mountains is more than 4,000 feet tall. Hills and mountains associated with this landform, and ranging from 1,400 to 2,800 feet in height, extend south of the park for approximately five miles.

Part of Hummingbird Springs Wilderness Area is located within the study area. This wilderness extends from approximately Happy Valley Road to Waddell Road, and east to approximately 451st Avenue. The entire wilderness area encompasses 31,200 acres, but only a small eastern portion is located within the study area boundaries. This wilderness is marked by the 3,148 foot Sugarloaf Mountain, located outside the study area. The landscape surrounding the Hummingbird Springs Wilderness Area to the north, east, and northeast is characterized by peaks and hills ranging from 1,800 feet to 2,600 feet tall.

The land within the project area is generally higher in elevation in northern reaches and lower in the southern reaches. The White Tank Mountains are located within the southeastern quadrant of the project area. Several more mountains, peaks and hills are scattered throughout the landscape. There is an expansive range grouped in the northwestern corner of the study area, a smaller one in the southwestern corner, and an even smaller rise in the northeastern corner. Surface bodies of water (natural and man-made) include the Hassayampa River, Gila River, Arlington Canal, Beardsley Canal, Buckeye Canal, Roosevelt Irrigation District (RID) Canal, and Central Arizona Project (CAP) Canal, along with several washes.

Major Watercourses and Drainage

<u>Major Watercourses</u>

The Gila River lies adjacent to the southeast corner of the study area. Its channel flows generally from east to west along the south study area boundary for approximately twelve miles. Approximately two miles west of its confluence with the Hassayampa River, the Gila turns south to roughly parallel Old U.S. Highway 80 and SR-85.

The Hassayampa River, a tributary of the Gila, flows from north to south across the central portion of the project area. The river crosses the northern study area boundary at an elevation of 1,800 to 2,000 feet. It crosses the southern boundary at a lower elevation--approximately 800 to 1,000 feet. Several washes west of the northern reaches of the Hassayampa River flow from these highlands to Jackrabbit Wash, which flows into the river.

The CAP Canal flows from east to west within the study area, crossing the eastern boundary of the study area in its northern reaches, near White Wing Road. Within the project study area, the CAP canal is also referred to as the Hayden-Rhodes Aqueduct. This canal is managed and operated by the Central Arizona Water Conservation District. Its elevation in the study area is approximately 1,400 feet. The CAP canal extends

southwest from its intersection with the eastern study area boundary to the western boundary, crossing the western boundary approximately two miles north of I-10.

The Arlington Canal also flows from east to west, traversing the southern boundary of the study area. This canal parallels the Gila River for most of its length within the study area. Its elevation in the study area ranges from 800 to 880 feet. This canal crosses several roadways, including Johnson Road, Bruner Road, and SR-85.

The Beardsley Canal flows from north to south, traversing the east side of the White Tank Mountains. Its elevation in the study area ranges from 1,100 to 1,340 feet. The canal crosses many roadways, including Indian School Road, Olive Avenue, Sun Valley Parkway/Bell Road, and US-60. It begins near Lake Pleasant south of the New Waddell Dam, and crosses the Agua Fria River as it heads generally south and west to cross US-60 northwest of SR-303L. It then parallels Trilby Wash Basin for several miles before turning due south midway between the Perryville Road and Jackrabbit Trail alignments, terminating near Indian School Road. The Maricopa Water District owns this facility.

The Buckeye Canal flows from east to west through the southern portion of the study area. Its elevation ranges from 860 to 890 feet. This canal parallels the Gila River, Maricopa County Route 85 (MC-85) and the Union Pacific Railroad throughout the study area. It crosses many roadways, including Cotton Lane extension (dirt road), Jackrabbit Trail, Perryville Road, Estrella Parkway and Bullard Avenue.

The RID Canal flows from east to west, traversing Buckeye and Goodyear. This canal runs parallel to I-10 between that highway and MC-85 through most of the study area. Its elevation ranges from 950 feet near the Hassayampa River to 1,010 feet near I-10. This canal crosses many roadways, including Miller Road, Rainbow Road, Jackrabbit Trail, Cotton Lane and Estrella Parkway.

Trilby Wash traverses the study area generally from northwest to southeast, crossing US-60 near Circle City and continuing south and east to enter the Trilby Wash Detention Basin in Surprise. This wash is located north of Sun Valley Parkway and west of the Citrus Road alignment.

Drainage Features

Figure 2-11 shows current drainage structures, and completed and current drainage studies performed through the Flood Control District of Maricopa County (FCDMC). The Gila River and its tributary, the Hassayampa River, are the two major waterways in the study area. Jackrabbit Wash runs through the northwest portion of the study area, flowing into the Hassayampa River north of I-10. There are five canals (Arlington, Beardsley, Buckeye, CAP and RID), five flood retardant structures, and one major dam. All of these structures support the larger drainage system.

FCDMC is analyzing almost the entire project area. Three types of studies are or have been conducted: area drainage master plans (ADMP), watercourse master plans, and floodplain delineation studies. An ADMP generally estimates flood potential for a watershed, maps watercourses, identifies existing and potential drainage problems, and develops preliminary solutions and standards for floodplain and stormwater management. Watercourse master plans identify and develop a plan and technical guidance for managing flood hazards, lateral migration of the watercourse, and the cumulative impacts of existing and future development. Floodplain delineation studies demarcate floodplains within the project area.

Because the described waterways constitute obstacles to construction of transportation infrastructure, the results of the above studies will help determine the most cost-effective and accessible transportation alignments throughout the study area. These studies are also being used by the development community; therefore, planned developments along significant drainage corridors should have incorporated any findings or resulting construction issues into their master plans.

Land Subsidence and Earth Fissures

Land subsidence has been identified in several south-central Arizona locations. This phenomenon occurs when water is removed from underground reservoirs and the weight of the overlying material compresses, causing the land to settle. Once compressed, alluvial deposits take up less space than before and the ground surface sinks. The amount of subsidence varies by location. Land subsidence also creates another potential problem: earth fissures. These are cracks in the ground surface that occur because of uneven or differentiated

land subsidence. Depending on circumstances, fissures can form gullies as much as 50 feet wide and 10 to 15 feet deep. Once fissures start to form, they tend to increase in number and length, spreading at uneven speeds and directions for several miles.

The effects of land subsidence and earth fissures can be significant, because they may cause significant damage to infrastructure, increase flooding potential, worsen groundwater pollution, and accelerate soil erosion.

The land between SR-303L and the White Tank Mountains have been identified as having land subsidence and earth fissure problems. Land subsidence and the accompanying earth fissures will probably occur in this area as long as groundwater overdraft continues, although since earth fissures can occur in previously unnoticed areas, when or where new fissures will occur is unpredictable. With the exception of the White Tank Mountains, most the study area is known to have some degree of groundwater depletion, with the greatest depletion occurring on both sides (north and south) of I-10 in the Tonopah area.

Cultural Resources

The study area is located along the Hassayampa River Valley, on the north side of the Gila River drainage west of Phoenix. The environment includes river valley bottoms, desert and uplands, and river terraces above the Gila and Hassayampa Rivers.

This area was likely intensively occupied by the Hohokam between ca. AD 350 and AD 1500. The site of Las Colinas, a late prehistoric "large urban center," is east of the study area. Trade routes west along the Gila River passed along the southern edge of the study area. Likely site types include villages, year-round settlements with populations of more than 100, ball courts, central plazas, and platform mounds; hamlets and smaller year-round settlements; farmsteads (seasonal occupations of small social groups tied closely to larger settlements); and field houses (short-term agricultural sites consisting of a single structure). Hohokam settlement was organized in part into irrigation communities in major drainages, so there would have been irrigation facilities, including canals, and other water control features.

Historic-period sites are likely numerous as well, including farms, irrigation canals and dams, industrial sites such as mines, and transportation-related sites (e.g., the existing railroads). Conservatively, the number of registered sites in the area is likely be in the hundreds, with many more unregistered sites in areas that have been less intensively surveyed.

The locations of cultural sites are protected to prevent vandalism of these resources. Information on these locations is available to qualified specialists through the Arizona State Museum.

Recreational Opportunities

A review of the Maricopa County Trails Plan and the MAG Desert Open Spaces Plan found several trail and land conservation types. Maricopa County defines segments by construction priority for the ultimate Buildout of the interconnected county trail system. MAG identifies scenic trailways and bikeways, and the MAG Open Spaces Plan locates conservation, retention, and secured open space areas. These elements can be found in Figure 2-12. The City of Surprise is currently (January 2007) updating its Alternate Modes Plan, which includes trails, bikeways and pedestrian facilities.

Threatened and Endangered Species

A review of the U.S. Fish and Wildlife Service (FWS) and Arizona Game and Fish Department (AGFD) threatened and endangered species lists for Maricopa County was conducted to determine those species that potentially occur within the project study area. The AGFD provided a Special Species Status letter on July 28, 2006, regarding listed species known to occur within the project study area. Table 2.3 provides a summary of this review.

The general habitat types available within the study area were compared to those species that are known to occur within Maricopa County. A ranking of HIGH, MODERATE, or LOW was assigned to each species based on potential habitat availability. A ranking of LOW means that the species is rare or unlikely to occur within the study area; MODERATE means that the species has a reasonable probability to occur within the

study area; and HIGH means that the species is likely to occur or occurrences have been reported and documented.

Species of Concern and Candidate species are not afforded protection under the Endangered Species Act and have no regulatory listing status. Generally, these categories are identified during listed species reviews, as these species have potential to become listed in the future.

The BLM and U.S. Forest Service (USFS) have identified Sensitive species known to occur on BLM or forest lands in Arizona. Coordination with the BLM and USFS is required to identify potential impacts to these species. The AGFD has identified certain species as Wildlife of Special Concern in Arizona; these species are known to be or may be in jeopardy or face known or perceived threats, including population decline. The Arizona Department of Agriculture Native Plant Law (1993) protects certain plant species from being collected or harvested. This listing includes Highly Safeguarded (HS) species, Harvest Restricted (HR) species, Salvage Restricted (SR) species, Export Restricted (ER) species, and Salvage Assessed (SA) species. The following restrictions apply to species in these categories:

- HS No collection permitted
- HR Permit required for removal of plant by-products
- SR Permit required for collection
- ER Out-of-state transport prohibited
- SA Permit required for live tree removal

Of the species listed in Table 2.3, 11 are federally endangered, 3 are federally threatened, 2 are federally listed candidate species, 27 are Species of Concern, 28 are Wildlife of Special Concern in Arizona, 37 are sensitive BLM or USFS species, and 19 are listed under Arizona's Native Plant Law. (Many belong to more than one category.) The Cactus Ferruginous Pygmy Owl (CFPO) and the Arizona Agave have been delisted by the FWS, but the CFPO listing status is currently being contested in the federal courts. The Bald Eagle was proposed for delisting in February 2006, but is still afforded protection under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Coordination with USFWS and AGFD will be required prior to any type of development (e.g., land use, transportation infrastructure).

Table 2.3 Species Known to Occur within Maricopa County and Potentially within the Project Study Area

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
BIRDS							
American Peregine Falcon	*Falco peregrinus anatum*	SC	WSC	S		Prefers areas near rocky cliffs and permanent water sources. Transient.	MODERATE
Bald Eagle	*Haliaeetus leucocephalus*	T (PDL)	WSC	S		Large trees or cliffs near water with abundant prey.	MODERATE
Belted Kingfisher	*Ceryle alcyon*		WSC			Transient and winter resident of lakes, ponds and rivers.	LOW TO MODERATE
Black-bellied Whistling-duck	*Dendrocygna autumnalis*		WSC			Prefers low edges of lakes, oxbow ponds, wetlands and slow flowing rivers and creeks. Cottonwood, willow and velvet mesquite are usually favored vegetated areas.	MODERATE
Cactus Ferruginous Pygmy-Owl	*Glaucidium brasilianum cactorum*	E (DL)*	WSC			Well-vegetated Sonoran desertscrub and adjacent to densely wooded dry washes. Saguaros and large thorny trees (ironwood, palo verde and velvet mesquite are preferred).	MODERATE
California Brown Pelican	*Pelecanus occidentalis californicus*	E				Coastal land and islands; species found around many Arizona lakes and rivers. Uncommon transient in Arizona.	LOW
Common Black-Hawk	*Buteogallus anthracinus*		WSC	S		Riparian obligates associated with perennial drainages with mature gallery forests of broadleaved deciduous trees.	MODERATE
Great Egret	*Ardea alba*		WSC			Lowland riparian areas with hydrophytic emergent vegetation and cottonwood, willow, mesquite and/or tamarisk areas.	MODERATE
Least Bittern	*Ixobrychus exilis*		WSC			Larger marshes with dense, tall growth of emergent vegetation interspersed with water.	MODERATE
Mexican Spotted Owl	*Strix Occidentalis lucida*	T (CH)	WSC	S		El. 4,100 – 9,000 ft. Nests in canyons and generally dense older forests of mixed conifer or ponderosa pine/gambel oak.	LOW

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
BIRDS							
Mississippi Kite	*Ictinia mississippiensis*		WSC			Lowland riparian woodlands; cottonwoods	LOW TO MODERATE
Osprey	*Pandion haliaetus*		WSC			Open bodies of water containing fish. Wetlands and shorelines of ponds, lakes, reservoirs and rivers. Drainages containing ponderosa pine, fir, cottonwood, maple, box elder, alder and willow.	LOW TO MODERATE
Snowy Egret	*Egretta thula*		WSC			Shallow protected backwaters of lakes, rivers, canals or other wetlands with roosting in nearby trees and shrubs.	LOW TO MODERATE
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E (CH)	WSC	S		Cottonwood/willow and tamarisk vegetation communities along rivers and streams. Distribution in range restricted to riparian corridors.	HIGH
Western Burrowing Owl	*Athene cunicularia hypugaea*	SC			S	Variable in open, well-drained grasslands, steppes, deserts, prairies and agricultural lands. Sometimes in open areas such as vacant lots, golf courses and airports.	MODERATE
White Snowy Plover	*Charadrius alexandrinus nivosus*		WSC	S		Sparsely vegetated alkali flats and drying shores of shallow water impoundments. Generally migrants observed along open shorelines, mudflats, sandbars of reservoirs, ponds and/or rivers.	LOW
Yellow-billed Cuckoo	*Coccyzus americanus*	C	WSC	S		Large blocks or riparian woodlands (cottonwood, willow, or tamarisk galleries).	MODERATE
Yuma Clapper Rail	*Rallus longirostris yumanensis*	E	WSC			Freshwater and brackish marshes. Generally associated with dense emergent riparian vegetation. Requires wet substrate with dense herbaceous or woody vegetation for nesting/burrowing.	MODERATE

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
FISH							
Bonytail Chub	*Gila elegans*	E	WSC			Main stream portions of mid-sized to large rivers, usually over mud or rocks. Can utilize ponded or inundated terrestrial habitats.	LOW TO MODERATE
Desert Pupfish	*Cyprinodon macularius*	E (CH)	WSC			Shallow springs, small streams, and marshes. Tolerate saline and warm water.	LOW TO MODERATE
Desert Sucker	*Catostomus clarki*	SC			S	Gila River basin. Found in rapids and flowing pools of streams and rivers.	LOW TO MODERATE
Gila Chub	*Gila intermedia*	E (CH)				Pools, springs, cienegas, and streams.	LOW TO MODERATE
Gila Longfin Dace	*Agosia chrysogaster chrysogaster*	SC			S	Gila River basin. Intermittent hot low-desert streams to clear/cool brooks at higher elevations.	LOW TO MODERATE
Gila Topminnow	*Poeciliopsis occidentalis occidentalis*	E	WSC			Small streams, springs, and cienegas vegetated shallows.	LOW TO MODERATE
Little Colorado Sucker	*Catostomus sp. 3*	SC	WSC	S	S	Creeks, small to medium rivers and impoundments.	LOW TO MODERATE
Razorback Sucker	*Xyrauchen texanus*	E (CH)	WSC	S		Riverine and lacustrine areas, generally not in fast moving water and may use backwaters. Found in Horseshoe Reservoir.	LOW TO MODERATE
Roundtail Chub	*Gila robusta*	SC	WSC	S		Cool to warm water, mid-elevation streams and rivers. Known to occur in the mainstem and tributaries of the Verde and Salt Rivers, as well as, canals in metropolitan Phoenix.	LOW TO MODERATE
Sonoran Sucker	*Castostomus insignis*	SC			S	Gila River basin. Warm water rivers to trout streams.	LOW TO MODERATE
Speckled Dace	*Rhinichthys osculus*	SC		S		Gila river basin. Bottom dweller in rocky riffles, runs and pools of headwaters, creeks and small to medium rivers.	LOW TO MODERATE

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
AMPHIBIANS							
Great Plain Narrow-mouthed Toad	*Gastrophryne olivacea*		WSC			Mesquite semi-desert grassland to oak woodland in close proximity to streams, springs and rain pools.	LOW TO MODERATE
Lowland Burrowing Treefrog	*Pternohyla fodiens*		WSC			Xeric environments, burrowing in low open mesquite grasslands, usually associated with major washes and arroyos.	LOW TO MODERATE
Lowland Leopard Frog	*Rana yavapaiensis*		WSC	S		Aquatic systems in desert grasslands to pinyon juniper.	LOW TO MODERATE
REPTILES							
Red-back Whiptail	*Aspidoscelis burti xanthonota*	SC		S	S	Santank and Sauceda Mts. in Maricopa Co. Canyons and hills in juniper-oak woodlands, down to Sonoran upland desert habitats.	LOW
Desert Rosy Boa	*Charina trivirgata gracia*	SC		S	S	Rocky areas in desert ranges, especially in canyons with permanent or intermittent streams.	LOW TO MODERATE
Mexican Rosy Boa	*Charina trivirgata trivirgata*	SC			S	Maricopa Mts in Maricopa Co. Rocky mountains or hillsides in desert ranges – granite outcroppings.	LOW
Arizona Skink	*Eumeces gilberti arizonensis*	SC	WSC	S	S	Documented along riparian habitats along perennial reaches of the Hassayampa River and its tributaries below Wickenburg. Rocks, leaf littler near permanent or semi-permanent streams.	HIGH
Sonoran Desert Tortoise	*Gopherus agassizii*	SC	WSC			Primarily on rocky slopes and bajadas of Sonoran desertscrub. Category 3 habitat identified in study area.	HIGH
Arizona Chuckwalla	*Sauromalus ater*	SC			S	Near cliffs, boulders, or rocky slopes. Rocky desert, lava flows, hillsides and outcrops.	LOW TO MODERATE
Northern Mexican Garter Snake	*Thamnophis eques megalops*	SC	WSC	S		Known from the Agua Fria River and the Verde River. Densely vegetated habitats including cienegas, cienega streams, and stock tanks.	LOW

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
INVERTEBRATES							
Maricopa Tiger Beetle	*Cicindela oregona maricopa*	SC		S	S	Sandy stream banks and gravels/clays along streambanks. May occur in seeps or reservoir banks.	LOW
MAMMALS							
California Leaf-nosed Bat	*Macrotus californicus*	SC	WSC	S		Desert below 4,000 ft. elevation. Caves and tunnels. Sonoran desert scrub.	MODERATE
Cave Myotis	*Myotis velifer*	SC		S		Desert scrub of creosote, brittlebush, palo verde and cacti. Roosts in caves, tunnels and mineshafts and under bridges.	MODERATE
Yuma Myotis	*Myotis yumanensis*	SC				Variety of upland and lowland habitats. Prefers cliffs and rocky walls near water. Can have nursery colonies in buildings, caves, mines and under bridges.	MODERATE
Lesser Long-nosed Bat	*Leptonyceteris curasoae yerbabuenae*	E	WSC	S		Desert scrub habitat with agave and columnar cacti. Day roosts in caves and abandoned tunnels.	MODERATE
Greater Western Bonneted Bat	*Eumops perotis californicus*	SC				Lower and upper Sonoran desertscrub near cliffs, preferring rugged rocky canyons with abundance crevices.	LOW TO MODERATE
Pale Townsend's Big-eared Bat	*Corynorhinus townsendii pallescens*	SC				Day roosts in caves and mines from desertscrub up to woodlands and conifer forests.	LOW TO MODERATE
Pocketed Free-tailed Bat	*Nyctinomops femorosaccus*			S		Arid lower elevations usually around high cliffs and rugges rock outcrops.	LOW TO MODERATE
Sonoran Pronghorn	*Antilocapra Americana sonoriensis*	E	WSC	S		Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	LOW TO MODERATE
Western Red Bat	*Lasiurus blossevillii*		WSC			Riparian and other wooded areas. Generally roosts in trees.	LOW TO MODERATE
Western Yellow Bat	*Lasiurus xanthinus*		WSC			May be associated with Washingtonian fan palm, other palms or sycamores, hackberries and cottonwoods.	LOW

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
PLANTS							
Acuna Cactus	*Echinomastus erectocentrus* var. *acunensis*	C	HS			Well-drained knolls and gravel ridges between major washes; granite soils in Sonoran desert scrub association.	LOW
Arizona Agave	*Agave arizonica*	E (DL)	HS			El. 3,000-6,000 ft. Transition zone between oak-juniper woodland & mountain mahogany-oak scrub.	LOW
Arizona Cliffrose	*Purshia subintegra*	E	HS			White soils of tertiary limestone lakebed deposits.	LOW
Arizona Rosewood	*Vauquelinia califonica* ssp. *sonorensis*				S	Desertscrub and desert grassland, in woodland or forest at base of cliffs, along canyon bottoms and on moderate to steep slopes.	LOW
Bigelow Onion	*Allium bigelovii*		SR			Gentle slopes from 2,000 – 5,000 ft elevation. Open, dry rocky soil in grassland and open chaparral, and desert scrub.	LOW
California Barrel Cactus	*Ferocactus cylindraceus* var. *cylindraceus*		SR			Gravelly or rocky hillsides, canyon walls, alluvial fans, and wash margins. Known to occur in the White Mountains, Maricopa Co.	LOW TO MODERATE
Emory's Barrel-cactus	*Ferocactus emoryi*		SR			(None Noted.)	LOW TO MODERATE
Flannel Bush	*Fremontodendron californicum*		SR		S	Known to occur within the Four Peaks-Mazatzal Mts. and Superstition Mts. in Maricopa Co. Dry, north slopes in canyons. Well-drained rocky hillsides and ridges.	LOW
Fish Creek Fleabane	*Erigeron piscaticus*	SC	SR	S	S	Total range in Maricopa County: Fish Creek Canyon, Superstition Mts. Moist, sandy canyon bottoms associated with perennial streams.	LOW
Fish Creek Rock Daisy	*Perityle saxicola*	SC		S		Found in Gila and Maricopa Cos. Near Tonto National Monument, Roosevelt Lake, above Horse Camp Creek (Sierra Ancha Mts.). Xeric habitat on very steep slopes.	LOW

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
PLANTS							
Golden Barrel Cactus	*Ferocactus cylindraceus* var. *eastwoodiae*		SR			(None noted.)	LOW TO MODERATE
Hohokam Agave	*Agave murpheyi*	SC	HS	S	S	Verde River drainage, Bradshaw, McDowell, New River and Wickenburg Mts. Benches or alluvial terraces on gentle bajada slopes above major drainages in desert scrub.	LOW
Kofa Barberry	*Barberis harrisoniana*				S	Sand Tank Mts. Bottoms of deep, shady rocky canyons.	LOW
Organ Pipe Cactus	*Stenocereus thurberi*		SR		S	Sonoran desert; adjacent to thorn forests mostly on hills and bajadas.	LOW
Pima Indian Mallow	*Abutilon parishii*	SC	SR	S		Superstition Mts. Mesic situations in full sun with higher elevation Sonoran desert scrub.	LOW
Ripley Wild-buckwheat	*Eriogonum ripleyi*	SC	SR	S		Near Horseshoe Lake and Chalk Mountain, Maricopa Co. Tertiary lakebeds on well-drained powdery soils derived from limestone, sandstone or volcanic tuffs/ashes.	LOW
Straw-top Cholla	*Opuntia echinocarpa*		SR			Flats, slopes and washes.	MODERATE
Cactus Apple	*Opuntia engelmannii* var. *flavispina*		SR			May occur up to 2,500 ft. elevation in sandy bajadas.	MODERATE
Sweet Acacia	*Acacia farnesiana*			S		Rarely grows in the wild. El. 2,500 to 4,000.	LOW
Tonto Basin Agave	*Agave delamateri*	SC	HS	S		Mazatzal Mts near Sunflower. Usually found atop benches, at edges of slopes, on open hilly slopes in desert scrub, overlooking major drainages and perennial streams. 2,190 – 5,100 ft. Elevation.	LOW
Tourmey Agave	*Agave toumeyana* var. *bella*		SR			4,000 – 5,000 ft. elevation. Rocky slopes in chaparral.	LOW

Table 2.3 - Continued

Common Name	Scientific Name	Status				Habitat Considerations	Potential Occurrence in Project Study Area
		FWS	State	USFS	BLM		
PLANTS							
Tumamoc Globeberry	*Tumamoca macdougalii*		SR	S	S	Xeric situations, in the shade of a variety of nurse plants along gullies and sandy washes of hills and valleys in Sonoran desert scrub.	LOW TO MODERATE
Varied Fishhook Cactus	*Mammillaria viridiflora*		SR			Semidesert grasslands, interior chaparral, pinyon-juniper and oak woodlands, crevices, boulders, canyon sides and gravelly igneous substrates from 4,600-6,600 ft. elevation.	LOW
Zuni Fleabane	*Erigeron rhizomatus*	T				Found in Elevation 7,600–7,700 ft. pinyon-juniper woodlands	LOW

Notes: **E** = Endangered **T** = Threatened **PDL =** Proposed for Delisting **DL** = Delisted
C = Candidate Species **CH** = Designated Critical Habitat **SC** = Species of Concern

WSC = Wildlife of Special Concern **HS =** Highly Safeguarded **SR =** Salvage Restricted
ER = Export Restricted **SA** = Salvage Assessed
HR = Harvest Restricted **S =** Sensitive Plants

*The listing status is being contested in federal court. This species was delisted from the Endangered Species Act in April 2006.

Sources: USFWS. Species list for Maricopa County. Accessed from http://www.fws.gov/arizonaes/Threatened.htm#CountyList. July 25, 2006.
AZGFD. Species in the Arizona HDMS. April 2006. Accessed from http://www.azgfd.gov/w_c/edits/hdms_species_lists.shtml. July 25, 2006 and December 21, 2006.
AGFD. Special Status Species for Interstate 10/Hassayampa Valley Roadway Framework Study. July 28, 2006.

Potential Hazardous Materials Locations

Preliminary information regarding potential hazardous materials in the study area was collected through observation on aerial photographs only. No Initial Site Assessment (ISA) or Phase I Environmental Site Assessment was conducted for any sites within the study area. No properties were identified or evaluated for potential hazardous materials. It is recommended that an ISA, done to ASTM standards, is done for the site of any proposed developments within the Hassayampa Valley Framework Study area.

Four sites in the study area are potential sources of hazardous materials: three vehicle proving grounds and a nuclear power generating station. The vehicle proving grounds are located in the northern portion of the study area. Toyota, DaimlerChrysler and Volvo use them to test new automotive designs and concepts. In reaction to development, DaimlerChrysler has sold its 5,500-acre property to real estate developers. The site, in operation since 1958, will continue to operate as a proving ground until late 2007. The DaimlerChrysler proving ground contains mostly vacant, unimproved land, but also houses office buildings, labs, paved test tracks and other vehicle testing areas. The Volvo facility is located just east of the Luke Auxiliary Airfield, near the alignments of Pinnacle Peak Road and 211th Avenue.

The third proving ground within the study area is owned and operated by Toyota. This facility was established in 1993 and is located sixteen miles west of the DaimlerChrysler proving ground. It covers approximately

12,000 acres and contains a ten-mile paved circular track, ride and handling course, dirt course, straightaway course, brake testing area, steep grade area, and office buildings.

Located in the southwestern portion of the study area is the Palo Verde Nuclear Generating Station (PVNGS). The plant houses three nuclear reactors, all of which are on-line. This makes Palo Verde the second largest power plant in the U.S., while the capacity of reactor unit two makes it the largest nuclear reactor in the U.S. The net capacity of the plant is approximately 4,000 megawatts. The source of coolant water for the three reactors is treated wastewater effluent from neighboring municipalities. The wastewater is stored and treated on-site.

Figure 2-13 displays evacuation routes and planning zones in case of an emergency or nuclear event at the PVNGS. The 10-mile-radius Emergency Planning Zone is illustrated in gray, with the major evacuation routes for all who live or work in this zone. The 50-mile-radius Ingestion Pathway Zone is shown in 10-mile intervals, illustrating the area of potential health effects in case of an event.

Air Quality

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has established air quality standards to protect public health and the environment. EPA has set national ambient air quality standards (NAAQS) for the six primary air pollutants. These criteria pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM10 and PM2.5) and sulfur dioxide (SO_2). Gasoline-powered motor vehicles cause more than three-fourths of the Phoenix area's CO emissions. Arizona has adopted the federal NAAQS as the state Ambient Air Quality standards.

EPA designates an area as nonattainment if it has violated, or has contributed to violations of, the NAAQS over a three-year period. If an area is designated as nonattainment, the Clean Air Act requires the state, local and tribal governments to develop and produce a state implementation plan (SIP) to reduce emissions of the pollutants that exceed federal standards. A SIP is an enforceable plan developed at the state and local level that explains how the area will comply with air quality standards according to the Clean Air Act. The SIP is the cumulative record of all air pollution control strategies, state statutes, state and local rules, and local ordinances implemented under Title I of the Clean Air Act by governmental agencies within the state.

Figure 2-14 maps three air quality nonattainment and maintenance areas, as designated by EPA within the study area. Portions of the study area are classified as non-attainment for ozone and PM10, and as maintenance areas for CO, due to past violations of the NAAQS. This ozone non-attainment area must demonstrate attainment with the 8-hour ozone standard by 2009, and with the 24-hour and annual PM10 standards by December 31, 2006. If, for example, the PM10 standards are not met, a five-percent plan will be invoked, whereby the state would need to update the SIP to demonstrate a five percent annual reduction in PM10 concentrations. On January 5, 2005, EPA redesignated the Phoenix metropolitan area to attainment for CO and approved the attainment demonstration and maintenance plan that shows maintenance of the CO standard through 2015. The Phoenix metropolitan area has not had an exceedance of the CO standard since 1998.

As a result of new EPA regulations and guidelines set forth by the Federal Highway Administration (FHWA), future traffic studies will include an assessment of hazardous air pollutants, such as mobile source air toxics, that could adversely affect local communities. Project components, such as changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to the no-build alternative, will also be evaluated for the potential to create adverse mobile source air toxics.

Public Utilities

Figure 2-15 displays transmission line locations for both the Arizona Public Service (APS) and Salt River Project (SRP) utility companies. These lines range from 69kV to 500 kV. There are seventeen power line receiving stations located throughout the study area, with the largest being the PVNGS, located in the southeast portion of the area.

Five new power lines have been approved for this area. The West Valley North and West Valley South lines run around the northeast side of White Tank Mountain Regional Park, paralleling SR-303L south to

approximately the Buckeye Canal. The Palo Verde Hub to TS-5 line originates at the PVNGS, looping west and following the CAP Canal back east to the TS-5 receiving station. The Palo Verde to Gila Bend and Palo Verde-Pinal West transmission line corridors both originate at the Red Hawk receiving station, near the southern boundary of the study area, but soon leave the study area.

These power line transmission corridors will need to be considered when choosing future roadway alignments, as they are expensive to build and difficult to move. However, many existing and future power line corridors share right-of-way with major transportation and drainage routes.

2.2.4 Existing Land Use

Figure 2-16 illustrates existing land uses in the study area. The following subsections summarize key land uses and activity centers in the study area portions of Buckeye, Glendale, Goodyear, Surprise, and unincorporated Maricopa County.

Town of Buckeye

Almost the entire MPA of Buckeye lies within the study area. North of I-10, much of this land is undeveloped, except a large expanse of open space and some low-density residential development south of White Tank Mountain Regional Park. A large number of community master plans are approved in this area north of I-10, however. South of I-10, the Buckeye MPA is a combination of open space along the Hassayampa and Gila rivers, agricultural land between the RID Canal and the Gila River, undeveloped land just south of I-10, and scattered industrial uses. The open space category includes all active and passive open space, cemeteries, and golf courses. Small pockets of residential and commercial development exist at major arterial intersections, as well as in the downtown Buckeye area on both sides of MC-85 east of Miller Road.

City of Glendale

A small portion of the Glendale MPA is located within the study area from Perryville Road east, between Peoria Avenue and Camelback Road. This area is a combination of low-density residential development and open space. These uses generally support Luke Air Force Base, located just east of SR-303L.

City of Goodyear

All of the Hassayampa study area south of Camelback Road and east of Perryville Road is located in the northwestern quadrant of the Goodyear MPA. Goodyear has traditionally been an agricultural community and much of its land is still used for agricultural purposes, along with open space near the Gila River and pockets of low-density residential and commercial development dispersed near arterial intersections.

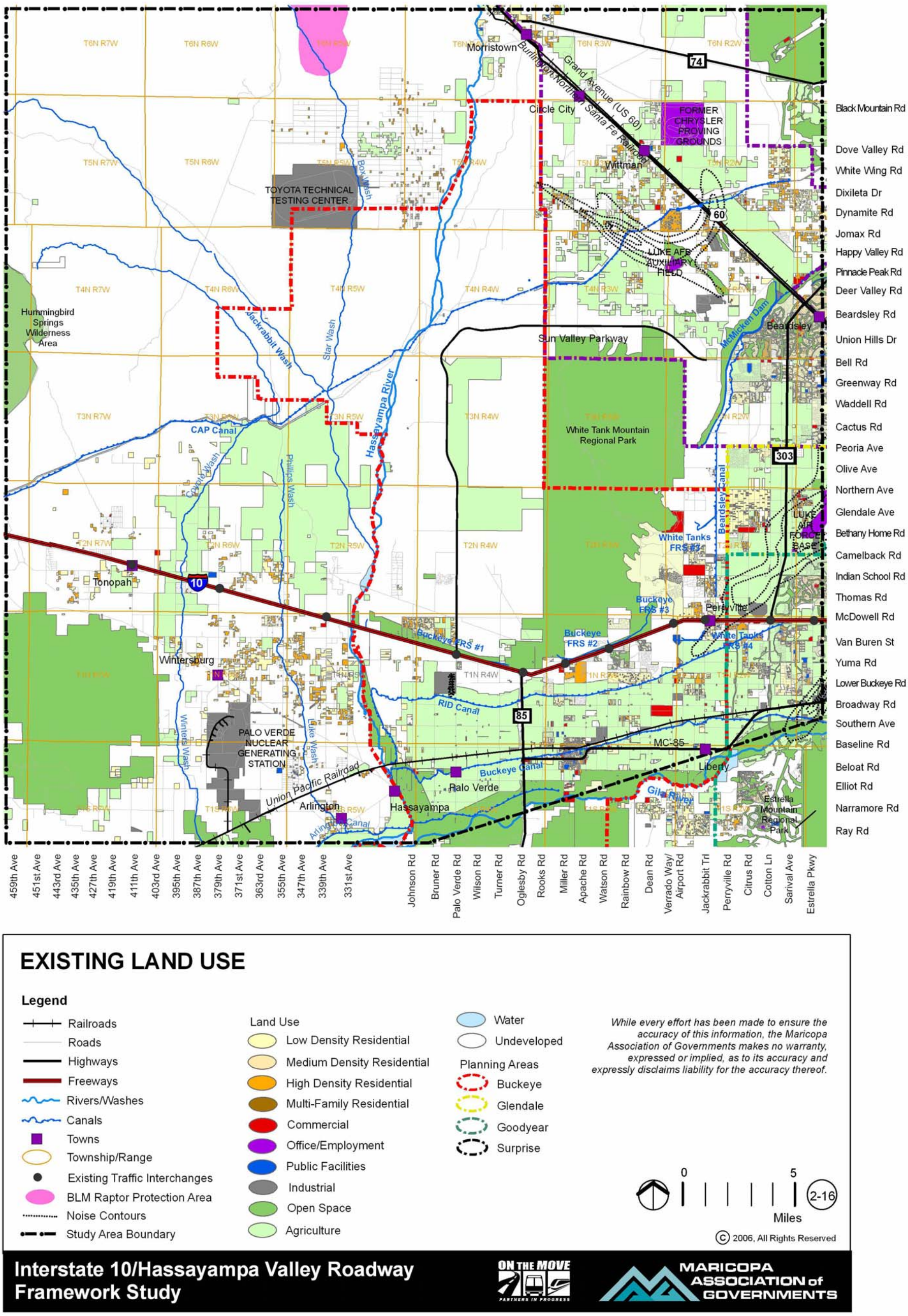
City of Surprise

The western portion of the Surprise MPA is included in the Hassayampa study area, including land east of 255th Avenue and north of Peoria Avenue. North of US-60, much of the land is either devoted to ranching or is undeveloped. A General Plan Amendment has recently been submitted for the former DaimlerChrysler Proving Grounds to convert this facility into a mixed-use center of residential and commercial development. The area south of US-60 spanning SR-303L is intensely developed with residential, commercial and open space. South of US-60, and north and west of the McMicken Dam, the area is a combination of open space, flood retention and undeveloped land, with small pockets of residential and commercial development. A Luke Air Force Base Auxiliary Field is located in this area, at approximately Happy Valley Road and 219th Avenue.

Maricopa County

Areas of unincorporated Maricopa County include White Tank Mountain Regional Park and all land west of the Buckeye MPA. Most of this land is currently undeveloped, with the exception of the Toyota Technical Testing Center and the PVNGS. Some scattered low-density residential development exists south of I-10 near unincorporated Wintersburg. White Tank Mountain Regional Park and Hummingbird Springs Wilderness Area are large tracts of protected open space.

Figure 2-16 Existing Land Use



2.2.5 Future Land Use

Figure 2-17 depicts planned future land use, based on the adopted general plan of each jurisdiction. Each city's general plan covers not just the area within its current limits, but its entire MPA, typically including land currently unincorporated but envisioned for annexation in the future. As Figure 2-17 shows, most of the land east of the Hassayampa River lies within the MPA of a city or town, whereas most of the land west of the river falls outside any MPA. Because this map represents anticipated Buildout conditions, the "undeveloped" category from Figure 2-16 no longer exists. In addition, much of the land shown as "agricultural" under existing conditions is designated as residential, commercial, office/employment, or mixed-use in Figure 2-17. Substantial territory will be preserved as open space, including land along the Hassayampa and Gila rivers south of I-10, White Tank Mountain Regional Park, state land south of the park, Hummingbird Springs Wilderness Area, and a large patch of open space south of Tonopah.

The following subsections summarize key land uses and activity centers in the study area portions of Buckeye, Glendale, Goodyear, Surprise, and unincorporated Maricopa County. All of these jurisdictions have updated (or are updating, in the case of Buckeye) their general plans to reflect the 1998 Growing Smarter and 2000 Growing Smarter Plus legislation, which strengthened general plan requirements by adding four new elements: Open Space, Growth Areas, Environmental Planning, and Cost of Development.

Town of Buckeye

The Town of Buckeye is currently updating the Buckeye General Plan and Development Code. The majority of the land north of I-10 will consist of planned developments (i.e., master-planned communities) which will have a combination of residential, commercial, mixed-use, open space, and office/employment land uses. Many planned developments will exist south of I-10, but greater emphasis will be placed on large employment centers and higher-density residential development, as opposed to self-contained master-planned communities. At the Buckeye General Plan Charrette Visioning Forum on May 13 through May 17, 2006, participants sketched out a vision of Buckeye consisting of several villages, linked through an interconnected system of open space and transit. These connections will occur in the town centers of the villages or master-planned communities. The Buckeye airport will expand as a major employment center, and the majority of existing open space near the confluence of the Hassayampa and Gila rivers will be preserved.

City of Glendale

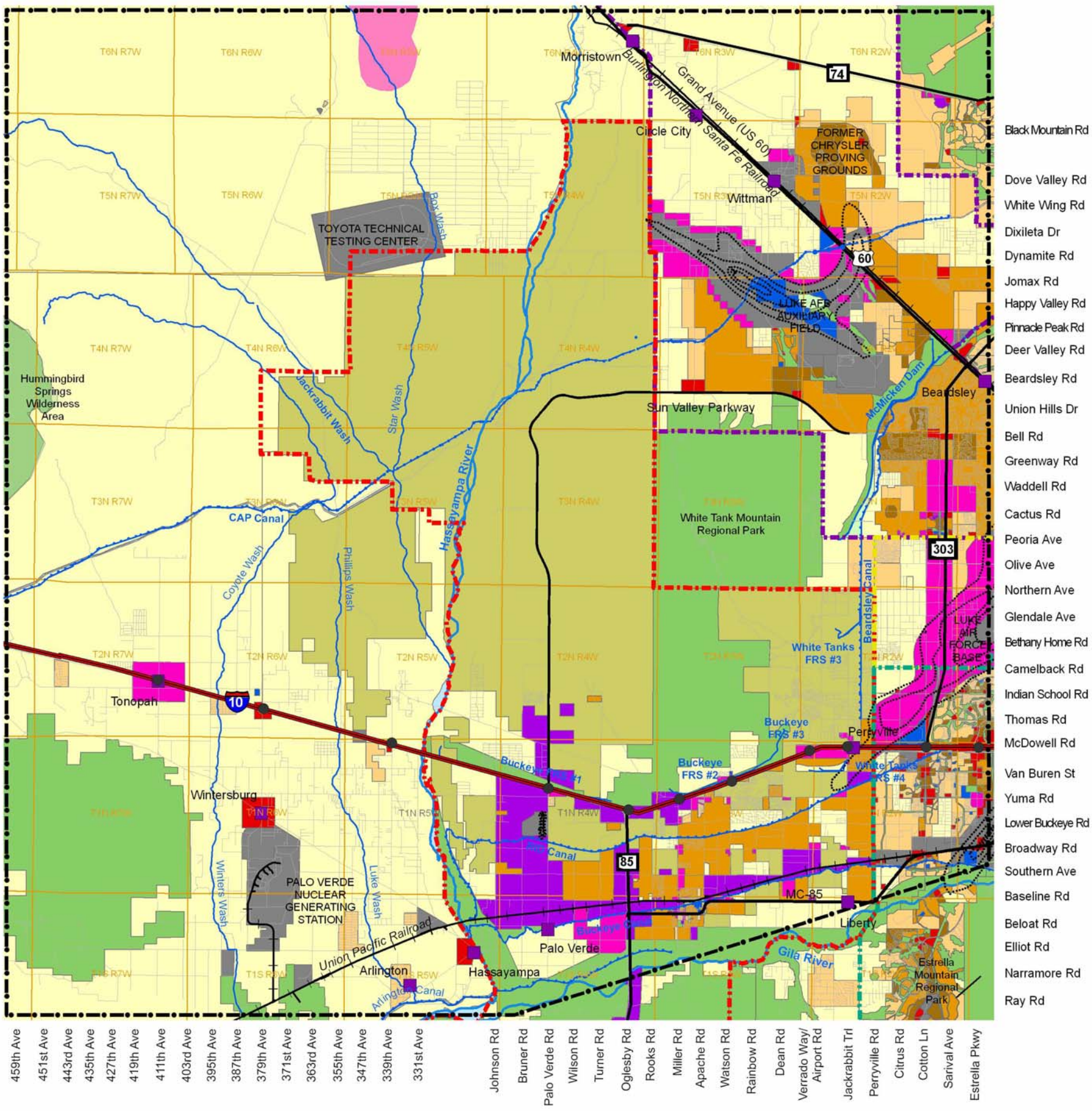
The Glendale General Plan identifies two growth areas pertinent to the project. The Luke Compatible Growth Area seeks to restrict residential and business development around Luke Air Force Base. The area is planned, strategically, to accommodate low concentrations of non-military activity. The SR-303L corridor, west of Luke Air Force Base, is expected to become a hub for commercial and employment activity.

City of Goodyear

The Goodyear MPA will continue developing with a mix of residential and commercial land uses. Land along the Union Pacific Railroad will tend to be industrial, while land along the Gila River will be preserved as open space.

The Goodyear General Plan identifies two growth areas within the project limits, the I-10 corridor and the Gila River corridor. The I-10 corridor spans a zone one mile wide on either side of I-10. This area is expected to include residential, employment, and support services. The corridor is projected to contain a Buildout population of nearly 34,000, with more than 11 dwelling units per acre and an employment base of approximately 28,500 jobs. The Gila River corridor spans an area approximately one-half mile wide on each side of the river. This area is projected to include residential, employment and open space land uses, developed in a manner environmentally compatible with the river. The corridor is projected to contain a Buildout population of over 12,400 and an employment base of approximately 2,500 jobs.

Figure 2-17 Future Land Use



City of Surprise

The Surprise General Plan shows the following growth areas within the Hassayampa project limits:

- Grand Avenue (US-60) – SR-303L: This growth area is designated as an important commercial and employment center, maximizing economic development opportunities at the intersection of these two major transportation corridors. The SR-303L corridor will also be the focus of a future transit local route, providing a connection to and from the economic activity centers along Bell Road.
- Jomax Road – Grand Avenue: This area is almost at the geographic center of the Surprise MPA and is expected to have a high degree of mixed-use development, including a regional commercial and employment center and high-density residential development. Many people are expected to live, work and shop in this area.
- Grand Avenue – 211th Avenue: Planned as a major activity center, with intermodal freight (BNSF Railroad) facilities, commerce, employment and educational institutions.
- Jomax Road – 163rd Avenue: This area is optimal for high-technology firms or the development of a university-type research park. It is the only major employment-designated area in the MPA that does not have any noise or vibration constraints from aircraft or the BNSF railroad.
- Sun Valley Parkway – 211th Avenue: This area is expected to grow as a residential center with a mix of medium, medium-high and high-density residential development. This is an attractive area because of the substantial open space and viewsheds provided by the White Tank Mountains.
- 243rd Avenue – Sun Valley Parkway: Because of its proximity to White Tank Mountain Regional Park, this area is anticipated to become the site for high-end, low-density residential development for residents with higher incomes. Resort development will be targeted for this area, along with high-end retail and commercial activities.
- SR-303L Corridor: Some fairly intense development is expected along this corridor, including medium-density residential, commercial, employment, and mixed-use areas. As in many other portions of the study area, a complete arterial roadway system and other new infrastructure will have to be built to accommodate new residents and businesses. This area will also serve as the southern gateway to Surprise.

According to the future land use map in the Surprise General Plan, north of US-60 Surprise will consist primarily of residential development with small commercial and employment nodes along this highway. South of US-60, a large area of office/employment and mixed-use development will surround the Luke Air Force Base Auxiliary Field, bordered on the north by low-density residential development and on the south by medium- and high-density residential. Land along the McMicken Dam will be retained as open space. The portion of the city south of US-60 on both sides of SR-303L will continue to develop as a relatively dense residential and mixed-use area.

Maricopa County

The Maricopa County Comprehensive Plan indicates three General Plan Development Areas (GPDA), or growth areas. A GPDA is an unincorporated area that is likely to be annexed by a city or town in the future, and is therefore included in an adopted municipal general plan (and in the MPA for that municipality). These areas within the county include all land in the Buckeye MPA south of I-10, land spanning US-60 west of SR-303L in the Surprise MPA, and land spanning Sun Valley Parkway, also in the Surprise MPA. Urban growth area plans have been described for all of these areas in the preceding future land use descriptions for cities and towns.

Based on the Comprehensive Plan, unincorporated Maricopa County west of the Hassayampa River is expected to have mainly low-density residential development, with only small nodes of dense mixed-use development. The Toyota Technical Testing Center and the Palo Verde Nuclear Generating Station are expected to become areas of high employment. Tonopah (unincorporated) will become an area of mixed-use development, while Wintersburg will become a regional commercial center.

2.2.6 Public Land Management

Public lands in the study area are managed by both the ASLD and the BLM. The ASLD has authority over state lands until they are sold or leased, when planning authority is handed over to the appropriate city or county. BLM retains planning authority and control over its lands and rarely sells them to private entities, but will participate in land swaps in order to accumulate larger masses of land or release BLM-owned islands.

Three public land management studies are currently (January 2007) underway in the study area (Figure 2-18). The ASLD is studying land holdings west of the White Tank Mountains for future auction. This project is called the White Tanks Land Use Master Plan and will seek to help guide future development of these lands. The BLM is completing a Resource Management Plan and Environmental Impact Statement for a large portion of land in southwest Maricopa County, including all land south of I-10 in the study area. This study will guide the intensity of human interaction with the land in and around the Sonoran Desert National Monument.

The third study is a BLM project: the Phoenix South Planning Area Resource Management Plan (RMP) and Environmental Impact Statement (EIS). The management plan includes BLM lands bordering the Sonoran Desert National Monument, south of the Hassayampa study limits. The RMP will establish the amount of human interaction with the natural environment and the appropriate and allowable uses. Generally speaking, the overarching vision of the BLM is to retain an open and functioning desert ecosystem while still filling multiple-use needs.

2.2.7 Master Planned Communities

As of August 2006, at least 100 master-planned communities were planned within the study area. These communities are at various stages of development, with a general east-to-west growth pattern. The City of Surprise has an even balance of privately-owned lands and state land. Surprise's planning area has many small communities planned, but much of the private land is still open to new development proposals. North of I-10, the Town of Buckeye is almost entirely entitled with large master-planned communities. South of I-10, on the other hand, many smaller scattered communities are planned.

With the exception of Maricopa County's Belmont and Whispering Ranch master-planned communities, few developments are currently planned outside the municipal planning areas west of the White Tanks. Much of this land is owned by the BLM, which essentially precludes future large-scale development.

Planned Communities Development Overview and Implications

Figure 2-19 shows all of the planned residential developments known within the study area in August 2006. This map depicts approximately 100 planned developments, currently at various planning stages. More detailed information on each of these communities can be found in Table 2.4. Pertinent information was gathered from developers and local jurisdictions. The study team made every effort to obtain accurate and complete information up to August 15, 2006.

Figure 2-18 Public Land Management Studies

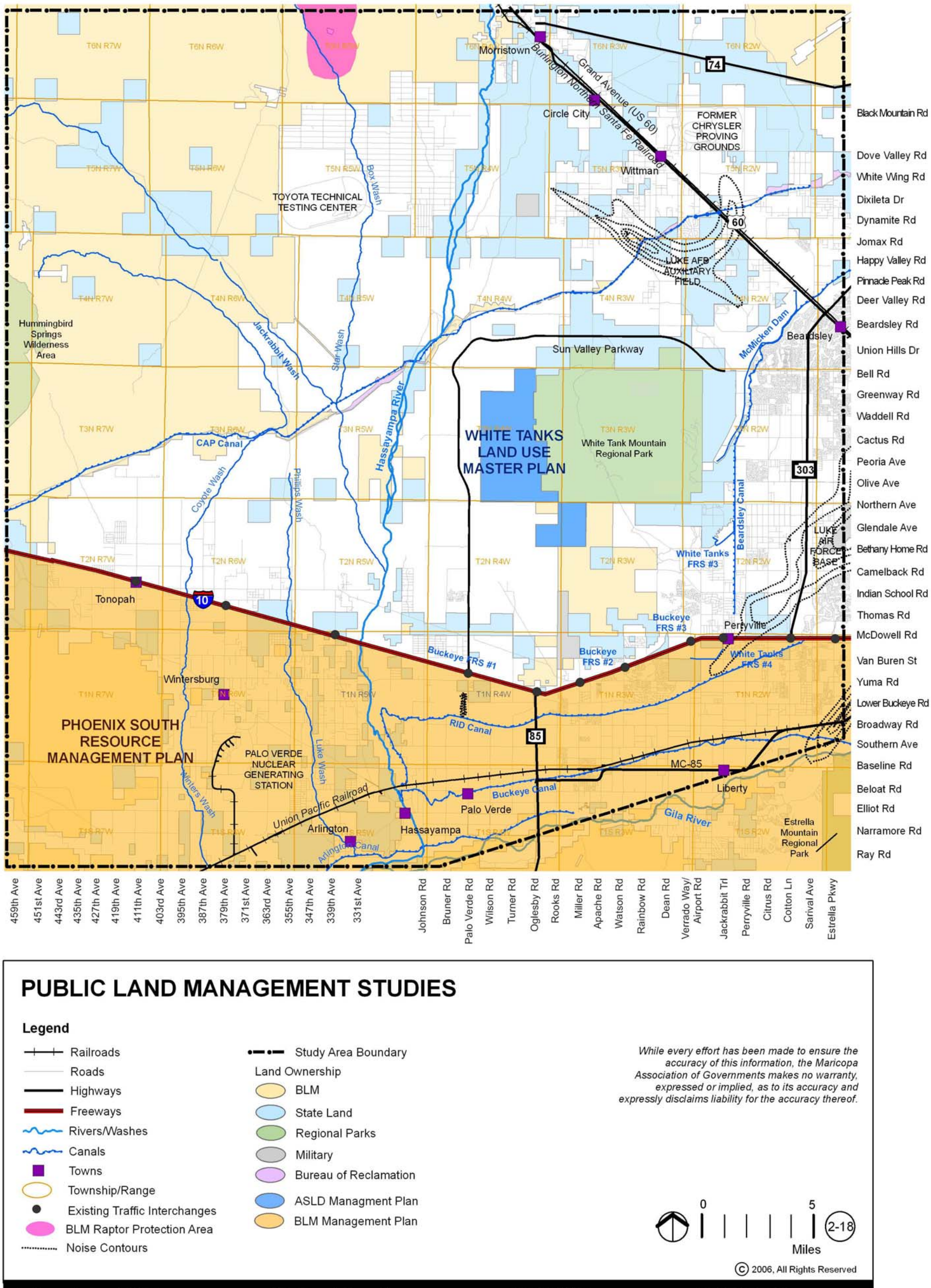


Figure 2-19 Study Area Planned Developments and Land Ownership

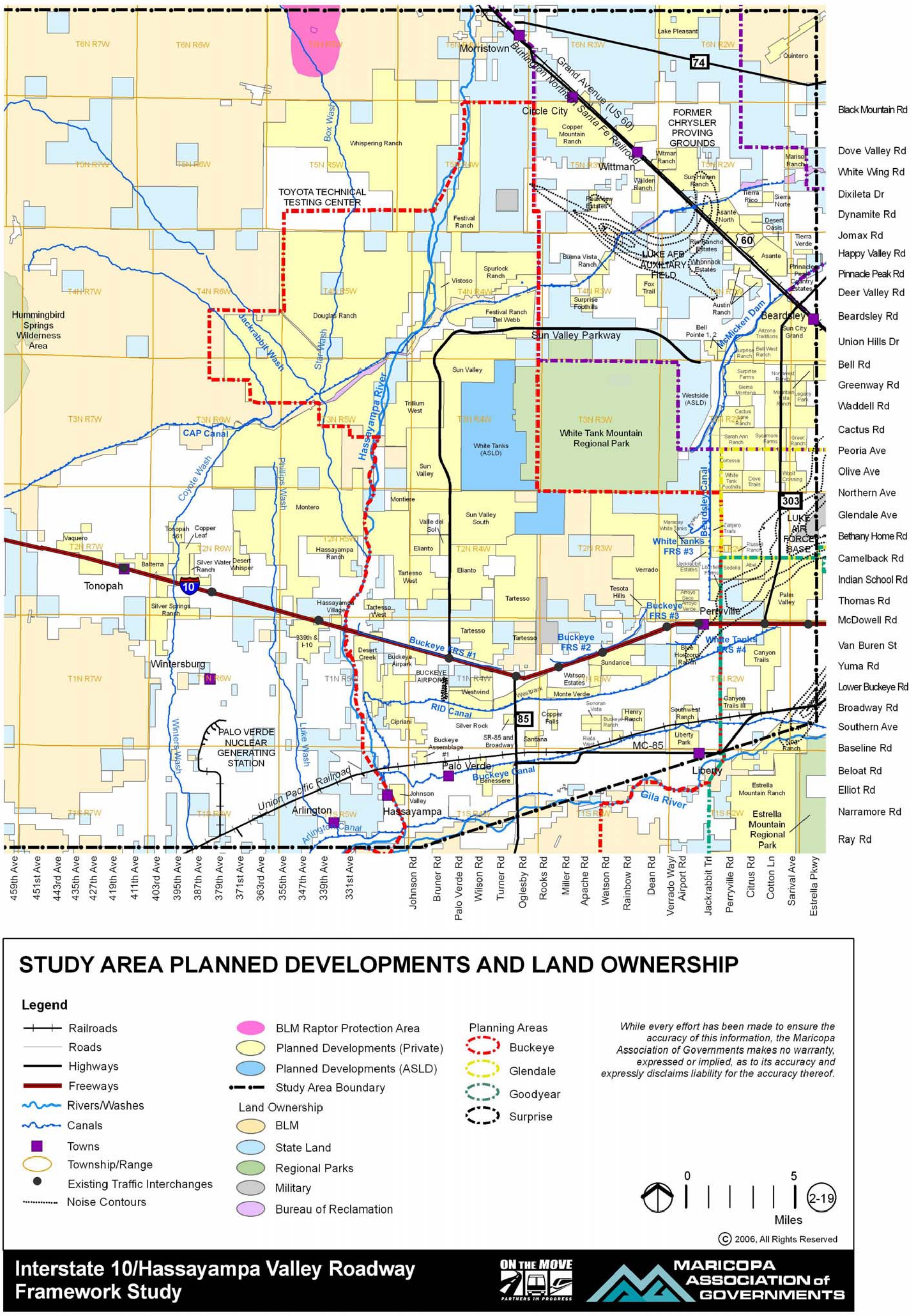


Table 2.4 Hassayampa Valley Master Planned Communities

Name	Status	Total Acres	Total Dwelling Units	Commercial/ Employment Acres	Schools			Target Density* (du/acre)
					Elementary Schools	Middle Schools	High Schools	
Buckeye MPA								
Benessere	Proposed	1,100	3,800	unknown	unknown	unknown	unknown	unknown
Blue Horizons	Approved	565	2,225	26	1	0	0	3.94
Cipriani	Proposed	2,362	6,453	187	5	0	1	2.73
Copper Falls	Approved	275	857	43	0	0	0	3.12
Desert Creek	Proposed	2,234	8,490	245	3	0	1	5.50
Douglas Ranch	Approved	35,250	84,034	2,472	27	0	6	2.39
Elianto	Approved	3,751	12,501	143	4	0	1	unknown
Festival Ranch	Approved	10,105	24,176	unknown	unknown	unknown	unknown	2.40
Henry Park	Proposed	430	1,655	unknown	unknown	unknown	unknown	3.85
Monte Verde	Proposed	860	2,991	38	0	0	1	3.30
Montierre	Approved	477	2,065	unknown	unknown	unknown	unknown	3.50
Sienna Hills (formerly Tesota Hills)	Approved	444	1,302	3	0	0	0	2.59
Silverock	Approved	1,241	5,397	83	3	0	0	4.35
Southwest Ranch	Approved	457	1,560	126	0	0	0	3.41
Spurlock Ranch	Approved	2,840	7,329	270	4	1	1	2.58
Sun Valley	Approved	16,266	41,370	413	26	0	4	3.26
Sun Valley Villages I, II	Proposed	5,770	17,536	669	11	0	2	3.28
Sun Valley South	Approved	11,200	29,200	1,265	4	0	0	2.93

Table 2.4 - Continued

Name	Status	Total Acres	Total Dwelling Units	Commercial/ Employment Acres	Schools			Target Density* (du/acre)
					Elementary Schools	Middle Schools	High Schools	
Sundance	Approved	2,016	6,862	222	3	0	0	3.40
Tartesso	Approved	13,000	50,000	57	4	0	1	3.56
Tartesso East, Amendment 2	Approved	5,780	23,270	110	4	0	1	4.03
Tartesso West, Amendment 1	Approved	5,124	19,667	189	10	0	1	3.84
Trillium	Approved	3,042	8,762	108	4	0	1	2.88
Valle del Sol	Proposed	320	1,129	40	0	0	0	4.0
Ventana Ranch (Buckeye Farms)	Approved	319	1,050	89	0	0	0	3.34
Verrado	Approved	8,800	14,080	600	1	1	1	1.60
Westpark	Approved	1,060	3,895	165	3	0	0	3.30
Westwind	Proposed	807	3,000	39	2	0	0	3.72
Maracay White Tanks 320	Proposed	318	1,020	0	0	0	0	3.20
Surprise MPA								
Austin Ranch	Future	850	2,240	18	1	0	0	2.64
Austin Ranch II	Proposed	175	674	25	0	0	0	3.84
Arizona Traditions	Under Construction	532	1,769	unknown	0	0	0	3.33
Asante	Future	1,508	6,703	101	2	0	0	4.40
Asante North	Proposed	2,106	6,000	232	3	0	0	4.26
Bell Pointe 1	Under Construction	106	405	unknown	0	0	0	3.82
Bell Pointe 2	Proposed	27	155	3	0	0	0	6.17

Table 2.4 - Continued

Name	Status	Total Acres	Total Dwelling Units	Commercial/ Employment Acres	Schools			Target Density* (du/acre)
					Elementary Schools	Middle Schools	High Schools	
Bell West Ranch	Under Construction	286	1,100	unknown	0	0	0	3.85
Buena Vista Ranch	Proposed	353	10,169	22	unknown	unknown	unknown	3.02
Copper Mountain Ranch	County	unknown	10,000	unknown	unknown	unknown	unknown	unknown
Desert Oasis	Under Construction	890	3,520	unknown	unknown	unknown	unknown	3.96
Fox Trail	Future	877	2,320	30	unknown	unknown	unknown	2.65
Grand Vista	Future	7,500	22,000	unknown	unknown	unknown	unknown	2.90
Lake Pleasant	County	5,000	9,800	unknown	unknown	unknown	unknown	1.96
Marisol Ranch	Approved	634	2,070	unknown	unknown	unknown	unknown	3.26
Peakview Estates	County	483	244	13	unknown	unknown	unknown	1.98
Prasada	Approved	3,355	4,495	1,225	3	0	0	4.51
Rio Rancho Estates	Future	194	863	34	unknown	unknown	unknown	4.44
Sarah Ann Ranch	Imminent	320	960	unknown	unknown	unknown	unknown	3.00
Sierra Montana	Under Construction	776	2,635	unknown	unknown	unknown	unknown	3.40
Sierra Norte	Proposed	160	374	unknown	unknown	unknown	unknown	unknown
Sun City Grand	Completed	3,723	9,510	114	0	0	0	2.55
Sunhaven Ranch	Approved	2,116	8,001	375	3	0	0	3.78
Surprise Farms	Under Construction	1,415	4,405	unknown	1	0	1	3.11
Surprise Foothills	Proposed	1,089	2,129	unknown	unknown	unknown	unknown	1.96
Surprise Ranch	Proposed	200	662	unknown	unknown	unknown	unknown	3.31
Sycamore Farms	Imminent	637	1,177	226	unknown	unknown	unknown	1.85

Table 2.4 - Continued

Name	Status	Total Acres	Total Dwelling Units	Commercial/ Employment Acres	Schools			Target Density* (du/acre)
					Elementary Schools	Middle Schools	High Schools	
Tierra Rico	Proposed	80	177	0	0	0	0	2.21
Walden Ranch	Proposed	520	1,761	29	unknown	unknown	unknown	3.39
Whonnock Estates	Proposed	40	154	unknown	unknown	unknown	unknown	3.85
Witman Ranch	County	577	1,570	unknown	1	0	0	2.72
Zanjero Trails	Proposed	831	3,525	18	1	0	0	4.42
Maricopa County MPA								
Balterra	Proposed	1,110	6,100	161	1	0	0	5.50
Belmont	Approved	20,800	72,800	2,059	16	4	2	3.50
Copper Leaf	Proposed	1,280	3,986	204	2	0	0	3.10
Desert Whisper	Proposed	961	3,505	43	1	0	0	3.88
Hassayampa Ranch	Approved	2,066	5,707	36	2	0	0	2.67
Hassayampa Village	Proposed	160	unknown	96	unknown	unknown	unknown	unknown
Silver Springs Ranch	Proposed	2,389	8,086	152	1	0	1	3.38
Silver Water Ranch	Proposed	529	2,077	37	0	0	0	3.50
Tonopah 561	Proposed	561	2,902	102	1	0	0	5.17
339th & I-10	Proposed	1,290	4,276	180	1	0	0	2.67
Goodyear MPA								
King Ranch	Approved	2,000	5,712	86	2	0	0	2.86

*Does not necessarily equal "Total Dwelling Units" divided by "Total Acres."
Source: Community Master Plans/Land Use Maps 2002-2006; table compilation complete as of August 15, 2006.

Developments east of the White Tank Mountains generally follow existing arterials and section lines, fitting into the larger grid network. Developments west of the White Tanks are typically larger and have created their own internal circulation patterns, not coinciding with any established roadway network or grid (which typically does not exist this far west). A key objective of this study is to develop an arterial roadway framework in this area to allow access between these communities, and between the Hassayampa Valley and other areas. However, the topography west of the White Tank Mountains, with its many washes and hills, will not easily conform to the traditional one-mile arterial grid network that has worked well throughout the Phoenix metropolitan area.

This study will also define access to I-10 and other high-capacity transit corridors. Currently, only Belmont and Douglas Ranch have a defined strategy in their master plans for routing a high-capacity transportation corridor through the community. The developers envision this route as the future CANAMEX Corridor, which will follow the 347th Avenue alignment through the center of the Belmont community, departing to the north over the CAP Canal. North of Belmont, Douglas Ranch has planned its town center and large-scale, mixed-use development along this route.

Major Master Planned Communities Summaries

Adjacent to and west of the White Tank Mountains, the planned developments are much larger than those farther south or east. A more in-depth review of six of the largest developments appears below and in Table 2.5, which uses information from Table 2.4 for a simple comparison of these developments.

Table 2.5 Major Master-Planned Communities Summary

Name	MPA	Total Acres	Total Dwelling Units	Target Density (du/acre)*
Belmont	Maricopa County	20,800	72,800	3.5
Douglas Ranch	Buckeye	35,250	84,034	2.39
Sun Valley	Buckeye	16,266	41,370	3.26
Sun Valley South	Buckeye	11,200	29,200	2.93
Tartesso	Buckeye	13,000	50,000	3.56
Verrado	Buckeye	8,800	14,080	1.6

*Gross area density; does not necessarily equal "Total Dwelling Units" divided by "Total Acres."

Source: Community Master Plans/Land Use Maps 2002-2005.

- Belmont: The master plan for Belmont was developed in 1991, with an expected Buildout timeframe of 40 to 50 years. It is composed of 25 residential villages developed for various market segments. Each village will have a distinct community node, generally focused around a school and a neighborhood park. A village center in the center of Belmont will contain extensive regional employment and service industries. Belmont will have a variety of housing types, with the neighborhoods least dependent on the employment center (i.e., retirement neighborhoods) to be developed first. Later residential development will include suburban-style single-family development, rental, and luxury housing. Belmont has planned for alignment of the proposed CANAMEX route through the village center.

- Douglas Ranch: The master plan for Douglas Ranch was developed in 2001. The development covers approximately 36 square miles with 27 planning areas, each developed around a school and neighborhood park. Many large wash corridors such as Jackrabbit Wash run through the development, leading to a land use plan with ample open space and looping roadways. The majority of the community will be composed of low-density residential development, with higher densities concentrated around the town center, located at the intersection of Douglas Parkway and Wickenburg Highway. This area, as well as the entire Wickenburg Highway corridor, is part of a CANAMEX land use corridor, which will contain much commercial and mixed-use development. The town center will also have a transit center to accommodate eventual bus and rail service.

- Sun Valley/Sun Valley South: The master plans for Sun Valley and Sun Valley South were developed in 2001. These communities span Sun Valley Parkway from approximately Bethany Home Road to Union Hills Drive. Villages will be grouped around school sites, with small areas of neighborhood commercial development. Larger commercial development will be located near arterial intersections, with a large urban center located in Sun Valley South near the intersection of Sun Valley Parkway and Glendale Avenue. Located at the edge of the White Tank Mountains, many open space corridors are planned, including several golf courses. Sun Valley will be composed of primarily medium-density residential development, with slightly lower densities in Sun Valley South.

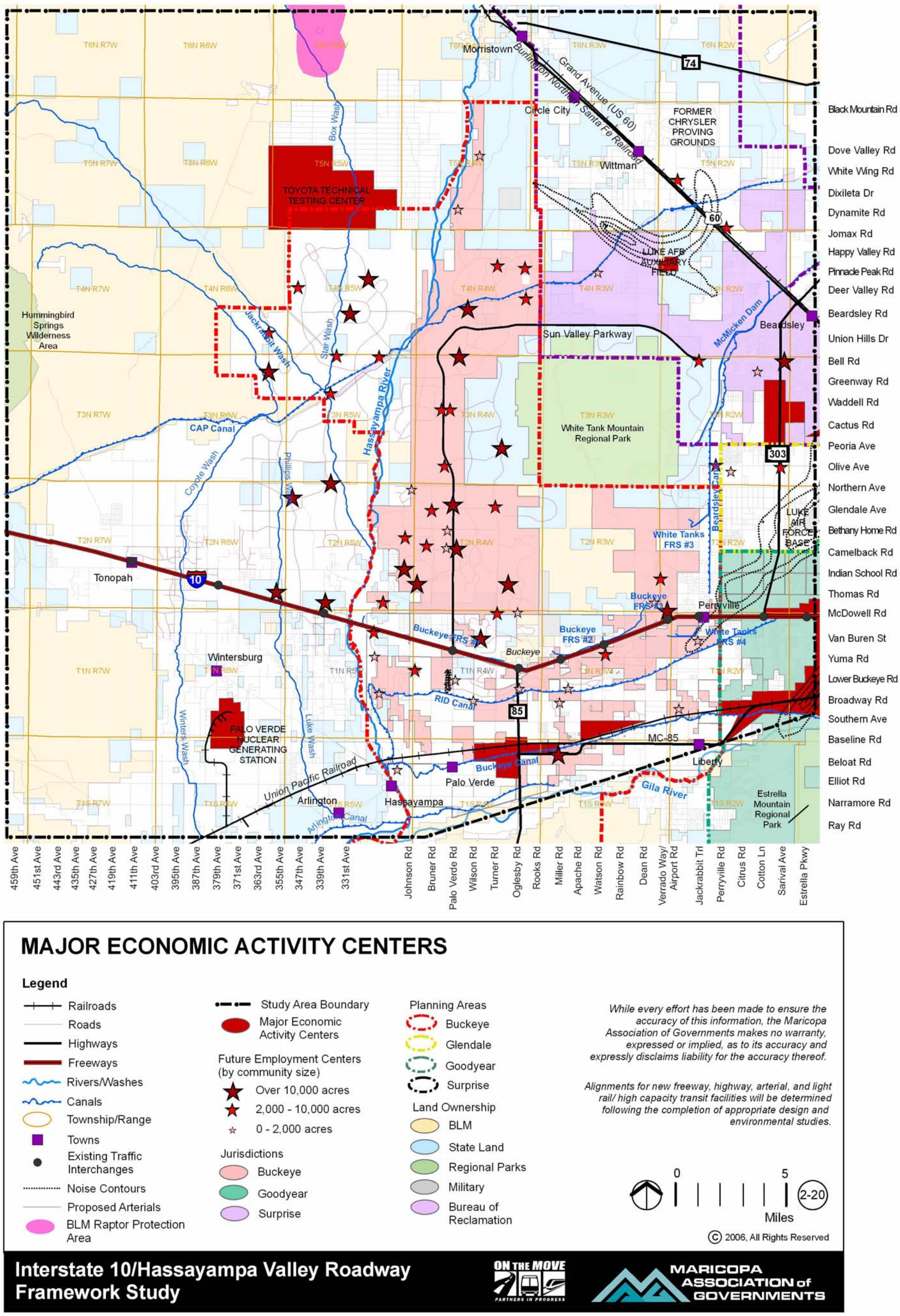
- Tartesso: The master plan for Tartesso was developed in 2002. Tartesso consists of several tracts of land on both sides of Sun Valley Parkway, south of both the Sun Valley and Sun Valley South communities. Development, which will cluster around neighborhood parks and schools, will consist primarily of medium- to high-density residential development, but with lower densities and more open space at the base of the White Tank Mountains. The Tartesso Town Center, to be located just north of I-10 at Sun Valley Parkway, will accommodate several shopping centers, two large employment complexes, a lifestyle center similar to Scottsdale's Kierland Commons, an auto mall, a movie theater, hospital, hotels, and higher-density residential development.

- Verrado: Located at the southern base of the White Tank Mountains, Verrado broke ground in 2002. The community is known for its "neo-traditional" style of architecture and urban development, a style that fosters interaction between neighbors and a quaint atmosphere, achieved through a dense town center, closely spaced houses, front porches and parks. The Verrado Main Street District is located at approximately the Camelback Road alignment and Verrado Way. This walkable area contains loft apartment living, shops, services, and restaurants. Another commercial node is located closer to I-10. Residential development is concentrated in the southern/central part of the development, as the northern portion is too steep because of the White Tank foothills. Much of this more mountainous area will be preserved as open space, with a resort, golf courses, and large estate residential development.

Major Employment Centers

Figure 2-20 maps significant employment centers in the study area. Except for some existing facilities (the Luke Air Force Base Auxiliary Air Field, the Toyota Technical Testing Center and PVNGS), major employment centers will be located along high-capacity transportation corridors such as I-10, SR-303L and MC-85. This pattern is likely to continue west as development spreads. The larger master-planned communities are also likely to have "town centers" serving as hubs of employment and other economic activity.

Figure 2-20 Major Economic Activity Centers



2.3 Related Studies and Reports

This section summarizes 26 studies considered pertinent to the Interstate 10-Hassayampa Valley Roadway Framework Study. They are grouped according to status: completed (within the last ten years), in progress, and future. Transportation studies are summarized in Chapter 4.

2.3.1 Completed Studies

1. West Valley South Power Line and Substation Project

Date Completed: December 2003
Lead Agency: APS
Author: URS Corporation

Purpose of Study: This study sought to respond to the increasing demand for electricity in the West Valley by expanding electrical services in Avondale, Buckeye, Glendale, Goodyear, Litchfield Park and Maricopa County. The goal of the project was to site substations and power lines in locations that minimize impacts to the natural and human environment.

Study Area: The area studied is bounded by approximately Thunderbird Road on the north, Baseline Road on the south, Oglesby Road on the west and 99th Avenue on the east.

Process: A comprehensive and detailed inventory of existing and future land uses, scenic resources, and other environmental factors was conducted. This environmental analysis was done in conjunction with an aggressive community involvement plan. Each alternative substation site and power line route was then evaluated by resource specialists to assess the potential impact of each alternative on land uses, scenic views, historic/archaeological sites and biological resources. After all potential substation sites and power line routes were assessed; they were ranked by level of impact.

Recommendations Relevant to the Study Area: The preferred system will allow APS to consolidate some 69kV and 230kV transmission lines on the same structures. The line will run north along Perryville Road from approximately Southern Avenue to Bethany Home Road, moving west to Tuthill Road and again north to Olive Avenue, where it will run east along Olive Avenue to the SR-303L alignment. The power line will then follow SR-303L south to Campbell Avenue, where it will loop west to meet up with the Perryville Road alignment. This option contains five new power line substations.

2. West Valley North Power Line and Substation Project

Date Completed: May 2005
Lead Agency: APS
Author: URS Corporation

Purpose of Study: This study was an extension of the West Valley South Power Line and Substation Project, also seeking to expand electrical services in the West Valley, while siting substations and power lines in locations that minimize impacts.

Study Area: The study area extended from approximately Jomax Road on the north to Northern Avenue on the south and from Sun Valley Parkway on the west to Reems Road/US-60 on the east.

Process: A comprehensive and detailed inventory of existing and future land uses, scenic resources and other environmental factors was conducted. This environmental analysis was done in conjunction with an aggressive community involvement plan. Each alternative substation site and power line route was then evaluated by resource specialists to assess its potential impact on land uses, scenic views, historic/archaeological sites and biological resources. After all potential substation sites and power line routes were assessed, they were ranked by level of impact.

Recommendations Relevant to the Study Area: The preferred system begins at Olive Avenue, paralleling SR-303L north to Cactus Road, and then proceeds west to one-half mile east of the Jackrabbit Trail

(195th Avenue) alignment. From there, the route continues north to approximately Beardsley Road, where it jogs west three-fourths of a mile, then north to Deer Valley Road, and west again to 243rd Avenue. Finally, it jogs north (following an existing fiber optic installation) to the CAP Canal, which it follows westerly to terminate at the proposed substation.

3. Palo Verde Hub to TS-5 500 kV Transmission Line Project

Date Completed: June 2005
Lead Agency: APS
Author: Environmental Planning Group

Purpose of Study: This study planned electrical transmission infrastructure to bring bulk power into the high growth area west of the White Tank Mountains. The project also will strengthen the entire APS transmission system by providing an additional high-voltage transmission source to the Phoenix metropolitan area, allowing importation of power from generating sources at or around the PVNGS.

Study Area: The study area has an irregularly shaped border that extends approximately four miles north of the CAP Canal, four miles south of the PVNGS, two miles west of Harquahala Valley Road, and two miles east of Sun Valley Parkway.

Process: In addition to general land use and environmental analysis, because this power line was proposed to be partially located on federal land, adherence to the National Environmental Policy Act was required, causing APS to work with the BLM to file right-of-way application and conduct an Environmental Assessment (EA). A public involvement program was conducted simultaneously with the EA.

Recommendations Relevant to the Study Area: The recommended transmission line will begin at the Palo Verde Hub at either the PVNGS or the Arlington Valley Energy Facility, and proceed northwest for approximately 20 miles to the north side of the CAP Canal. The line will then turn east and parallel the canal for approximately 23 miles, terminating at the new TS-5 Substation near the Hassayampa Pumping Plant along the canal.

4. Buckeye Conceptual Planning

Date Completed: June 2000
Lead Agency: Arizona State Land Department (ASLD)
Author: BRW, Inc.

Purpose of Study: This report outlined the needs for state lands within the Buckeye MPA for the year 2020, based on population and employment projections.

Study Area: The MPA of the Town of Buckeye.

Process: The study used several allocation models to predict the amount of employment, residential dwelling units and population in the year 2020. The mapping and socioeconomic analyses were also used to estimate future conditions in the study area.

Recommendations Relevant to Study Area: The Final Conceptual Plan outlines land use for approximately 19,900 acres of developable state lands in Buckeye. There are projected to be approximately 55,000 dwelling units accommodating a population of 128,000 in the year 2020. This future development includes 1,936 acres of commercial and employment uses and areas for potential affordable housing.

5. El Rio Watercourse Master Plan

Date Completed: March 2006
Lead Agency: FCDMC
Author: Stantec Consulting Inc.

Purpose of Study: The plan is intended to examine a range of flood control management plans that will foster maintenance and enhancement of the Gila River.

Study Area: The plan encompasses a segment of the Gila River from its confluence with the Agua Fria River westward to its crossing of SR-85.

Process: Development of the plan entailed identification of flood and erosion hazards, a definition of river characteristics, incorporation of stakeholder concerns, minimization of future spending of public funds, and consideration of environmental characteristics and multiple-use activities. Several plans were considered and evaluated based on public safety, social, economic, and environmental criteria.

Recommendations Relevant to Study Area: The final recommended alternative was a combination of soft-structural and non-structural elements with resource vegetation management. These elements were designed to prevent erosion and follow the 100-year floodway.

6. Padelford Wash Floodplain Delineation Study

Date Completed: 2002
Lead Agency: Flood Control District of Maricopa County (FCDMC)
Author: A-N West, Inc.

Purpose of Study: This study was conducted to create a new detailed floodplain analysis of Padelford Wash.

Study Area: The area of Padelford Wash lies between the CAP Canal on the south and SR-74 on the north, approximately along the 163rd Avenue roadway alignment.

Process: Development of the plan entailed identification and delineation of floodplain corridors within the assigned study area.

Recommendations Relevant to Study Area: This study provided a more detailed drainage analysis for this corridor to assist in development feasibility studies.

7. Offsite Emergency Response Plan for Palo Verde Nuclear Generating Station

Date Completed: Unknown
Lead Agency: Maricopa County
Author: Maricopa County Emergency Management Department

Purpose of Study: This plan was created to ensure a coordinated response to protect the public from the effects of radiation exposure in the event of an incident having offsite consequences.

Study Area: The response plan considers all land within a 50-mile radius of the PVNGS, which is located on 4,080 acres near Wintersburg.

Process: This plan outlines necessary responses and communications in case of a serious event. Two emergency planning zones (EPZ) surround PVNGS: the Plume Exposure Pathway EPZ and the Ingestion Exposure Pathway EPZ. The Plume Exposure Pathway EPZ covers a 10-mile radius around the PVNGS and includes evacuation routes for residents. The Ingestion Exposure Pathway EPZ has a 50-mile radius, denoting the area in which food or potable water could become contaminated as a result of a release of radioactive materials into the atmosphere.

Recommendations Relevant to Study Area: The Plume Exposure Pathway EPZ outlines evacuation routes from the PVNGS in case of a nuclear event. These evacuation routes follow existing arterial and high-capacity roadways within the Hassayampa study area, including I-10, Buckeye-Salome Road, 355th Avenue, Wintersburg Road, Elliot Road and Old US 80.

8. Maricopa County Eye to the Future – White Tank/Grand Avenue Area Plan

Date Completed: 2000
Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: This plan was compiled to provide one cohesive document in which regional growth and development conditions are addressed and analyzed. It is intended to prepare for growth over the next 15 to 20 years.

Study Area: Boundaries of the planning area encompass 760 square miles and include all or parts of the following communities: Avondale, Buckeye, El Mirage, Glendale, Goodyear, Litchfield Park, Peoria, Surprise, Youngtown, Sun City, Sun City West, Wittman, Circle City and Morristown (the last five are unincorporated). The boundaries extend from approximately SR-74 on the north to the Gila River on the south, and from the eastern limit of the Town of Buckeye on the west to Lake Pleasant Road on the east.

Process: This study is an updated consolidation of two previous sub-area studies: the White Tank/Agua Fria Policy and Development Guide and the Grand Avenue Area Plan, published in 1982 and 1992. They were combined into one document so that regional considerations could be identified, analyzed and addressed.

Recommendations Relevant to Study Area: Goals formulated at the conclusion of the study include integration of land use development with transportation systems and the natural environment; promotion of public health, safety and welfare; roadway improvements to accommodate future needs; and encouragement of the use of transit and alternative transportation modes.

9. Maricopa County Eye to the Future – Tonopah Arlington Area Plan

Date Completed: September 2000
Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: This study incorporates new and current issues in an update of the previous area plan, which was intended to guide decisions by the Planning and Zoning Commission, Board of Supervisors, policymakers and the private sector.

Study Area: The planning area for this study encompassed the communities of Tonopah and Arlington.

Process: Tonopah and Arlington were addressed as individual planning areas.

Recommendations Relevant to Study Area: Many of the policy recommendations in the area plan evolved from pre-existing plans within Maricopa County that were adapted to fit the Tonopah/Arlington area. The main transportation objective is the establishment of a countywide circulation system providing safe, convenient and efficient movement of goods and people. The plan recommends, among numerous policies, the development of alternative modes of transportation, maintenance of existing roadways, improved Interstate highway access, and provision of all-weather travel over washes.

10. Maricopa County Eye to the Future – State Route 85 Corridor Area Plan

Date Completed: November 2002
Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: The plan was intended to prepare for and accommodate growth throughout the SR-85 corridor for the next ten to twenty years.

Study Area: The study area covers approximately 360 square miles and encompasses SR-85 from I-10 to I-8. The corridor also includes land up to five miles east and west of SR-85, stretching into the towns of Buckeye and Gila Bend.

Process: This corridor plan sets goals, objectives and policies in land use, transportation, environment, economics, growth areas, open space, water resources and cost that will be used to guide development along SR-85. The plan will be re-evaluated and updated periodically.

Recommendations Relevant to Study Area: Future land uses of the area within the Hassayampa study area (a six-mile segment of SR-85 from I-10 to the Gila River) will include two commercial centers to the west of SR-85 near the El Paso Natural Gas Line Road; and a mix of dedicated open space, rural residential, large lot residential, and industrial employment centers. Recommendations include upgrading the existing two-lane SR-85 to a four-lane highway, as well as concentrating urban development around the Town of Buckeye.

11. Maricopa County Eye to the Future – Rainbow Valley Area Plan

Date Completed: January 2003
Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: This study is an update of a previous area study. It was initiated in response to rapid growth in Rainbow Valley, the evolution of new issues, the availability of new mapping data, and legislation that required new planning elements.

Study Area: Rainbow Valley is bounded by Rainbow Road on the west, Citrus Road on the east, Southern Avenue on the north, and El Paso Natural Gas Line Road on the south.

Process: This plan contains a series of goals, objectives, and policies used to define development standards, guide public investment, and guide public and private decision-making. Residents and stakeholders presented new planning objectives and the old study area was expanded to incorporate new development.

Recommendations Relevant to Study Area: Priorities in the plan, reflecting public input, center on preservation of open space and a rural lifestyle. Most of the planning area overlapping with the Hassayampa study area is intended to be used for low-density or large-lot residential development. The public also expressed concern with access across the Gila River and the environmental impacts of growth in general and all-terrain vehicles in particular.

12. Maricopa County Regional Trail System Plan

Date Completed: August 2004
Lead Agency: Maricopa County
Author: Maricopa County Trail Commission

Purpose of Study: This study created a regional planning framework for a 1,521-mile trail network for pedestrians, equestrians, bicyclists, and other non-motorized trail users, expanding upon existing and planned trail systems and seeking to provide connections between municipalities, trails, parks, and neighborhoods, as well as to provide open space corridors to protect natural and cultural resources.

Study Area: Maricopa County.

Process: The Maricopa County Trail Commission was formed in February 2000 to help form a regional trail system, using established trail routes and identifying future trail corridors throughout Maricopa County. The 1,521 miles of the Maricopa County Regional Trail System are organized into segments and priorities that will serve as a guide for implementing the trail plan.

Recommendation Relevant to Study Area: The Hassayampa study area contains portions of various proposed trail systems. The Priority 1 segments, including portions of the Beardsley Canal and Gila River floodplain, are part of the Sun Circle Trail or the Maricopa Trail. Priority 2 segments are important regional corridors that connect to the Maricopa Trail and may provide connections to regional park systems, such as trails along I-10 and Buckeye-Salome Road. Priority 3 segments are regional corridors that are not currently key components of the regional trail system, but may become important future trails. Examples are the RID Canal, the Hassayampa River and the CAP Canal. Most Priority 4 trails are conceptual corridors in outlying areas of Maricopa County, including several in the Hassayampa study area.

13. Estrella Mountain Ranch/Goodyear General Plan Amendment

Date Completed: March 2006
Lead Agency: Newland Communities
Author: DMJM Harris

Purpose of Study: This narrative describes the elements of, and justification for, a Major General Plan Amendment within the City of Goodyear to establish a transportation framework for the master-planned community of Estrella Mountain Ranch, including arterial roadway and transit options, as well as a plan for the extension of SR-303L south of I-10 and across the Gila River.

Study Area: Estrella Mountain Ranch Master-Planned Community in Goodyear.

Process: This document has been submitted to the City of Goodyear for City Council approval in December 2006.

Recommendations Relevant to Study Area: The proposed SR-303L alignment follows the east side of Waterman Wash, south to I-8 through a combination of privately owned and BLM land. This alignment is open to change, however, as the Hidden Valley Regional Transportation Study will begin in early 2007. This study will mirror the Hassayampa study, exploring potential roadway connections south of the Gila River from 459th Avenue to approximately I-10. Alignment possibilities may demonstrate alternative routes for SR-303L, such as creating a north-south connection to I-8 in Pinal County or an east-west connection to I-10 near Maricopa, either north or south of the Ak-Chin Indian Community.

14. Palo Verde to Pinal West Transmission Project

Date Completed: 2004
Lead Agency: SRP
Author: Greystone Environmental Consultants

Purpose of Study: This study is a result of the Central Arizona Transmission System Study to determine new power line transmission capacity for central Arizona. The objective is to analyze system reliability, capacity and increasing demand for energy delivery in Arizona, and to plan for any additional required transmission. The project began as one, but was subsequently divided in two, Palo Verde to Pinal West (PV-PW) and Pinal West to Southeast Valley/Browning (PW-SEV/BRG). The latter is outside the Hassayampa study area.

Study Area: The study area follows the El Paso Natural Gas Line Road alignment on the south, bordering the Sonoran Desert National Monument, and extends for approximately six miles north and east of this alignment, originating at the Hassayampa Substation and terminating at the Pinal West substation.

Process: An extensive siting process was conducted to determine the most appropriate location for the power line, involving a land use and environmental analysis as well as an extensive public outreach program.

Recommendations Relevant to the Study Area: Only a portion of the recommended alternative falls within the Hassayampa study area. The preferred 500 kV transmission line alignment runs south from the Red Hawk substation until it meets El Paso Natural Gas Line Road, and then follows this rural road to the Pinal West Substation.

2.3.2 Current Studies

15. Palo Verde Hub to North Gila 500 kV Transmission Line Project

Lead Agency: APS
Author: Environmental Planning Group

Purpose of Study: This project will site a new 500 kV transmission line that will provide the electrical transmission infrastructure to import additional generation resources from the power plants in and around the Palo Verde Hub (agglomeration of the PVNGS and Hassayampa, Red Hawk, Arlington, and Mesquite substations) into the Yuma area, which is experiencing high growth. The project will also improve the reliability of the APS electric system in the Yuma area by providing an additional high-voltage transmission source to that region

Study Area: The study area extends from the La Paz/Yuma County line on the north to the Barry M. Goldwater Air Force Range on the south, and from the Colorado River on the west to the Palo Verde Hub on the east.

Implications for the Hassayampa Study Area: The recommended alternative in the EA shows the transmission line running southwest from the Palo Verde Hub and following the Union Pacific Railroad line west of the Signal Mountains toward Yuma.

Project Status: The EA will be complete in summer 2006, with a Finding of No Significant Impact and a Record of Decision expected in fall 2006. A Certificate of Environmental Compatibility will be then be submitted to the State of Arizona, with approval expected by spring 2007.

16. White Tanks Master Land Use Plan

Lead Agency: ASLD
Author: URS Corporation

Purpose of Study: This study will illustrate a conceptual land use plan for state land holdings west of White Tank Mountain Regional Park. This plan is being prepared to help guide future development and auction of these lands.

Study Area: Adjacent state land parcels west of White Tank Mountain Regional Park.

Implications for the Hassayampa Study Area: The recommended land use plan will eventually be incorporated into the Town of Buckeye General Plan. Understanding the vision for these lands will help in assessing locations and determining classifications for future roadways in this area. The preliminary draft calls for mostly low-density residential development, with areas of commercial and employment along the extensions of Peoria Avenue, Cactus Road and Waddell Road, west of the White Tank Mountains. Turner Road would also be extended north, weaving through the state lands as a major north-south arterial roadway.

Project Status: Draft White Tanks Master Land Use Plan published in May 2006.

17. West Side Study Area Conceptual Plan, White Tanks

Lead Agency: ASLD
Author: ASLD

Purpose of Study: This study will illustrate a conceptual land use plan for state land holdings north and east of White Tank Mountain Regional Park. This plan is being prepared to help guide future development and auction of these lands.

Study Area: State land parcels adjacent to the north and east sides of White Tank Mountain Regional Park.

Implications for the Hassayampa Study Area: The recommended land use plan will eventually be incorporated into general plans for Maricopa County and the City of Surprise. Understanding the vision for these lands will help in assessing locations and determining classifications for future roadways in this area. The preliminary draft shows areas of high commercial development along Sun Valley Parkway/Bell Road, as well as commercial and high-density residential development along Northern Avenue, near the eastern edge of White Tank Mountain Regional Park.

Project Status: Preliminary Conceptual Plan draft published in May 2006.

18. Phoenix South Planning Area Resource Management Plan (RMP) and Environmental Impact Statement (EIS)

Lead Agency: Department of the Interior
Author: BLM, Phoenix Field Office

Purpose of Study: The overarching vision of the BLM in creating a RMP for the Phoenix South Planning Area is to retain an open and functioning desert ecosystem while still fulfilling multiple-use needs.

Study Area: The Phoenix South Planning Area covers approximately 8.8 million acres in Maricopa, Pinal and Pima counties. It comprises all of the land south of I-10 in the Hassayampa study area.

Implications for the Hassayampa Study Area: The management plan will include criteria identified for special status species, grazing management, fire management, mineral and energy resources, land, realty and recreation. Issues raised during the scoping process also address preservation of visual resources, transportation and access needs, utility corridor development, and socioeconomic impacts of land use. All of these factors will be used to determine the amount and capacity of public use on BLM land.

Project Status: A Draft EIS was expected to be released to the public in late fall 2006.

19. Buckeye Sun Valley Parkway Area Drainage Master Plan (ADMP)

Lead Agency: FCDMC
Author: FCDMC

Purpose of Study: This ADMP will identify known and potential flooding and erosion hazards in the Buckeye/Sun Valley area. It will estimate flood potential for watersheds, map watercourses, identify existing and potential drainage problems, and develop preliminary solutions and standards for sound floodplain and stormwater management.

Study Area: The watershed for the study area is generally bounded by Gates Road to the north, the White Tanks Mountains and the Dean Road alignment to the east, the Gila River to the south, and the Hassayampa River to the west, covering approximately 280 square miles.

Implications for the Hassayampa Study Area: This study will identify areas of flooding and drainage concerns, especially relative to new development in the study area. FCDMC will offer both structural and nonstructural alternative solutions to reduce flooding hazards.

Project Status: This project began in June 2003 and the data collection phase is complete.

20. Loop 303 Corridor/White Tanks ADMP

Lead Agency: FCDMC
Author: URS, Logan Simpson Design

Purpose of Study: This ADMP will identify existing drainage issues and provide alternative stormwater management plans in a north/south regional drainage corridor. These plans will be coordinated with the development of SR-303L.

Study Area: The study will analyze of approximately 220 square miles of watershed from the McMicken Dam south to the Gila River, and from the White Tank Mountains east to the Agua Fria River.

Implications for the Hassayampa Study Area: The study will identify drainage problems, update the existing hydrology, and develop cost-effective solutions for a storm water collection and disposal system. It will also identify potential outfall alternatives.

Project Status: An alternative was selected in October 2003 using a series of channels and basins to convey flows to the Gila and Agua Fria Rivers by maximizing the use of existing flood control facilities. The project area adjacent to SR-303L will be modified to reflect the upgrade of SR-303L from a parkway to a freeway.

21. Lower Hassayampa Watercourse Master Plan

Lead Agency: FCDMC
Author: J.E. Fuller Hydrology and Morphology

Purpose of Study: This watercourse master plan will identify and develop a plan and technical guidance for managing flood hazards, lateral migration of the watercourse, and cumulative impacts of existing and future development.

Study Area: The study area generally includes the floodplain and erosion hazard areas of the lower Hassayampa River, extending from the confluence with the Gila River on the south to the CAP Canal on the north--including the confluence of Jackrabbit Wash with the Hassayampa River.

Implications for the Hassayampa Study Area: This project will determine future land uses and the width of the lower portion of the Hassayampa River. Recommendations may include bridge crossings, channelization, and relationships to adjacent residential or commercial development.

Project Status: Phase 1, Existing Studies Inventory, is complete. Phase 2, the development of the master plan, will begin in January 2007.

22. Wittman ADMP

Lead Agency: FCDMC
Author: Entellus

Purpose of Study: The purpose of the Wittmann ADMP is to identify potential solutions to mitigate existing flooding problems and anticipate future ones associated with impending development. The goal of this study is to keep ahead of development and identify mostly non-structural flood control solutions for the area.

Study Area: The study area is composed of approximately 308 square miles in unincorporated Maricopa County, Peoria, Surprise and Buckeye, beginning at approximately Peoria Avenue on the south, extending north into Yavapai County, and generally following Douglas Ranch Road and McMicken Dam as the western and eastern boundaries.

Implications for the Hassayampa Study Area: This study will assess issues associated with McMicken Dam and the CAP Canal, anticipate future potential drainage problems, and generate "Rules of Development" with policies, standards, and guidelines to help guide development in this area.

Project Status: A consultant was selected in March 2006 and data collection is underway. This project is expected to take approximately 2.5 years to complete.

23. Maricopa County Eye to the Future – McMicken Dam Scenic Corridor Guidelines

Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: This study is intended to provide policies that will guide development along a scenic corridor, by maintaining the vision of the Maricopa County Regional Trail System and the natural environment of washes, vegetation, and wildlife.

Study Area: The scenic corridor extends southwest for 9.5 miles from Grand Avenue to Peoria Avenue along McMicken Dam. The project area encompasses land within one-fourth mile of the property owned by FCDMC.

Implications for the Hassayampa Study Area: Maricopa County policies favor leaving existing conditions intact. The guidelines favor preservation of sensitive natural habitats, the use of open space as a development buffer, and imparting a southwestern character to development. Building height, signage, lighting and fencing are to be limited.

Project Status: A draft version of the report was published in March 2006.

24. Buckeye General Plan Update

Lead Agency: Town of Buckeye
Author: Partners for Strategic Action

Purpose of Study: This study is an update of the Town of Buckeye's General Plan, completed in 2001. The General Plan and the Town's Development Code will be completely rewritten to reflect recent and projected growth trends in the area, including the many entitled master-planned communities that are expected to make Buckeye one of Arizona's largest cities.

Study Area: Buckeye MPA.

Implications for the Hassayampa Study Area: This study will establish a transportation plan and update the current zoning plan within this MPA, which lies almost completely within the Hassayampa study area.

Project Status: This project began in March 2006, with expected completion in the spring of 2007.

2.3.3 Future Studies

25. Luke Wash ADMP

Lead Agency: FCDMC
Author: To be determined

Purpose: The purpose of this study is to identify flooding hazards and develop alternatives for mitigating them. The study will incorporate development plans for the area and jurisdictional drainage policies to develop a preferred solution.

Study Area: The study will include an analysis of approximately 115 square miles, with the northern limit just north of the CAP Canal, the southern boundary at the Gila River, the eastern limit along the Hassayampa River and Jackrabbit Wash, and the western boundary west of 163rd Avenue.

Expected Date of Initiation: January 2007

26. Upper Daggs/Star Wash Floodplain Delineation Study

Lead Agency: FCDMC
Author: To be determined

Purpose of Study: This study will upgrade approximately 75 linear miles of existing floodplains and tributaries of Daggs and Star washes to provide the county with improved floodplain mapping and analysis.

Study Area: The Upper Daggs/Star Wash study area is located immediately west of the Hassayampa River and north of the Patton Road alignment.

Expected Date of Initiation: Summer 2006

2.4 References Cited

Arizona Game and Fish Department. 2006. Species in the Arizona HDMS. April 2006. Accessed from http://www.azgfd.gov/w_c/edits/hdms_species_lists.shtml.

Arizona Game and Fish Department. 2006. Letter to Jessica Popp. Special Status Species for Interstate 10/Hassayampa Valley Roadway Framework Study. July 28, 2006.

Cabeza Prieta Natural History Association. Sonoran Desert Plants. Opuntia engelmannii var. flavispina. Obtained from http://cabezaprieta.org/plant_page.php?id=1640 on April 11, 2007.

eFloras. Flora of North America. Opuntia engelmannii Salm-Dyck ex Engelmann var. flavispina. FNA Vol. 4, Page 136. Obtained from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415198 on April 11, 2007.

United States Fish and Wildlife Service. 2006. Species list for Maricopa county. Access from http://www.fws.gov/arizonaes/Threatened.htm#CountyList.

U.S. Department of Agriculture. Natural Resources Conservation Service. Plants Database. PLANTS Profile. Opuntia engelmannii Salm-Dvck ex. Engelm. Var. flavispina (L.Benson) Parfitt & Pinkava. Obtained from http://plants.usda.gov/java/profile?symbol=OPENF on April 11, 2007.

_____. Flora of North America. Mammillaria viridiflora (Britton & Rose). FNA Vol. 4, Page 251. Obtained from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415355 on April 11, 2007.

Interstate 10 – Hassayampa Valley Roadway Framework Study

Chapter 3

Evaluation Framework

September 2007

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

Prepared by

DMJM HARRIS | AECOM

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3.1 Goals

The evaluation criteria for roadway network alternatives in the I-10/Hassayampa Valley study area are designed to meet the following goals, which were developed by the MAG Study Team in collaboration with the Funding Partners and Study Review Team:

- ***Safety:*** Develop and maintain a safe transportation system for all users.
- ***Mobility:*** Provide for the rapid and efficient movement of people and goods within the study area, as well as between the study area and other portions of the region and the state.
- ***Access:*** Provide access to high-capacity roadways for study area residents, businesses and activity centers, including mixed-use centers.
- ***Planning Consistency:*** Ensure that the recommended roadway network is consistent with established local plans, whether public or private.
- ***Environmental Compatibility:*** Develop a transportation system that avoids undue disturbance of the natural, physical and human environment.
- ***Cost:*** Minimize the overall cost of the roadway network
- ***Ease of Implementation:*** Recommend an alternative or concept plan that can be implemented with minimal opposition from stakeholders and without undue legal or institutional obstacles.
- ***Cost/Benefit:*** Minimize the cost per unit of user benefit (i.e., vehicle miles of travel).

3.2 Evaluation Criteria and Performance Measures

Table 3.1 lists the evaluation criteria and performance measures associated with each goal. The evaluation criteria are designed to measure the expected attainment of various aspects of a particular goal. The number of criteria per goal ranges from one to eight. This variation reflects both the inherent complexity of each goal and the amount of data available for use in making informed judgments. For example, the MAG model generates numerous measures of effectiveness that can be used to evaluate mobility quantitatively. Mobility is also a broadly defined goal that can be approached in many ways.

Each evaluation criterion has an associated performance measure, and each measure involves minimizing or maximizing a particular outcome that reflects fulfillment of the criterion and attainment of the related goal. Many of the performance measures are quantitative—i.e., directly measurable numerically. These are the easiest measures to use because they require the least exercise of professional judgment in comparing alternatives. The entire safety and mobility evaluation uses quantitative model outputs, or measures of effectiveness derived from these outputs, such as vehicle miles and vehicle hours of travel, travel speed, and volume to capacity ratio. (Level of Service is estimated using methods from the current edition of the *Highway Capacity Manual*, published by the Transportation Research Board Committee on Highway Capacity and Quality of Service.) The last three mobility criteria used a series of strategically placed east-west and north-south "cut-lines." These cut-lines are useful in comparing travel demand with roadway capacity, within a broad band comprising several parallel arterials and higher-level facilities.

The access, cost and cost/benefit portions of the evaluation are also based at least partially on quantitative data. Planning consistency, environmental compatibility and ease of implementation, on the other hand, are evaluated in a more subjective manner that relies heavily on the MAG Study Team's professional judgment and knowledge accumulated during this study. Chapter 6 presents the complete evaluation of alternatives and its results.

A performance measure may be used more than once if it can help measure achievement of two or more goals. In Table 3.1, the fourth mobility measure, "Minimize peak period VHT [vehicle hours of travel] in the study area," is also used to measure air quality and fuel conservation, since traffic congestion (reflected in vehicle hours of travel) causes greater tailpipe pollutant emissions and fuel consumption.

3.3 Limitations of the Evaluation

Some evaluation criteria are not listed in Table 3.1 because the data necessary to conduct an evaluation does not currently exist. For example, environmental justice—the degree to which an alternative avoids disproportionate impacts to certain minorities and disadvantaged groups—is an important component of environmental compatibility. However, most of the Hassayampa Valley study area is currently very sparsely settled, and the demographic composition of the future population is unknown. Impacts on cultural resources cannot be assessed, because limited information is available and this study lacks the scope and resources to investigate individual locations. Consideration of these impacts must be left to more detailed future studies.

Table 3.1 Evaluation Criteria and Performance Measures

Goals	Evaluation Criteria	Notes/Remarks
Safety	Intensity of roadway system use	Minimize PM peak period vehicle miles of travel (VMT) per lane mile in study area
	Proportion of travel on the safest facilities	Maximize the percent of study area PM peak period VMT on freeways*
Mobility	Prevalence of freeway congestion	Minimize the percent of freeway lane miles operating at Level of Service E or worse in the PM peak period*
	Efficiency of freeway traffic flow	Maximize average PM peak period travel speed on freeways in the study area
	Efficiency of surface street traffic flow	Maximize average PM peak period travel speed on arterials and parkways in the study area
	Efficiency of vehicular traffic flow	Minimize PM peak period vehicle hours of travel (VHT) in the study area
	Overall congestion	Minimize the percent of congested (Level of Service E or worse) PM peak period VMT
	Adequate directional network capacity	Minimize the number of facilities crossing selected cut-lines at LOS E or worse in the PM peak period
	North-south traffic flow	Minimize the overall PM peak period volume/capacity ratio across east-west cut-lines
	East-west regional connections	Maximize the number of continuous freeway and parkway lanes crossing a north-south cut-line drawn through the White Tank Mountains
Access	Residential access to freeways	Maximize the percent of study area residents within two miles of a (local service) freeway interchange
	Business access to freeways	Maximize the percent of study area employment within two miles of a (local service) freeway interchange
Planning Consistency	Public land use planning	Maximize land use planning consistency
	Public transportation planning	Maximize circulation planning consistency
	Public economic development planning	Maximize consistency with jurisdictional economic development plans
	Private community planning	Maximize consistency with development master plans

Table 3.1 - Continued

Goals	Evaluation Criteria	Notes/Remarks
Environmental Compatibility	Flood control structure impacts	Minimize impacts to existing canals and flood control structures
	Floodplain and drainage impacts	Minimize impacts associated with crossing of floodplains or disturbance of drainage features, including Waters of the U.S. under jurisdiction of the U.S. Army Corps of Engineers
	Impacts to public recreational land	Minimize impacts to resources protected under Section 4(f) or 6(f)
	Impacts to sensitive habitats and species	Minimize impacts to areas containing known or likely habitat for Threatened, Endangered and other sensitive species
	Wildlife movement impacts	Minimize impacts to wildlife corridors
	Air quality and fuel conservation	Minimize PM peak period VHT in the study area (used also for mobility)
Cost	Construction cost	Minimize capital cost
	Cost of maintaining transportation infrastructure	Minimize operating and maintenance cost
	Land acquisition cost	Minimize right-of-way cost
Ease of Implementation	Funding Partners' and SRT support	Obtain strong support from the Study Review Team & Funding Partners
	Stakeholder and community acceptance	Maximize the likelihood of acceptance by outside agencies, stakeholders & the community
	Miscellaneous constraints	Minimize any legal or institutional barriers that may make one alternative harder to implement than others
Cost/Benefit	Generalized ratio of cost to benefit	Minimize "planning-level" capital cost per VMT accommodated

*Weighted by the relative number of freeway lane miles in each alternative (compared with the average for all alternatives)

Source: MAG Study Team, April 2007

Interstate 10 – Hassayampa Valley Roadway Framework Study

Chapter 4

Existing and Future Transportation Conditions

September 2007

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

Prepared by

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4.1 Introduction

This report presents an inventory and analysis of existing and planned transportation facilities, as well as related findings of previous and continuing studies that are pertinent to the development of the Interstate 10-Hassayampa Valley Roadway Framework Study. Each previous or current transportation planning study was obtained from the jurisdiction or agency coordinating the study.

The Interstate 10-Hassayampa Valley ("Hassayampa") study area extends from approximately SR-74 on the north to the Gila River on the south, and from 459th Avenue on the west to SR-303L on the east, covering an area of roughly 1,430 square miles.

4.2 Transportation Facilities

This section presents an inventory of transportation issues and characteristics that are pertinent to the development of this study. The inventory resulted in a series of detailed maps that have been included in this section, along with descriptive text, under the following categories:

- Existing Roadway Facilities
- Planned Future Transportation Facilities

4.2.1 Existing Roadway Facilities

Jurisdictional Responsibility

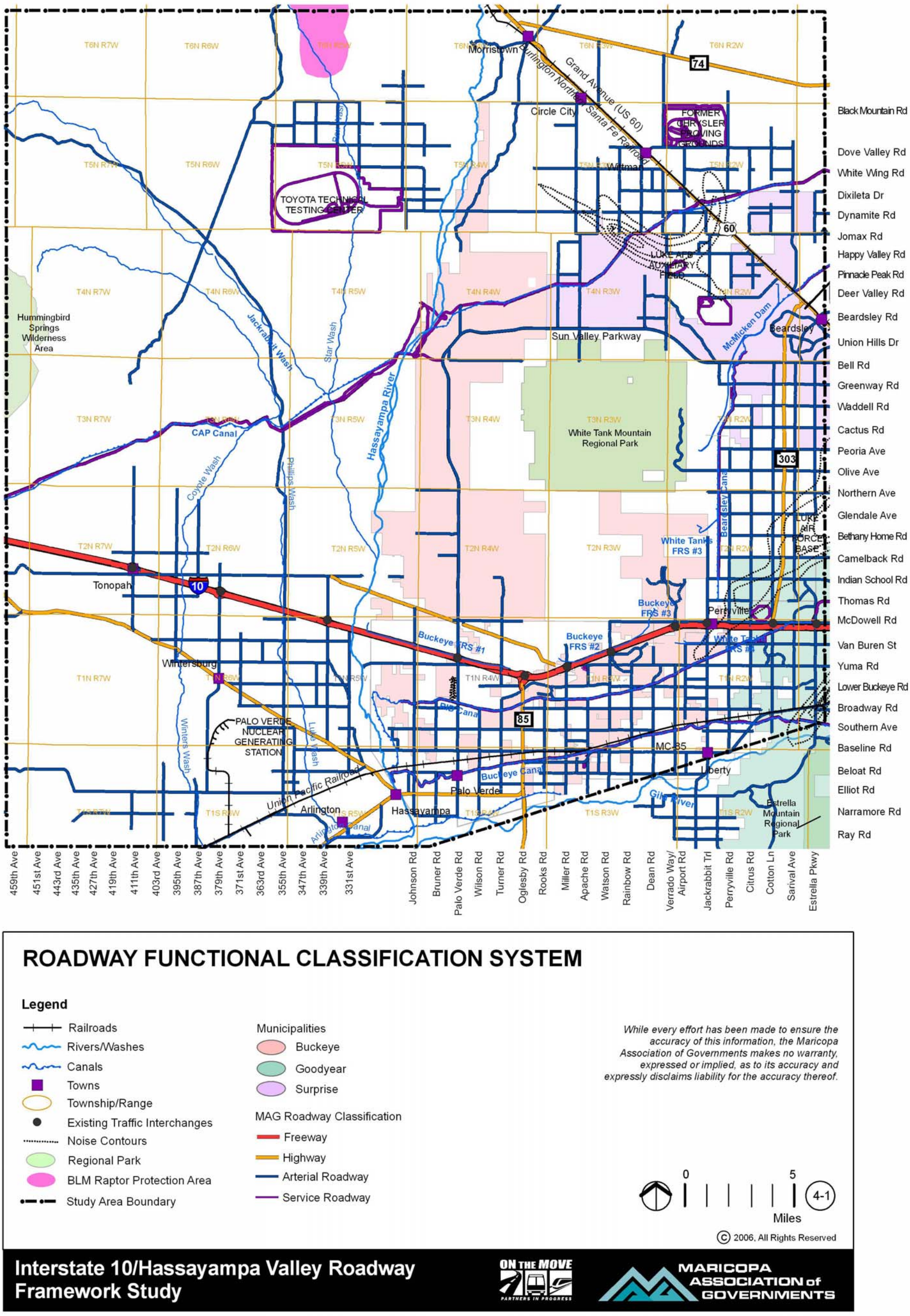
A well-developed transportation network does not yet exist in the Hassayampa Valley, which is very sparsely populated at present. I-10, a major transcontinental corridor for surface transportation of people and goods, bisects the study area as its only east-west high-capacity corridor. SR-85, SR-303L, MC-85, US-60 and SR-74 all function within the eastern half of the project area, providing connections to other highways in the region. Between the White Tank Mountains and SR-303L, the Maricopa County Department of Transportation (MCDOT) and municipalities have begun to construct the arterial network on the section-line grid that characterizes Phoenix and other cities to the east. Some elements of the grid are also in place in the developed areas of Buckeye, located mostly south of the White Tanks.

State highways (I-10, US-60, SR-74, SR-85 and SR-303L) are operated and maintained by the Arizona Department of Transportation (ADOT). Most other public roads within municipalities are the responsibility of the city or town. MCDOT is responsible for roadways in unincorporated areas of Maricopa County, and also maintains control over roads not annexed by adjacent cities and towns. As a result, MCDOT operates and maintains the bulk of the roadway miles in the project study area, including the extensive lands that lie within the Buckeye and Surprise Municipal Planning Areas (MPAs), but that will not be annexed until an indeterminate date in the future. Meanwhile, MCDOT must use its limited resources not only to maintain existing roadways throughout these vast unincorporated areas, but also to build new facilities to serve growth and development in these areas.

Roadway Functional Classification

Figure 4-1 illustrates the existing functional classification of major roadways throughout the study area. The functional classification of roadways is an assignment of roads into categories according to the character of service they provide in relation to the total transportation network. This is important because roadway classification systems are the basis for defining function and, in turn, the design criteria for roadway networks. The specific design standards for each functional class of roadway sometimes differ among jurisdictions, however.

Figure 4-1 Roadway Functional Classification System



The primary source of the information depicted in Figure 4-1 is MAG, rather than individual jurisdictions. Therefore, the ultimate "Buildout" roadway classifications as envisioned by each municipality or Maricopa County may not be shown on this map. To understand the differences in classification systems between jurisdictions, the following tables (4.1 through 4.3) display functional classes and the corresponding definitions for each jurisdiction.

The MAG functional classifications shown in Figure 4-1 tend to be more general than those used by individual jurisdictions. Figure 4-1 shows four classes that MAG uses: freeway, highway, arterial, and service roadway. The cities of Surprise and Goodyear divide their functional classification systems into additional roadway categories (Figure 4-2). All classes of "arterials" and "parkways" are shown in Figure 4-1 as arterials, according to the MAG categorization. The Town of Buckeye is currently updating its General Plan and does not yet have a comprehensive functional classification system in place. However, Buckeye has prepared typical sections for various functional classifications (freeway, parkway, principal arterial, major arterial, minor arterial, collector, industrial collector, and local road) that staff will present for Town Council action in February 2007. Tables 4.1 through 4.3 provide additional information on roadway classifications in Surprise, Goodyear and unincorporated Maricopa County.

As can be seen in Figure 4-1, I-10 is the only existing freeway within the study area. Several highways can be found throughout the study area: US-60, SR-74, SR-303L, SR-85, and the Tonopah-Salome Highway. The ADOT (state highway) functional classification system characterizes all roadways as either rural or urban, and as arterials (including freeways) or collectors. According to this system, I-10 is considered a Rural Principal Arterial (Interstate), US-60 west of SR-303L is a Rural Principal Arterial (Other), SR-74 is a Rural Major Collector, and the category of Urban Principal Arterial (Other) includes SR-303L, US-60 east of SR-303L, and SR-85 from I-10 to Riggs Road (Figure 4-3). Definitions for these classifications can be found in the Federal Highway Administration (FHWA) Approved Federal Functional Classification System Guidelines (2005).

Figure 4-1 shows that the arterial grid network is relatively well developed east of the White Tank Mountains and south of I-10, but much less developed west of the White Tanks. The map also displays several service roadways, either paralleling the Central Arizona Project (CAP) Canal or within the Toyota and former Chrysler proving grounds.

Table 4.1 City of Surprise Functional Classification System

Street Classification	Service Function	Thru Travel Lanes	Access	Medians	On-Street Parking	Sidewalks	Rights-of-way
Freeway/ Expressway	High-speed regional access	6 to 10	Full access control on freeways to partial access control on expressways	Yes (no cuts)	None	None on freeways	150 to 500 ft. (More at interchanges/intersections)
Parkway	High/moderate-speed intercity access designed to complement the freeway/ expressway system	6 to 8	Interchanges or signals at one-mile intervals and signals at half-mile locations as needed. Limited access to side streets and major commercial development with right turn lanes	Yes (quarter-mile cuts)	None	Yes, behind landscaped buffer as needed	135 to 200 ft. (More at interchanges/intersections)
Major Arterial	Moderate speed, intercity access, connects activity centers	6	Side street and major development entry, limited individual parcel access, no back-out driveways	Yes, where possible (quarter-mile cuts)	None	Both sides, determined by streetscape design	135 ft. (More at intersections)
Arterial	Moderate speed, intercity access, connects neighborhoods and activity centers	4	Side street and commercial entries; no back-out driveways	Yes, where possible (quarter-mile cuts)	None, except downtown	Both sides, determined by streetscape design	110 ft. (More at intersections)
Collector	Brings traffic from local streets to arterials	2 to 4	Side street and limited individual parcel entry. No back-out driveways	No	One or both sides	Both sides, determined by streetscape design	60 to 110 ft.
Local Street	Provides access to individual parcels	2	Individual parcel entry	No	One or both sides	Both sides, determined by streetscape design	40 to 50 ft.

Source: Surprise Transportation Plan, 2005.

Table 4.2 City of Goodyear Functional Classification System

Street Classification	Service Function	Thru Travel Lanes	Medians	On-Street Parking	Sidewalks	Rights-of-way
Freeway/ Expressway	Designed to move high volumes of traffic over substantial distances	4 to 8	Yes (no cuts)	None	None on freeways	Not specified
Parkway	Designed to move high volumes of traffic over substantial distances; at-grade with substantial building setbacks	4 to 6	Landscaped median	None	Yes, behind landscaped buffer as needed	Not specified
Scenic Arterial	Vehicular mobility; at-grade; accommodates alternative modes	4 to 6	Landscaped median	None	Both sides, determined by streetscape design	150 ft.
City Center Arterial	Vehicular mobility; at-grade; accommodates alternative modes	4	Landscaped median (wide median, could eventually support two extra lanes)	None	Both sides, determined by streetscape design	150 ft.
Major Arterial	Vehicular mobility; moderate trip lengths; at-grade; accommodates alternative modes	6	Raised median	None	Both sides, determined by streetscape design	130 ft.
Arterial	Vehicular mobility; moderate trip lengths; at-grade; accommodates alternative modes	4	Raised median	None	Both sides, determined by streetscape design	110 ft.
Major Collector	Short trip lengths; direct access to adjacent residences and commercial activities; accommodates alternative modes	4	Raised median	None	Both sides, determined by streetscape design	80 ft.
Minor Collector	Carries limited through traffic; provides property access, accommodates alternative modes	2	At-grade median	Yes	Both sides, determined by streetscape design	60 ft.
Local Street	Provides direct property access; not designed to accommodate through traffic	2	None	Yes	Attached or detached	50 ft.

Source: City of Goodyear General Plan, 2003.

Table 4.3 Maricopa County Functional Classification System

Street Classification	Service Function	Thru Travel Lanes	Medians	On-Street Parking	Sidewalks	Rights-of-way
Freeway/ Expressway	High-speed regional access.	8	Yes	None	None	300 ft.
		Rural System				
Principal Arterial	Supplements freeway and expressway system; high-speed travel	4	Inverted median	None	Both sides, attached	150 ft.
Minor Arterial	Interstate or intercounty service; high-speed travel.	2 to 4	At-grade median	None	Both sides, attached	130 ft.
Major Collector	Intercounty service; movement between traffic generators	2	At-grade median	None.	Both sides, attached	80 ft.
Minor Collector	Movement between local traffic generators	2	None	None	Both sides, attached	60 ft.
Local Street	Short distance travel	2	None	None	Both sides, attached	50 ft.
		Urban System				
Principal Arterial	Through traffic and major circulation movement; high-speed travel.	4 to 6	Inverted median	None.	Both sides, detached	130 ft.
Minor Arterial	Land access and major circulation movement; moderate-speed travel.	4	At-grade median	None.	Both sides, detached	130 ft.
Major Collector	Land access and traffic circulation; penetrates local areas.	2	At-grade median	Can accommodate	Both sides, detached	80 ft.
Minor Collector	Land access and traffic circulation; penetrates local areas.	2	None	Yes	Both sides, detached	60 ft.
Local Street	Movement between adjacent lands and collectors; frequent driveway access; short distance travel.	2	None	Yes	Both sides, attached	50 ft.

Source: Maricopa County Roadway Design Manual, 2004.

Figure 4-2 Municipal Functional Classification Systems

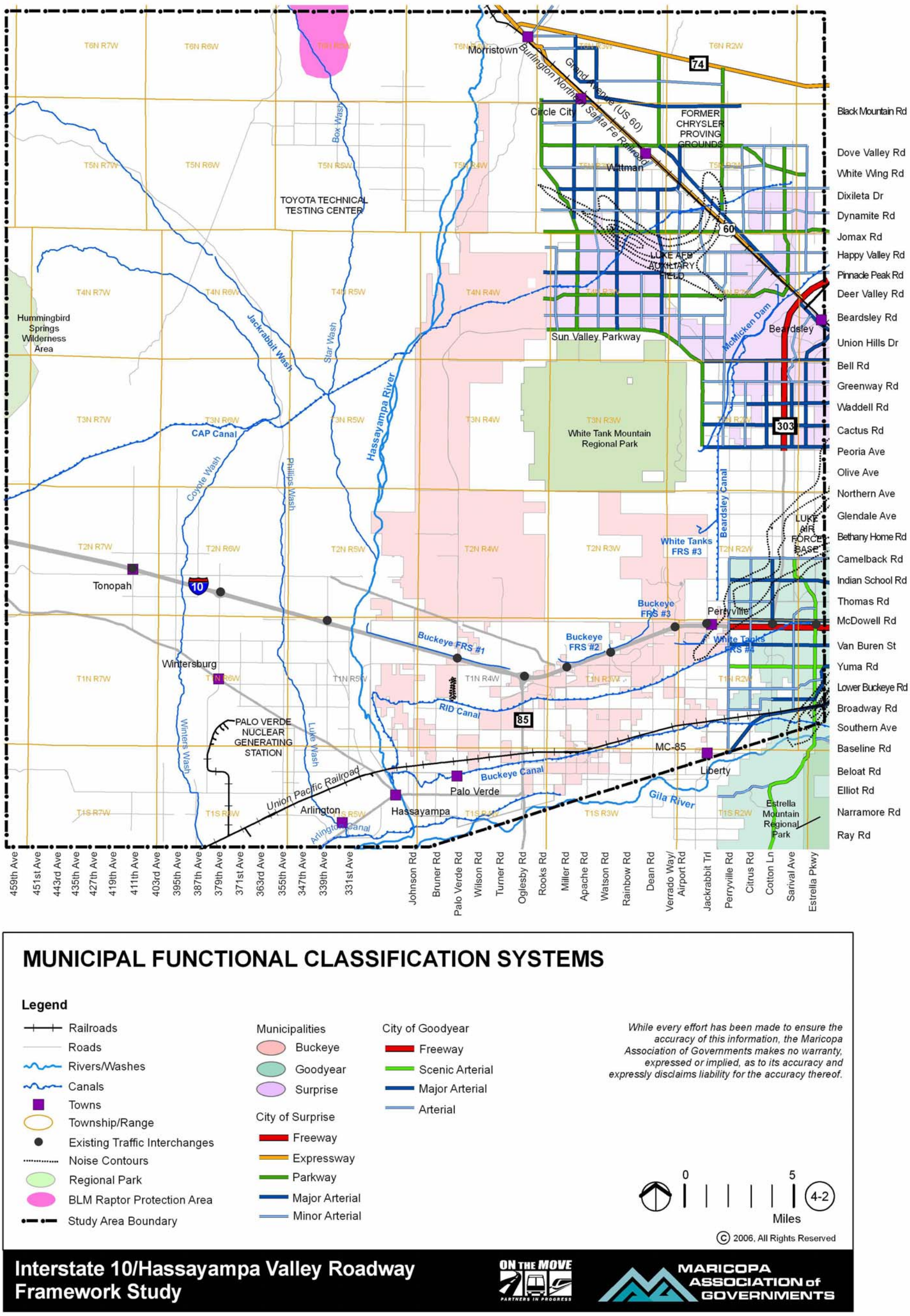
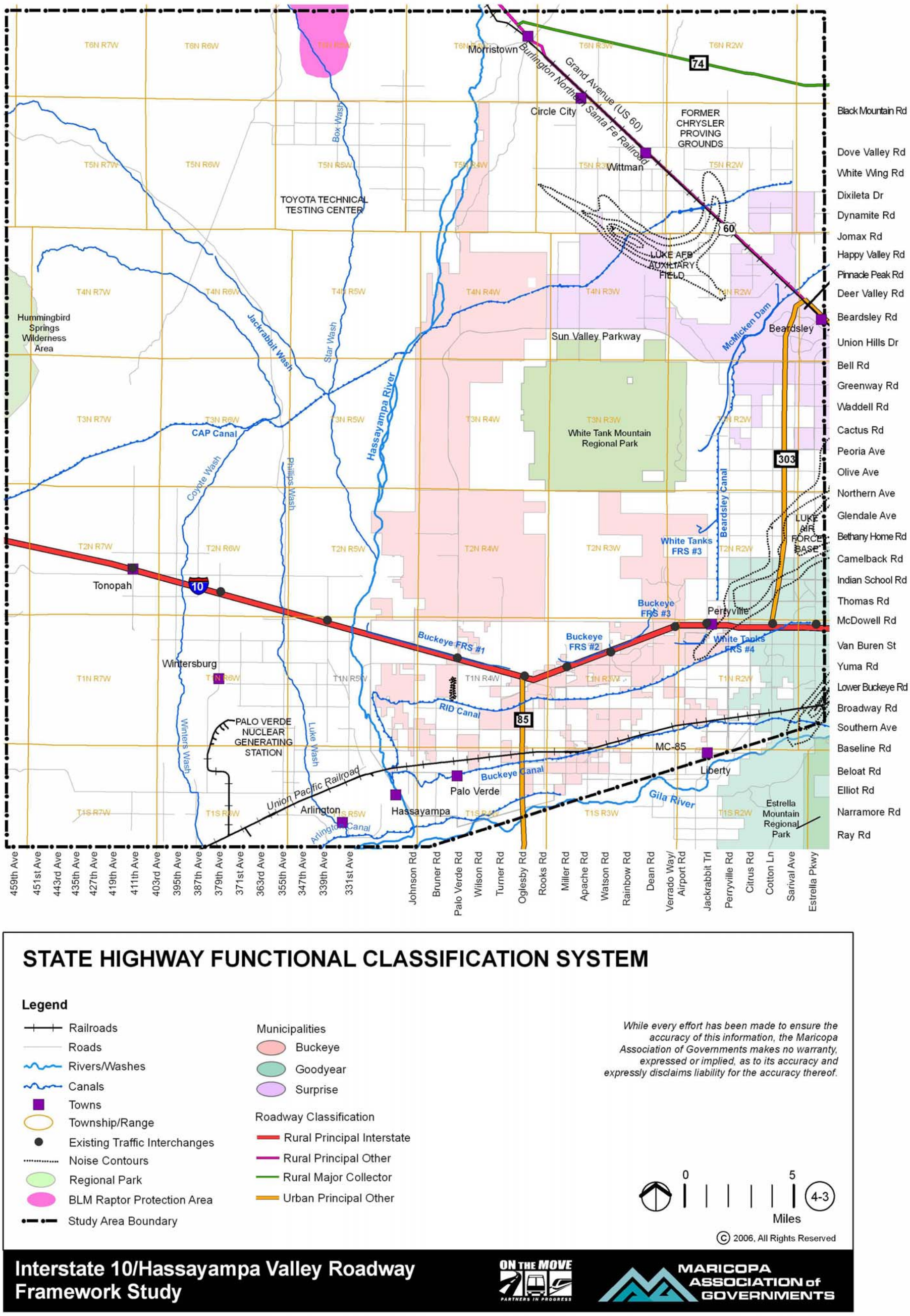


Figure 4-3 State Highway Functional Classification System



Currently, there are only seven road crossings of the Hassayampa River, which are located at Gates Road near Morristown; Patton Road; the CAP Canal service roadway; the Tonopah-Salome Highway; I-10; Baseline Road; and Old Highway 80. With the exception of I-10 and Old Highway 80, all are low water crossings. Only two river crossings over the Gila River exist in the study area: SR-85 and Jackrabbit Trail/Tuthill Road. A new Gila River crossing at Cotton Lane recently received environmental clearance and will soon be constructed. The Union Pacific Railroad (UPRR) bridge over the Hassayampa River between Baseline Road and Old Highway 80 is the only railroad river crossing in the study area.

Roadway at-grade railroad crossings include, from west to east on the UPRR: Agua Caliente Road, 355th Avenue, Salome Highway, Johnson Road, Palo Verde Road, Wilson Avenue, Turner Road, SR-85, Rooks Road, Miller Road, 4th Street, Baseline Road, Apache Road, Rainbow Road, Dean Road, Airport Road, Jackrabbit Trail, Perryville Road, and Cotton Lane; and from north to south on the BNSF Railroad: Gates Road, Center Street, 203rd Avenue, and 163rd Avenue. Both US-60 (near Morristown) and SR-303L cross the BNSF on grade-separated structures. The study area has no grade-separated crossings of the UPRR.

Average Daily Traffic (ADT)

Table 4.4 displays ADT on freeway/highways and arterial roadways. Data was gathered from MAG's 2003 Average Weekday Traffic map, MCDOT's 2004 Traffic Counts, the City of Surprise traffic count map, and ADOT's State Highway System Average Annual Daily Traffic Log with 2005 information. For specific locations counted more than once, only the highest traffic count is shown in the table. Volumes were rounded to the nearest hundred.

Table 4.4 Hassayampa Valley ADT

AGENCY	STREET	REFERENCE STREET	ADT
North-South Freeway/Highway			
MAG	SR-303L	North of Bell Rd	4,000
Surprise	SR-303L	North of Greenway Rd	19,500
Surprise	SR-303L	North of Cactus Rd	15,100
Surprise	SR-303L	North of Peoria Ave	16,600
MAG	SR-303L	North of Northern Ave	7,000
MAG	SR-303L	South of Thomas Rd	13,000
MAG	SR-303L	South of Van Buren St	2,000
MAG	SR-303L	South of Lower Buckeye Rd	2,000
ADOT	SR-85	South of I-10	16,500
MAG	SR-85	South of Beloat Rd	11,000
MCDOT	Old US-80	East Arlington School Rd	1,000
East-West Freeway/Highway			
MAG	SR-74	East of US-60	6,000
ADOT	US-60	Between SR-74 & SR-303L	18,700
Surprise	US-60	East of SR-303L	22,000
MCDOT	Salome Hwy	North of Baseline Rd	1,600
MCDOT	Salome Hwy	West of 379th Ave	1,000

Table 4.4 - Continued

AGENCY	STREET	REFERENCE STREET	ADT
ADOT	I-10	At SR-303L	66,000
ADOT	I-10	At Jackrabbit Tr	52,000
ADOT	I-10	At Verrado Way	47,400
ADOT	I-10	At Watson Rd	45,600
ADOT	I-10	At Miller Rd	43,800
ADOT	I-10	At SR-85	25,800
ADOT	I-10	At Palo Verde Rd	25,300
ADOT	I-10	At 339th Ave	23,100
ADOT	I-10	At Wintersburg Rd	25,200
ADOT	I-10	At 411th Ave	25,700
North-South Arterial Roadway			
MAG	Cotton Lane	North of Thunderbird Rd	1,000
MAG	Cotton Lane	North of Peoria Rd	1,000
MAG	Cotton Lane	North of Bethany Home Rd	1,000
MAG	Cotton Lane	North of Yuma Rd	2,000
MAG	Cotton Lane	South of Lower Buckeye Rd	2,000
MCDOT	Tuthill Dr	North of Narramore Rd	500
MCDOT	Airport Rd	North of Elliot Rd	50
MCDOT	Airport Rd	North of Narramore Rd	500
MCDOT	203rd Ave	South of US-60	600
MAG	Rainbow Rd	North of Southern Ave	2,000
MAG	Miller Road	North of Beloat Rd	3,000
MCDOT	Douglas Ranch Rd	South of Gates Rd	<50
MCDOT	Vulture Mine Rd	South of Vulture Peak Rd	1,200
East-West Arterial Roadway			
MCDOT	Patton Rd	West of Crozier Rd	2,800
Surprise	Bell Rd	West of SR-303L	3,600
Surprise	Greenway Rd	West of SR-303L	12,700
Surprise	Thunderbird Rd	West of SR-303L	2,000
Surprise	Cactus Rd	West of SR-303L	800
Surprise	Peoria Ave	East of SR-303L	2,000
MAG	Northern Ave	East of Citrus Rd	2,000
MAG	Indian School Rd	West of Citrus Rd	2,000
MAG	Thomas Rd	East of Jackrabbit Tr	3,000
MAG	McDowell Rd	West of Citrus Rd	2,000

Table 4.4 - Continued

AGENCY	STREET	REFERENCE STREET	ADT
MCDOT	Van Buren St	East of Jackrabbit Tr	700
MCDOT	Van Buren St	West of 339th Ave	1,100
MCDOT	Van Buren St	East of 379th Ave	500
MCDOT	Yuma Rd	East of Citrus Rd	2,200
MCDOT	Yuma Rd	East of Jackrabbit Tr	1,600
MCDOT	Yuma Rd	East of Miller Rd	800
MCDOT	Yuma Rd	East of Rainbow Rd	3,400
MCDOT	Broadway Rd	East of Citrus Rd	300
MAG	Broadway Rd	East of Tuthill Dr	2,000
MAG	Broadway Rd	West of Rooks Rd	1,000
MCDOT	Southern Ave	East of Rooks Rd	600
MAG	Southern Ave	West of Rainbow Rd	1,000
MCDOT	Southern Ave	East of Watson Rd	800
MAG	Southern Ave	West of Miller Rd	1,000
MAG	Baseline Rd	East of Tuthill Dr	8,000
MAG	Baseline Rd	West of Watson Rd	8,000
MCDOT	Beloat Rd	East of Airport Rd	2,100
MCDOT	Beloat Rd	East of Rainbow Rd	1,900
MCDOT	Beloat Rd	East of Tuthill Dr	2,200
MCDOT	Elliot Rd	West of 355th Ave	300
MCDOT	Elliot Rd	West of 383rd Ave	200
MCDOT	Ray Rd	East of Tuthill Dr	300

Notes:
MAG traffic counts were collected in 2002 and 2003.
MCDOT traffic counts were collected in 2004.
ADOT traffic counts were collected in 2005.

4.2.2 Planned Future Transportation Facilities

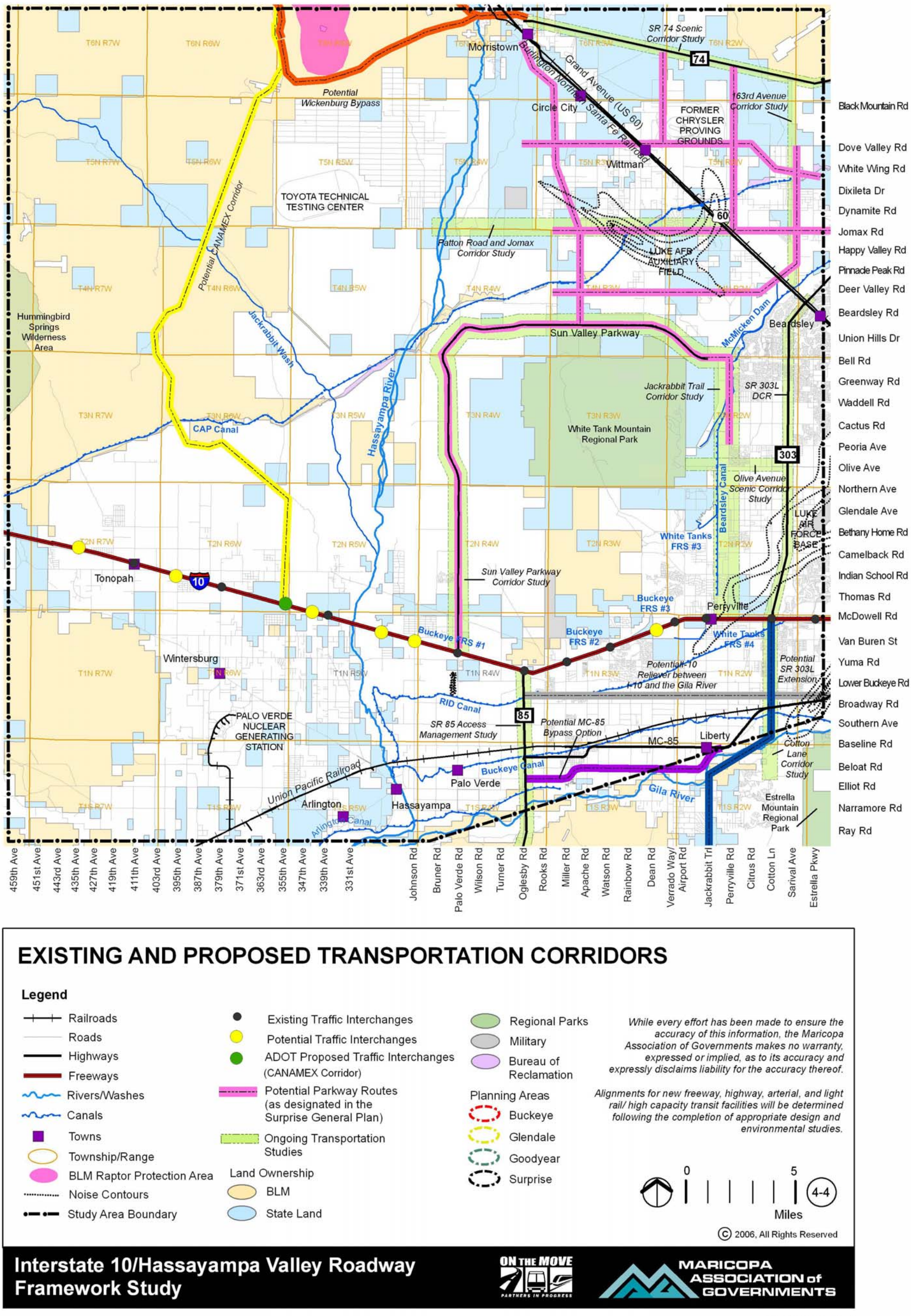
Figure 4-4 shows currently planned transportation improvements as well as future corridors under consideration.

High-Capacity Corridors

Few alternative high-capacity corridors have been planned so far for this area. The potential CANAMEX Corridor generally follows Wickenburg Road and Vulture Mine Road north of I-10 to the planned US-93 Wickenburg Bypass (which would begin at US-60 southeast of Wickenburg). The precise location of this corridor remains subject to change, however, depending in part on the plans of nearby master-planned communities, and in part on the results of this study.

A Design Concept Report is being developed for SR-303L from US-60 to I-10. Other current or recently completed studies include the SR-74 Scenic Corridor Study, the SR-74 Access Management Study, the SR-85 Access Management Plan, the MC-85 Corridor Study, and determination of the SR-801 location between I-10 and the Gila River. Future planning includes determining the alignment of SR-303L south of I-10.

Figure 4-4 Existing and Proposed Transportation Corridors



In addition to freeway and highway corridors, Figure 4-4 illustrates proposed parkway alignments from the recently updated Surprise Transportation Plan. MCDOT recently completed, or is preparing, corridor studies for the Patton Road/Jomax Road Corridor (east/west), Sun Valley Parkway (primarily north/south), and Jackrabbit Trail (north/south) as means to create alternative high-capacity corridors to support the arterial roadway network. These corridors have been identified as locations for future parkways or other roadways with a higher level of access management—and therefore higher capacity—than a standard urban arterial.

Arterial Corridors

MCDOT is also conducting several arterial roadway studies, including the Cotton Lane Corridor Study and the 163rd Avenue Corridor Study. The southward extension of Cotton Lane will include a new bridge over the Gila River. MCDOT has also initiated a Jomax East corridor study (Jomax Road east of US-60).

Master Planned Community Circulation

The project area will contain approximately 100 master-planned communities, based on current entitlements from local governments, especially Buckeye, Surprise and Maricopa County. The circulation systems of the communities located in Surprise have been incorporated into the recently updated Surprise Transportation Plan as part of the arterial grid network. In Buckeye, the circulation system is generally characterized by curvilinear roadways within each community, with only a few access points to and from the community. Some of these roadways are connected to adjacent developments, but many just end at the community property line, according to plans predating the Interstate 10-Hassayampa Valley Study. Few of these previously planned roadways connect multiple developments. The Town of Buckeye is currently updating its general plan and will address this connectivity issue in the circulation element.

4.3 Existing High-Capacity Transportation Corridors

4.3.1 I-10

Alignment

This east-west freeway facility crosses the entire study area. It is the only freeway serving the area, and one of only two Interstate highways crossing the entire state of Arizona. It is also one of the few continuous, coast-to-coast Interstates in the nation. I-10 serves as the principal freight route between the southern California ports, the Phoenix metropolitan area, south Texas and points east as far as Jacksonville, Florida.

Typical Section

I-10 through the study area is composed of four general purpose lanes (two in each direction) with an open median. Traffic interchanges (TI) consist of a mix of underpasses and overpasses. The majority of TIs were constructed in an ordinary diamond configuration, although the "T" interchange of I-10 with SR-85 has free-flow ramps for all entering and existing traffic.

Location of TIs

Traffic interchanges along I-10 currently exist at the following locations:

- MP 94.2, 411th Avenue
- MP 98.3, Wintersburg
- MP 103.5, 339th Avenue
- MP 109.7, Palo Verde Road (Sun Valley Parkway)
- MP 112.8, Oglesby Road (SR-85)
- MP 114.9, Miller Road
- MP 117.0, Watson Road
- MP 120.2, Verrado Way
- MP 121.7, Jackrabbit Trail
- MP 124.7, Cotton Lane (connecting to the SR-303L interim roadway)

ADOT has proposed an approximate two-mile spacing for TIs along I-10. Proposed future TIs include:

- MP 88.2, 459th Avenue
- MP 90.2, 443rd Avenue
- MP 92.2, 427th Avenue
- MP 96.3, 395th Avenue
- MP 98.3, 379th Avenue (Wintersburg Parkway proposal)
- MP 102.5, 347th Avenue (approved by ADOT)
- MP 105.5, Desert Creek Parkway
- MP 107.6, Johnson Road
- MP 122.7, Perryville Road

Proposed system interchanges include:

- MP 100.5, Hassayampa Freeway/CANAMEX Corridor
- MP 112.8, SR-85/Turner Parkway

Of these previously proposed TIs, only the one at 347th Avenue has been approved by ADOT and FHWA. All proposed TI locations are subject to change as a result of this roadway framework study. ADOT and FHWA, with support from the Town of Buckeye, have taken the position that TIs along I-10 in the Hassayampa Valley will be at least two miles apart. The one exception is the previously approved TI at 347th Avenue, which is one mile west of the existing 339th Avenue interchange.

Access Management

I-10 is a fully access controlled facility and will remain so. Because I-10 is an Interstate highway, a Change of Access Report must be approved by ADOT and FHWA before construction of any new traffic interchange.

Plans for Improvement

According to the MAG Regional Transportation Plan (RTP), I-10 between SR-303L and SR-85 will be widened from four to six through lanes. This improvement is currently scheduled to occur during Phase 4 of the RTP (fiscal years 2021-2026).

Process for Authorizing Change of Access

All requests for new or revised access points on completed Interstate highways must be closely coordinated with required federal planning and environmental processes. FHWA approval constitutes a federal action, and as such, requires adherence to National Environmental Policy Act (NEPA) procedures. The NEPA requirements are met as part of the normal project development process and as a condition of the access approval. This means that the final approval of access cannot precede the completion of the NEPA process. However, any proposed new access points can be submitted for a determination of engineering and operational acceptability before completion of this process. In this manner, FHWA can determine whether a proposal is acceptable for inclusion as an alternative in the environmental process.

Funding New TIs on Existing Freeways

ADOT generally does not use state or federal funds to pay for new local service interchanges on I-10 or other existing freeways. Where a proposed interchange location fully meets ADOT and FHWA requirements, ADOT may build a new TI in partnership with local jurisdictions or private parties, provided that those entities pay the full cost of construction. Examples of recently constructed TIs along I-10 within the study area include Watson Road and Verrado Way in Buckeye, neither of which was funded by ADOT.

The *Arizona State Transportation Board Policies* states that the Board will endeavor to ensure adequate transportation funding (for all state highway facilities) by:

- Aggressively pursuing adequate transportation funds;
- Taking full advantage of federal funding by insuring the availability of sufficient state matching funds;
- Pursuing new and existing funding sources;
- Encouraging alternative financial strategies, such as privatization and private and local financial participation;
- Coordinating resources with other agencies and levels of government;
- Seeking cost sharing opportunities with other agencies, levels of government and the private sector;
- Working with the Arizona congressional delegation to increase funding for Arizona in the Federal Aid highway and transit programs; and
- Advocating federal and state legislation that will increase transportation funding for the State.

4.3.2 US-60 (Grand Avenue)

Existing Alignment

US-60/Grand Avenue is a principal arterial roadway extending diagonally (southeast to northwest) from central Phoenix to Wickenburg. US-60 provides a direct connection between communities in the Northwest Valley and parallels the Phoenix Division of the BNSF Railroad, an active freight line that connects the UPRR in Phoenix with the BNSF transcontinental mainline near Williams, and with the Arizona & California Railroad near Wickenburg.

Typical Section

US-60 within the study area has four general purpose lanes with an open landscaped median. ADOT recently widened the portion from SR-303L to the Morristown railroad overpass from a two-lane undivided facility.

Location of Proposed Traffic Interchanges

Proposed traffic interchanges along US-60 through Surprise consist of:

- SR-303L
- Deer Valley Road
- Jomax Road
- Dove Valley Road
- Black Mountain Road
- SR-74

All of these proposed TIs are subject to change. Because US-60 is not planned as a freeway, partial at-grade access will be available at a limited number of other locations.

Access Management Strategy

US-60 between Wickenburg and SR-303L is a partially access-controlled facility. Left turns and U-turns are permitted only at designated median breaks that typically provide storage for turning vehicles on the highway. Right turns face no such limitation, however.

The City of Surprise is anticipating the start of an Access Management Plan for US-60 between SR-303L and SR-74 beginning in 2007. Meanwhile, to maintain the current function of US-60, Surprise will accept no further direct business or residential access to the highway. Such access will be accommodated from frontage roads or parallel arterial roadways, such as the proposed Tillman Boulevard, that can function as collector-distributor routes between east/west roadways crossing US-60.

The BNSF Railroad will not permit additional at-grade crossings of its track, although in some cases it will permit an existing at-grade crossing to be relocated. Therefore, all new roadway crossings of US-60 will need to be constructed with grade separations, unless existing grade crossings are closed in exchange for new ones.

Plans for Improvement

US-60 is a high-level arterial with partial access control northwest of SR-303L. Portions of the route may ultimately have full access control. This will be achieved by restricting access to predetermined locations that can be converted to grade separations over time.

4.3.3 SR-74

Existing Alignment

This highway travels mainly east-west through the Northwest Valley, extending approximately 30 miles from I-17 at Carefree Highway to US-60 at Morristown. This facility, a popular route between Phoenix and Wickenburg that also serves as the main access to Lake Pleasant Regional Park, is the only state highway outside the MAG regional freeway system located entirely within Maricopa County.

Typical Section

SR-74 through the study area is predominantly a two-lane, undivided rural facility.

Location of Proposed Intersections

The following list summarizes the recommended access locations by milepost and roadway name within the study area, once SR-74 has been developed to its ultimate cross-section:

- MP 0.00, US-60
- MP 1.25, Castle Hot Springs Road
- MP 2.85, future 243rd Avenue
- MP 6.99, 211th Avenue
- MP 10.01, future 187th Avenue
- MP 12.65, Quintero Access – Sarival Avenue – 167th Avenue

Access Management Strategy

The SR-74 Access Management Study divides the highway into three segments: western (US-60 to 171st Avenue), central (171st Avenue to Lake Pleasant Road), and eastern (Lake Pleasant Road to I-17). The entire western segment and part of the central segment lie within the Hassayampa study area. These two segments will eventually become four- to six-lane divided, urban state highways, with access restricted to designated intersections and traffic interchanges. Direct access will be permitted only at locations spaced two or more miles apart. Low-capacity, at-grade intersections will ultimately be replaced by higher-capacity traffic interchanges, as traffic grows and adjacent urban development proceeds. ADOT and its partners (the cities of Phoenix, Peoria, Surprise and Maricopa County) seek to protect the necessary additional right-of-way--typically about ten acres--at each proposed interchange location.

Plans for Improvement

SR-74 is currently a two-lane rural route. The ultimate facility concept for SR-74 shows that the western and central segments (US-60 to Lake Pleasant Road) will develop into a four- to six-lane divided urban state highway, and the eastern segment (Lake Pleasant Road to I-17) will develop as a ten-lane urban freeway. However, according to the MAG RTP, right-of-way preservation is planned along SR-74 between US-60 and Lake Pleasant Road for the ultimate, long-term widening and upgrade of the facility to a freeway.

4.3.4 SR-85

Existing Alignment

This mostly two-lane rural highway travels in a north-south direction, beginning at I-10 in Buckeye and extending south to Gila Bend and beyond. ADOT recommends use of the 34-mile segment from I-8 to I-10 as a bypass of the Phoenix metropolitan area. This segment also constitutes a portion of the proposed

CANAMEX Corridor that will provide a continuous, high-capacity international trade route across the western United States.

Typical Section

SR-85 through the study area (from I-10 to the Gila River bridge) is predominantly a two-lane undivided highway, although the bridge was built to accommodate a future four-lane divided highway.

Location of Proposed Traffic Interchanges

The SR-85 Access Management Study, prepared for ADOT in 2005, lists fourteen proposed TIs along this highway between I-10 and I-8. Some of these TIs are proposed at existing roadway intersections, while others will need to be constructed in conjunction with new intersecting roads.

Five interchanges are proposed at locations north of the Gila River:

- MP 149.5, Hazen Road
- MP 150.5, (existing) MC-85
- MP 152, Southern Avenue
- MP 153, Broadway Road
- I-10 (reconstructed system TI)

Access Management Strategy

The ultimate facility recommendation for SR-85 is a fully access-controlled highway built to freeway standards. Access to and from the highway will be provided only at grade-separated TIs that correspond to the locations of recommended interim at-grade intersections. Because of funding limitations, however, ADOT developed an implementation plan to construct a four-lane "interim" divided highway with limited access at selected at-grade intersections. Therefore, an interim access management plan was developed for implementation with the interim construction projects. This access management plan was designed for compatibility with the ultimate freeway design, even if the transition from divided highway to freeway requires many years.

Plans for Improvement

The RTP calls for SR-85 to be upgraded from its current configuration to the interim, four-lane divided highway in the first phase of the program (fiscal years 2006-2010). Construction of a full freeway, which is expected to have six lanes from Hazen Road to I-10, is not funded in the RTP.

4.3.5 MC-85

Existing Alignment

MC-85, a principal arterial roadway and an east-west Maricopa County facility, currently runs approximately on the Baseline Road alignment west of Perryville Road, terminating at SR-85. It connects Phoenix with the heart of Tolleson, Avondale, Goodyear and Buckeye, and serves as an alternative to I-10 from SR-303L to SR-85. This roadway was part of the main route from Phoenix to southern California before the completion of I-10 in the early 1980s. MCDOT is currently extending the existing two-lane section one mile west to Turner Road.

Typical Section

Within the study area, MC-85 is a two- to four-lane undivided roadway, with curb and gutter in the Buckeye Central Business District and a rural cross-section (no sidewalk, curb or gutter) elsewhere.

Access Management Strategy

Recommended access management strategies for MC-85, from the recently completed MCDOT corridor study, are as follows:

- Divided cross-section with a minimum 14-foot (urban) or 34-foot (rural) median, and with breaks restricted to four per mile wherever possible, in accordance with MAG Roads of Regional Significance (RRS) standards.
- Left turn lanes at all locations where left turns are permitted.
- Access control through frontage roads and raised medians, as well as adequate spacing between driveways and intersections (where possible, restricted to eight locations per mile, in accordance with MAG RRS standards).
- Traffic signals generally restricted to mile and half-mile locations, in accordance with MAG RRS standards.
- No on-street parking.

Plans for Improvement

The recently completed MCDOT MC-85 Corridor Study recommends a bypass south of downtown Buckeye, following first the north bank of the Gila River and then Beloat Road, and finally intersecting with SR-85 at the Hazen Road alignment (one of the proposed TI locations in the SR-85 access management plan). MC-85 will be widened to a six-lane divided highway from Litchfield Road to Jackrabbit Trail, and to a four-lane divided highway from Jackrabbit Trail to SR-85. The corridor study also recommends preserving sufficient right-of-way in the western portion of the bypass corridor to accommodate the future SR-801, which may be constructed on this alignment.

4.3.6 Sun Valley Parkway

Existing Alignment

Sun Valley Parkway between I-10 and the Beardsley Canal is approximately 28 miles long. It curves around the White Tank Mountains, connecting I-10 with Bell Road. This MCDOT facility runs north from I-10 approximately along the Palo Verde Road alignment, curving east along the Union Hills Drive alignment, and then switching down to Bell Road (an east-west principal arterial) west of the Beardsley Canal.

Typical Sections

Sun Valley Parkway between I-10 and the Beardsley Canal (187th Avenue) is a four-lane divided roadway with paved shoulders and (typically) a 16-foot raised median. Sun Valley Parkway turns into Bell Road in Surprise east of the Beardsley Canal, where it is fully developed as a six-lane urban arterial with a raised median and frequent access at intersections and driveways.

Access Management Strategy

Sun Valley Parkway currently contains private access points, including driveways and access ramps to electric transmission lines belonging to Salt River Project (SRP) and the Western Area Power Administration (WAPA). These existing access points consist of both improved driveways and unimproved roads.

The future access management strategy seeks to preserve a 200-foot right-of-way corridor in order to provide maximum flexibility for future improvements. The 200-foot right-of-way will accommodate adjacent drainage facilities and auxiliary lanes at the intersections, while providing the flexibility to include a wide median with indirect left turns if desired. (Under the indirect left turn concept, left turns are not permitted at the principal signalized intersections; instead, ample storage and pavement width are provided for U-turns at downstream median breaks, or vehicles may make a series of right turns. MCDOT, however, has not accepted this concept for any of its facilities.)

Plans for Improvement

MCDOT recently completed a corridor improvement study for Sun Valley Parkway. The entire roadway from I-10 to the Beardsley Canal would ultimately be widened to a six-lane divided highway with partial access control. The preferred concept for the corridor uses a narrow median to allow the existing improvements to remain, but the Town of Buckeye and City of Surprise have both expressed a desire to consider the indirect left turn concept. The study recommends that design concept reports (DCRs) be carried out for individual segments as traffic volumes approach 15,000 to 20,000 vehicles per day. These DCRs will allow more detailed engineering design and further refinement of the preferred alignment.

4.4 MAG Regional Transportation Plan

In November 2003, the MAG Regional Council unanimously adopted a new Regional Transportation Plan (RTP) laying out a program for multi-modal transportation improvements across Maricopa County through fiscal year 2026. One year later, county voters approved Proposition 400, which extends the 0.5 percent transportation excise (sales) tax for 20 years to fund implementation of the RTP. While more than half of the dedicated revenue stream is earmarked for the regional freeway system, a large proportion will be spent on public transit, arterial streets, and non-motorized improvements. However, all Proposition 400 funds have been allocated, leaving none of this money to fund additional transportation projects in the Hassayampa study area.

The RTP is updated every five years, with interim updates to incorporate any changes to the program. The following subsections describe the transportation improvements in the study area included in the 2003 MAG RTP and the 2006 MAG RTP Update. (The 2006 MAG RTP Update is a summary of the elements adopted in 2003, with revised revenue estimates and life cycle programs for freeways/highways, arterials, and transit.)

4.4.1 Arterials

The majority of the future arterial roadway network in the Hassayampa study area is planned to have four through lanes, except for eight roadways that will have six lanes. These roads consist of the parkways identified in the Surprise Transportation Plan (Dove Valley Road, Jomax Road, Deer Valley Road and 243rd Avenue), as well as Dixileta Road, 251st Avenue, Olive Avenue, and Perryville Road through Surprise, Glendale, and Goodyear. Right-of-way preservation is planned along Jomax Road.

4.4.2 Freeways

The MAG RTP includes construction of one new freeway in the corridor: SR-303L from I-17 to SR-801 (or MC-85). An interim roadway currently exists in the SR-303L corridor north of I-10. SR-801 is a planned new east-west freeway from SR-202L to SR-85. The portion of the corridor from SR-303L to SR-85 is planned for interim corridor development (construction of at least a two-lane road, and acquisition of enough right-of-way for a future freeway) during the lifetime of the RTP.

On existing highways, new general purpose lanes will be constructed along I-10 east of SR-85, and on SR-85 from I-10 to I-8. Right-of-way preservation is planned along SR-74. The general route of the proposed CANAMEX Corridor is delineated in the MAG RTP, shown as coming west (from I-10 in Pinal County) on I-8, north on SR-85, west on I-10 and north on Wickenburg Road and Vulture Mine Road into the Wickenburg area.

A new traffic interchange is proposed for construction on I-10 at Perryville Road during Phase 2 of the RTP (fiscal years 2011 through 2015). This TI has not yet received FHWA approval, however.

4.4.3 Bus Rapid Transit (BRT)/Light Rail Transit (LRT)

Future freeway BRT routes in the Hassayampa Valley are planned along SR-303L from Bell Road to I-10 and along I-10 west to 339th Avenue. The I-10 route will be implemented during Phase 1 of the RTP (fiscal years 2005-2010), while the SR-303L route will begin in Phase 4 (2021-2026). Park-and-ride lots are planned for SR-303L at Northern Avenue, and for I-10 at Miller Road.

According to Town of Buckeye staff, BRT service on I-10 between downtown Phoenix and Watson Road is scheduled for implementation in July 2008. The service will be extended west to Sun Valley Parkway in July 2010.

An arterial BRT route is planned along US-60 from central Phoenix to Jomax Road, with a park-and-ride lot at this terminus. This route is scheduled for implementation in Phase 2 (2011-2015). In addition, a new rural "super grid" bus route is planned along existing MC-85 from Litchfield Road to SR-85, then turning south to follow SR-85 to Gila Bend. The "super grid" concept consists of a high level of local bus service on major regional arterials. The proposed implementation period is Phase 4. From SR-303L to SR-85, this route is also an eligible corridor for future high-capacity transit.

4.5 Transportation Improvement Programs

Table 4.5 lists programmed roadway improvement projects from the MCDOT and MAG Transportation Improvement Programs and the ADOT Five-Year Construction Program through fiscal year 2011.

Table 4.5 Programmed Roadway Improvements, I-10/Hassayampa Valley Study Area

ROUTE	LOCATION	TYPE OF WORK	FISCAL YEAR	SPONSORING JURISDICTION
Cotton Lane	MC-85 to Elliot Road	Construct bridge over Gila River	FY 2006	MCDOT
Greenway Road	Grand Avenue to Cotton Lane	Widen roadway	FY 2006	City of Surprise
	Grand Avenue to Cotton Lane	Construct fiber optic interconnection	FY 2010	City of Surprise
McDowell Road	Pebble Creek Parkway to SR-303L	Widen roadway	FY 2006	City of Goodyear
Miller Road	I-10 to MC-85 & Buckeye Police Department	Design & install fiber optic backbone network	FY 2010	Town of Buckeye
Sarival Avenue	Bell Road to Greenway Road	Widen roadway	FY 2006	City of Surprise
	Cactus Road to Peoria Avenue	Widen roadway	FY 2006	City of Surprise
Sun Valley Parkway	I-10 to SR-303L	Conduct corridor study	Funded for study only (completed)	MCDOT
Verrado Way	Sunrise Lane to 1.5 miles north	Construct new roadway	FY 2008	Town of Buckeye
Yuma Road	Sarival Avenue to Cotton Lane	Widen roadway	FY 2006	City of Goodyear
I-10	SR-303L to SR-202L	Right-of-way protection	FY 2008	ADOT
	SR-303L to SR-202L	Right-of-way protection	FY 2009	ADOT
	SR-303L to SR-202L	Right-of-way protection	FY 2010	ADOT
MC-85	Jackrabbit Trail to Perryville Road	Conduct DCR	Funded for 30% Design Concept Report only	MCDOT
	Perryville Road to Cotton Lane	Conduct DCR	Funded for 30% Design Concept Report only	MCDOT
	Turner Road to SR-85	Construct new roadway	FY 2006	MCDOT
	Turner Road to SR-85	MC-85 extension	FY 2006	MCDOT
	At Miller Road	Install new traffic signals	FY 2006	MCDOT
	Cotton Lane to Estrella Parkway	Widen roadway, add bike lanes	FY 2008	MCDOT

Table 4.5 - Continued

ROUTE	LOCATION	TYPE OF WORK	FISCAL YEAR	SPONSORING JURISDICTION
SR-85	MP 139.0 to MP 141.71	Roadway construction	FY 2006	ADOT
	Gila River to Southern Ave	Interim widening, phase 1	FY 2008	ADOT
	MP 149.40 to MP 152.01	Roadway construction	FY 2009	ADOT
	I-8 to I-10	Roadway construction	FY 2010	ADOT
SR-74	US-60 to SR-303L	Protect right-of-way	FY 2007	ADOT
	US-60 to SR-303L	Protect right-of-way	FY 2008	ADOT
	US-60 to SR-303L	Construct eastbound & westbound passing lanes	FY 2008	ADOT
	US-60 to SR-303L	Protect right-of-way	FY 2009	ADOT
	US-60 to SR-303L	Protect right-of-way	FY 2010	ADOT
	US-60 to SR-303L	Construct eastbound passing lanes	FY 2010	ADOT
SR-303L	I-10 to US-60	Protect right-of-way	FY 2006	ADOT
	I-10 to US-60	Design & purchase right-of-way	FY 2006	ADOT
	I-10 to US-60	Design & purchase right-of-way	FY 2007	ADOT
	I-10 to US-60	Design & purchase right-of-way	FY 2008	ADOT
	I-10 to US-60	Design & purchase right-of-way	FY 2009	ADOT
	I-10 to US-60	Design & purchase right-of-way	FY 2010	ADOT
US-60	SR-303L to SR-101L	Design roadway widening	FY 2007	ADOT
	SR-303L to SR-101L	Construct roadway widening	FY 2009	ADOT

MP = milepost

4.6 Related Studies and Reports

This section summarizes 32 pertinent studies completed within the last ten years. They are grouped according to status: completed, current, and future. Information on current and future studies (4.6.1 and 4.6.2) was up to date as of August 2006.

4.6.1 Completed Studies

1. Final Design Concept Report: US-60, Morristown Railroad Overpass to Beardsley Road

Date Completed: June 1996
Lead Agency: ADOT
Author: Sverdrup Civil, Inc.

Purpose of Study: The purpose of the project was to develop and evaluate alternatives for improvement of US-60 to enhance safety, improve operations and increase capacity.

Study Area: The study area extends approximately 16 miles along US-60 from the SR-303L interchange to the Morristown railroad overpass.

Process: This study analyzes traffic needs within the project limits, evaluating right-of-way requirements, provisions for limiting access between the highway and adjacent properties, cost, impact on affected properties, constructability, traffic control, and drainage. An Environmental Assessment (EA) was developed concurrently with the Location/Design Concept Report (L/DCR), providing the necessary environmental and socioeconomic impact evaluations used in the alternative selection process.

Recommendations Relevant to the Study Area: Final recommendations for this study were incorporated within the 1997–2001 ADOT Five-Year Highway Construction Program. This two-lane undivided portion of US-60 was improved to a four-lane divided facility with partial access control.

2. East-West Mobility Study

Date Completed: May 2002
Lead Agency: MAG
Author: Entranco, Inc.

Purpose: This study explores current and future conditions of east-west traffic flow and presents strategies to improve mobility in an area that has no east-west freeways for a distance of approximately 15 miles, from SR-101L to I-10.

Study Area: The study area is bounded by Thunderbird Road /Waddell Road on the north, Northern Avenue on the south, SR-51 on the east, and SR-303L on the west. The western boundary of this study coincides with the eastern limit of the Hassayampa study area.

Process: Strategy formulation was approached in an organizational hierarchy, first identifying actions that would decrease the need for vehicle trips, then replacing those trips with transit, non-auto and HOV modes. Upper level strategies maximized road capacity and system efficiency for single-occupant vehicles. There was public and agency involvement throughout the project. Information was distributed and input solicited during the strategy formulation process.

Recommendations Relevant to the Study Area: Along with the no-build option, three "strategy packages" were formulated as a result of this study. The first package emphasizes improving non-auto options, creating an intelligent transportation system, and enhancing signal coordination. The second package entails improvements at 31 intersections, none of which are located in the Hassayampa study area. The third package involves widening several east-west streets, with recommended lane additions to Waddell Road, Olive Avenue, and Northern Avenue, from El Mirage Road to the western study area limit.

3. High-Capacity Transit Study

Date Completed: May 2003
Lead Agency: MAG
Author: IBI Group

Purpose: The goal of the study was to plan integrated, high-capacity transit corridors throughout Maricopa County.

Study Area: Greater Phoenix metropolitan area (SR-303L on the west to SR-202L on the east; SR-101L on the north to Pecos Road on the south).

Process: The study process was divided into six milestones that established the needs, opportunities, alternatives, and recommended plan for Maricopa County's transit network. Input was gathered from public and agency involvement as well as existing studies. Proven technologies and established transit systems in cities similar to Phoenix were also studied.

Recommendations Relevant to the Study Area: The study ultimately identified 29 corridors for possible inclusion in the transit network, some of which are within the Hassayampa study area. Potential LRT and commuter rail corridors were identified along the existing railroad tracks parallel to US-60 and I-10. LRT or BRT was suggested along Bell Road and Glendale Avenue. These corridors are all part of the plan's long-term (15 to 30 years) element.

4. Northwest Area Transportation Study

Date Completed: September 2003
Lead Agency: MAG
Author: Parsons Brinckerhoff

Purpose of Study: This was one of three sub-area transportation studies that became a part of the larger RTP for Maricopa County. The goal was to prioritize major projects through an identification of the area's transportation needs.

Study Area: The study area is bounded by the 1-17 on the east, the Maricopa-La Paz County line on the west, the Maricopa-Yavapai County line on the north, and I-10 on the south.

Process: Recommendations for transportation improvements were made as a result of an analysis that considered the work of previous studies, socioeconomic conditions, transportation data and issues, and alternative project design. The process was similar to that used in the Southwest Area Transportation Study (#5 below).

Recommendations Relevant to Study Area: Recommended projects include an I-10 reliever road extending between I-17 and SR-85 (currently planned as SR-801), and construction of additional general purpose and HOV lanes along SR-303L and I-10.

5. Southwest Area Transportation Study

Date Completed: September 2003
Lead Agency: MAG
Author: Wilbur Smith Associates

Purpose of Study: This study was one of three sub-area transportation studies that became a part of the larger RTP for Maricopa County. The goal was to prioritize projects through an identification of the area's transportation needs.

Study Area: The study area is bounded by the Maricopa-Pinal County line on the east, the Maricopa-La Paz and Maricopa-Yuma County lines on the west, I-10 on the north, and I-8 on the south.

Process: A database of information regarding existing and proposed transportation plans, programs and facilities within the study area was compiled by contacting municipalities and agencies. Demographic variables were examined to describe existing and future socioeconomic conditions. Current and future transportation facilities, conditions, options, and major issues were explored.

Recommendations Relevant to Study Area: Recommended projects include expanding the arterial grid network in less developed areas; constructing two new bridge crossings--Rainbow Valley Road over the Gila River and Camelback Road or the Tonopah-Salome Highway over the Hassayampa River--upgrading SR-85 to a freeway; creating two new freeways (SR-801 and the SR-303L extension south of I-10); building new traffic interchanges along I-10 at Perryville Road, Wilson Road, Johnson Road, and 363rd Avenue (proposed CANAMEX route); and widening I-10.

6. MAG Regional Transportation Plan (RTP)

Date Completed: November 2003
Lead Agency: MAG
Author: URS; MAG Transportation Policy Committee

Purpose of Study: The RTP was developed and coordinated to provide a comprehensive blueprint for transportation investments in the region through the year 2026.

Study Area: Maricopa County.

Process: The MAG Transportation Policy Committee directed planning and spearheaded an extensive public involvement process.

Recommendations Relevant to Study Area: General recommendations include the development of a Life Cycle Certification Program, consideration of project acceleration and changes in costs of materials, and a re-evaluation of the RTP every five years. Specific recommendations regarding improvements to the arterial, freeway, and transit systems are outlined for the entire county. Programmed projects for the Hassayampa study area include: a new freeway at SR-303L, interim corridor and right-of-way preservation for SR-801 and SR-74, new general purpose lanes on SR-85 and I-10, specification of the CANAMEX route, and BRT routes on I-10, SR-303L, and US-60.

7. SR-74 Access Management Study Final Draft

Date Completed: November 2003
Lead Agency: ADOT
Author: URS Corporation

Purpose: This study serves as a basis for future access management of SR-74. The plan aims to resolve major planning issues before project initiation, to preserve right-of-way, to develop locally-approved design elements, and to establish consensus among affected jurisdictions.

Study Area: The SR-74 Corridor is 30.7 miles long, extending from I-17 to US-60. A 12-mile long segment forms the northern boundary of the Hassayampa study area, extending east from the intersection of US-60 with SR-74.

Process: The recommendations were shaped by a public involvement process that involved stakeholder meetings, as well as policy and technical committees to evaluate access management strategies throughout the corridor.

Recommendations Relevant to Study Area: The study divides SR-74 into western, central, and eastern segments. Only the western segment is located within the Hassayampa study area. For this segment, the plan recommends development of SR-74 into a four-lane divided urban state highway, with signalized intersections, no direct intermediate access, and no curb cuts or driveways.

8. Final Feasibility Report for the US 93 Wickenburg Ultimate Bypass Project

Date Completed: July 2004
Lead Agency: ADOT
Author: Jacobs Civil Inc.

Purpose of Study: The purpose of the study was to select a recommended alternative among 34 potential realignments of US-93 in and around Wickenburg.

Study Area: The study area straddles the Maricopa/Yavapai county line, extending from approximately five miles northwest of the US-93/SR-89 junction to the intersection of US-60 with SR-74. Portions of the southernmost alternatives fall within the Hassayampa study area.

Process: This study consists of three elements: the widening of US-93 north of Wickenburg to the Santa Maria River, a US-93 bypass around Wickenburg, and an interim improvement project in downtown Wickenburg to relieve traffic congestion until the bypass can be funded. An extensive public involvement program was used to screen the bypass options from 34 potential realignments to two recommended alternatives. These recommended alternatives will be carried through the DCR process.

Recommendations Relevant to the Study Area: Two alternatives were recommended for future study: the Southwest Route Alternative and the Southern Loop Route. The Southern Loop Route dips south of the Southwest Route Alternative, south of Vulture Peak and Caballeros Peak. This route provides an opportunity to construct a bifurcated roadway with independent directional lanes to best fit the landform and facilitate phased construction.

9. Final Report Corridor Evaluation for CANAMEX Designation between I-10 and US 93

Date Completed: October 2004
Lead Agency: ADOT
Author: Kimley-Horn and Associates, Inc.

Purpose of Study: To evaluate the feasibility of the proposed Wickenburg Road/Vulture Mine Road Corridor upgrade as a segment of the proposed CANAMEX Trade Corridor.

Study Area: The project area in this study extends from I-10 at 355th Street, north along Wickenburg and Vulture Mine Roads to the proposed Wickenburg Bypass Southern Loop Route. The study is limited to the area within 500 feet of the existing centerlines of 355th Street, Wickenburg Road, and Vulture Mine Road. Almost the entire corridor is included within the Interstate10-Hassayampa Valley Roadway Framework Study boundaries.

Process: ADOT design criteria guided data collection, a field review, an evaluation of geometry along the corridor, and consideration of environmental issues. This review, along with two rounds of public meetings, was used to evaluate corridor options through the study area.

Recommendations Relevant to the Study Area: This study found that the project is generally feasible to build. No environmental fatal flaws are associated with the project, but additional environmental research was recommended for characteristics outside the scope of work (i.e., mining contamination). An EA will eventually be required.

Roadway design criteria set a minimum design speed of 70 mph and the cross-section of a four-lane rural divided highway. If this corridor is designated as a segment of the CANAMEX highway, 355th Avenue, Wickenburg Road, and Vulture Mine Road should be upgraded and designated as a state highway.

10. I-10 West Corridor Profile Study Final Report

Date Completed: May 2005
Lead Agency: ADOT
Author: Parsons Brinckerhoff

Purpose of Study: I-10 has been designated as a top priority corridor by the State of Arizona in its statewide transportation planning efforts. This study had several goals, including identification of issues affecting roadway performance and the general environment, as well as increasing development opportunities and the mobility of people, goods, and services.

Study Area: This corridor extends 36 miles from the system interchange with SR-101L on the east to the Wintersburg TI on the west, and encompassing a band extending two miles on either side of I-10.

Process: The consultant assembled an inventory and conducted an analysis of existing conditions. The inventory and analysis were then used to describe possible future conditions and deficiencies, identify the need for improvements, and develop recommendations.

Recommendations Relevant to the Study Area: Trucks currently make up a substantial portion of traffic volumes. Future levels of congestion are forecast to be unacceptable, so that substantial widening and additional traffic interchanges will ultimately be needed. Pavement reconstruction and rehabilitation will also be necessary, as will increased capacity on arterial roadways that interchange with I-10.

11. SR-85 Access Management Study, I-8 to I-10

Date Completed: September 2005
Lead Agency: ADOT
Author: DMJM Harris

Purpose of Study: The purpose of this study was to provide ADOT, Maricopa County, the Town of Gila Bend, and the Town of Buckeye with a cost-effective plan to manage access on SR-85 and to provide guidance for future development adjacent to this corridor during the phased conversion of SR-85 to a fully access-controlled (freeway) facility.

Study Area: The study area is a one-mile-wide strip centered on SR-85, extending from I-8 on the south to I-10 on the north.

Process: This study reviewed population and land use projections, projected access locations, proposed developments and roadways, traffic projections, and future traffic analyses to determine the best access management strategy for this corridor. A vision of the desirable future of SR-85 was developed, along with supporting documentation on how best to implement this plan.

Recommendations Relevant to the Study Area: Interim recommendations for access management along SR-85 include several new at-grade interchanges in the Hassayampa study area, as indicated in the previous discussion of SR-85. In part because of its strategic role in the CANAMEX corridor, the ultimate recommendation for SR-85 is a fully access-controlled highway built to Interstate standards, with access only at grade-separated interchanges. A continuous two-way frontage road will be constructed from the Gila River bridge to Gila Bend to provide local access.

12. Surprise Transportation Plan

Date Completed: December 2005
Lead Agency: City of Surprise
Author: Surprise Transportation Commission

Purpose of Study: This document is intended to plan for a safe, efficient, and effective multi-modal transportation system within Surprise. The plan's goals apply both to transportation within Surprise and to connections with regional systems.

Study Area: MPA of the City of Surprise.

Process: A General Plan Amendment outlined changes in the previous transportation plan. This amendment was adopted by the Surprise City Council and incorporated into the existing Surprise General Plan 2020.

Recommendations Relevant to Study Area: Recommendations include establishing the Sun Valley Parkway as a scenic parkway, and measures to achieve level of service "D" or better on all roadways. The Surprise Transportation Plan establishes the parkway concept as a key to enhancing regional mobility. The plan also provides for the extension of transit service into the region and enhancement of infrastructure for alternative modes of transportation.

13. MAG RTP 2006 Update

Date Completed: March 2006
Lead Agency: MAG
Author: MAG Transportation Policy Committee

Purpose of Study: This study updates the RTP originally adopted in 2003. It summarizes revised revenue estimates and includes life cycle programs for freeways/highways, arterial streets, and transit projects.

Study Area: Maricopa County.

Process: The update was developed as an amendment to the RTP, formed through a cooperative effort of government, business, public interest groups and the community at large.

Recommendations Relevant to Study Area: Additional projects planned within the Hassayampa Valley include expansion of the arterial grid network west of SR-303L to four through lanes; expansion of a fixed route bus network along SR-85, SR-303L, and US-60; an arterial BRT route along US-60 from Jomax Road to downtown Phoenix; and implementation of a regional freeway management system on I-10 (east of SR-85), SR-303L, and proposed SR-801 east of SR-303L.

Note: Release of the RTP 2007 update is expected soon.

14. MAG Regional Freeway Bottleneck Study

Date Completed: May 2006
Lead Agency: MAG
Author: Olsson Associates

Purpose of Study: The purpose of the Freeway Bottleneck Study was to identify and analyze bottlenecks, to evaluate freeway level of service, and to rank projects to mitigate the bottlenecks

Study Area: Maricopa County.

Process: In 2001, an aerial survey was conducted that identified sixteen congested freeway segments or "bottlenecks." A freeway operations model was used to analyze these bottlenecks and evaluate possible solutions.

Recommendations Relevant to Study Area: None of the sixteen bottlenecks are located within the Hassayampa study area.

15. SR-303L, MC-85 to Indian School Road, Final Design Concept Report

Date Completed: 2002
Lead Agency: MCDOT
Author: HDR

Purpose of Study: This section of SR-303L is considered a potential high-capacity, north-south highway for service to the West Valley. The purpose of this study was to provide guidance in determining the type of facility and number of lanes necessary to accommodate traffic in the Buildout scenario, as well as to develop an implementation plan of intermediate improvements to be completed as traffic volumes warrant.

Study Area: SR-303L from MC-85 to Indian School Road.

Process: This study went through a seven-tiered screening of alternatives to one recommended alignment. An environmental overview and cost estimate were completed on this final alternative.

Recommendation Relevant to Study Area: The recommended alternative uses a freeway alignment along Cotton Lane from MC-85 to I-10. Between I-10 and Indian School Road, this alignment angles east, meeting up with the alignment proposed for the segment from Indian School Road to Grand Avenue.

16. SR-303L, Indian School Road to Clearview Boulevard Initial Design Concept Report

Date Completed: 2002
Lead Agency: MCDOT
Author: URS

Purpose of Study: This section of SR-303L is considered a potential high-capacity, north-south highway for service to the West Valley. The purpose of this study was to provide guidance in determining the type of facility and number of lanes necessary in the Buildout scenario, as well as to develop an implementation plan of intermediate improvements to be completed as traffic volumes warrant.

Study Area: SR-303L from Indian School Road to Clearview Boulevard.

Process: This report outlines existing roadway and environmental conditions, the alternatives selection process, and the recommendations for the interim and ultimate freeway alignment.

Recommendation Relevant to Study Area: The recommended alternative uses a freeway alignment approximately halfway between Cotton Lane and Sarival Avenue (i.e., along the existing interim roadway). Several planned developments exist within the corridor, and it is very important to maintain communication with the cities and developers to preserve right-of-way.

17. Corridor Improvement Study: SR-303L between Riggs Road and MC-85

Date Completed: March 2004
Lead Agency: MCDOT
Author: Parsons Transportation Group

Purpose of Study: This section of SR-303L is considered a potential high-capacity, north-south highway for service to the West Valley and South Goodyear/Estrella Mountain Ranch. The study sought to define a corridor within which to locate a future access-controlled facility.

Study Area: SR-303L from MC-85 to Riggs Road.

Process: A corridor-level investigation examined engineering and planning factors to develop a full range of options that led to a preferred corridor alternative.

Recommendation Relevant to Study Area: Recommendations include increasing the capacity of the traffic network in the study area. The analysis of proposed alternatives found two feasible options, and recommended preservation of both corridors until future study can determine the best course of action. One alternative would follow approximately the Cotton Lane alignment to a new Gila River crossing, while the other would veer west south of I-10, crossing the river near Perryville Road. (In April 2006, Newland Communities, master developer of the planned community of Estrella Mountain Ranch, submitted a Major General Plan Amendment to the City of Goodyear, recommending a change in alignment south of Pecos Road, going around and through this community.)

18. MC-85 Corridor Study

Date Completed: **July 2006**
Lead Agency: MCDOT
Author: DMJM Harris

Purpose of Study: This study is an update of a previous study completed in 1998. It created a revised plan to implement capacity and access management improvements along the MC-85 corridor to accommodate expected future traffic.

Study Area: MC-85 from Turner Road to 75th Avenue.

Process: A corridor-level investigation examined engineering and planning factors in order to develop a full range of options that led to a preferred corridor alternative.

Recommendations Relevant to Study Area: A new alignment known as the South Bypass is recommended from approximately Perryville Road to SR-85; a portion of this new route may also become the SR-801 corridor. A six-line divided highway is recommended east of Jackrabbit Trail and a four-lane divided highway west of that point. The bypass route would follow Beloat Road and then Hazen Road to a planned interchange with SR-85.

4.6.2 Current Studies

19. ADOT Statewide Access Management Study

Lead Agency: ADOT
Author: URS Corporation

Purpose of Study: This study will develop an access management classification system for Arizona state highways and a comprehensive access management manual to guide the uniform application of access management throughout the state.

Study Area: State of Arizona

Implications for the Hassayampa Study Area: This study will set guidelines and standards for access to all state highways; therefore, it will apply to construction and reconstruction of state highways in the Hassayampa study area.

Project Status: The project began in the fall of 2005 and was in the roadway classification and design guidelines phase as of August 2006. The final report is expected in February 2007.

20. I-10 Reliever DCR/Environmental Compliance

Lead Agency: ADOT
Author: HDR

Purpose of Study: The purpose of this study is to determine the ultimate alignment for SR-801 (formerly the I-10 reliever) between SR-85 and SR-202L.

Study Area: The study area is along the proposed SR-801 alignment (approximately between Lower Buckeye and Broadway roads) from SR-85 to SR-202L, but the actual alignment remains subject to change; for example, it could dip south in Buckeye to join the proposed new alignment of MC-85 along Beloat and Hazen roads.

Implications for the Hassayampa Study Area: In the RTP, the route is funded for construction as a six-lane freeway between SR-202L and SR-303L, and as a two-lane roadway with right-of-way preservation for a future freeway between SR-303L and SR-85. Construction of the facility is targeted for Phase 4 of the RTP: 2021-2026. This roadway will be incorporated into the larger transportation framework of the Hassayampa study area.

Project Status: The DCR process was initiated in summer 2006.

21. State Rail Inventory and Assessment

Lead Agency: ADOT
Author: ADOT

Purpose of Study: This study will update the 2000 State Rail Inventory and Assessment Report and develop a 2006 baseline of critical rail infrastructure by reviewing current state railroad policies and objectives, inventorying Arizona railroad facilities, providing a status update on systems and projects, and exploring issues, needs and opportunities for rail on a state level.

Study Area: State of Arizona.

Implications for the Hassayampa Study Area: No passenger rail routes or intermodal facilities are located within the Hassayampa study area. However, a BNSF line runs adjacent to US-60 and a UPRR line is located between I-10 and the Gila River within the study limits. Potential improvements to these rail facilities should be reviewed and incorporated into the larger transportation framework.

Project Status: The project was initiated in spring 2006.

22. US-60 DCR/Categorical Exclusion (CE), SR-101L to SR-303L

Lead Agency: ADOT
Author: DMJM Harris

Purpose of Study: ADOT is studying the proposed widening of US-60 (Grand Avenue), by adding one lane in each direction to create a continuous six-lane thoroughfare. Various options for adding the new lanes will be studied, as well as the "no build" alternative, which would add no new capacity to the roadway. The widening of this ten-mile segment is included in the RTP as a Phase 2 project.

Study Area: US-60 from SR-303L to SR-101L.

Implications for the Hassayampa Study Area: This study proposes lane additions and changes in access to Grand Avenue up to the eastern Hassayampa study limit. Any proposed changes along US-60 within the Hassayampa study area should be compatible with these recommendations.

Project Status: Completion of the Initial DCR and CE was scheduled for September 2006. The Final DCR and CE were expected to be completed at the end of 2006.

23. SR-303L DCR, MC-85 to Grand Avenue

Lead Agency: ADOT
Author: URS Corporation

Purpose of Study: The purpose of this study is to determine the ultimate alignment for SR-303L between MC-85 and Grand Avenue (US-60).

Study Area: The study area is along the proposed SR-303L alignment (approximately halfway between Sarival Avenue and Cotton Lane) from MC-85 to US-60.

Implications for the Hassayampa Study Area: The roadway will be developed to ADOT freeway standards, with grade separations or interchanges at each major intersecting street.

Project Status: Design and construction plans for this freeway are underway. These engineering plans for the entire corridor are split into several projects. DCRs and 30% design plans from US-60 to Peoria Avenue are expected to be completed in March 2007.

24. Maricopa County Eye to the Future – Olive Avenue Scenic Corridor Guidelines

Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: The objectives of the study are to guide and enhance development along the Olive Avenue corridor and to promote and preserve the area's inherent scenic characteristics. This corridor is the principal gateway to White Tank Mountain Regional Park.

Study Area: The corridor studies extends one-fourth mile on each side of the road, from SR-303L to the eastern boundary of White Tank Mountain Regional Park.

Implications for the Hassayampa Study Area: Landscaping policies favor preservation of sensitive natural habitats, the use of open space as a development buffer, and a general southwestern character to development. Building height, signage, lighting, and fencing are to be limited.

Project Status: A draft version of the report was published in March 2006.

25. Maricopa County Eye to the Future – SR-74 Scenic Corridor Guidelines

Lead Agency: Maricopa County
Author: Maricopa County Planning and Development Department

Purpose of Study: These guidelines are being developed to guide and enhance planning of this corridor as development occurs, with a view to accommodating future growth in a manner consistent with community recommendations.

Study Area: SR-74 from US-60 to Lake Pleasant Road/New River Road.

Implications for the Hassayampa Study Area: Policies favor retaining or transplanting native plants. The guidelines also favor preservation of sensitive natural habitats, the use of open space as a development buffer, and a southwestern character to development. Building height, signage, lighting, and fencing are to be limited.

Project Status: A final draft was published in June 2006.

26. Jackrabbit Trail Corridor Study

Lead Agency: MCDOT
Author: DMJM Harris

Purpose of Study: This study is a planning and design analysis of the Jackrabbit Trail corridor to identify both short- and long-term improvements and access control strategies to meet travel demand through 2025.

Study Area: Jackrabbit Trail from I-10 north to Bell Road.

Implications for the Hassayampa Study Area: The Hassayampa study area encompasses the entire Jackrabbit Trail corridor. Both studies are underway concurrently, with results and findings to be shared between MAG and MCDOT. The recommended alignment and roadway classification of Jackrabbit Trail are expected to be incorporated in the Hassayampa roadway network.

Project Status: The consultant team was selected in May 2006 and work began late in 2006.

27. Patton Road and Jomax Road Corridor Study

Lead Agency: MCDOT
Author: CK Engineering

Purpose of Study: The goal of this study is to identify and establish the future roadway type, alignment, number of lanes and right-of-way requirements along both of these east-west corridors to safely accommodate future traffic demand. Potential Hassayampa River crossing options are also being developed and evaluated.

Study Area: The study area includes two parallel east-west roads, Patton Road and Jomax Road, between 299th Ave and Tillman Boulevard.

Implications for the Hassayampa Study Area: Depending on the pace of the project, decisions on future roadway alignments and conditions may be incorporated into the Intestate 10-Hassayampa Valley Roadway Framework Study.

Project Status: The first public open house occurred in February 2006. Early tasks include identifying existing conditions, developing socioeconomic and model inputs for Buildout travel demand modeling, and public and agency scoping.

28. Sun Valley Parkway Corridor Study

Lead Agency: MCDOT
Author: Parsons Brinckerhoff

Purpose of Study: The purpose of this study is to establish the ultimate alignment and access control plan for the Sun Valley Parkway, including intersection spacing and median break locations, and to develop construction phasing plans.

Study Area: Sun Valley Parkway from I-10 to Bell Road/Jackrabbit Trail, plus a corridor from the existing "bend" in the parkway (near the Bell Road alignment) north to US-60.

Implications for the Hassayampa Study Area: The preferred alternative will be incorporated into current Hassayampa Valley planning, as the Sun Valley Parkway is a major roadway within the study area. Access control plans will affect arterial roadway connectivity west of the White Tank Mountains.

Project Status: The last round of open houses for this project was held in June 2006.

29. Northern Avenue Parkway DCR

Lead Agency: MCDOT
Author: URS Corporation

Purpose of Study: This project begins preliminary engineering work to identify the preferred alignment and right-of-way needs for initiation of the environmental clearance process.

Study Area: Northern Avenue from SR-303L to Grand Avenue.

Implications for the Hassayampa Study Area: While this corridor is not in the Hassayampa study area, the western boundary of the DCR coincides with the eastern limit of the Hassayampa study. Therefore, recommendations and designs for Northern Avenue will be considered and incorporated into planning efforts west of SR-303L.

Project Status: This report is in draft format, with a completed version expected in January 2007. The EA is moving forward and right-of-way is being purchased.

30. 163rd Avenue Corridor Study/DCR, Grand Avenue to SR-74

Lead Agency: MCDOT
Author: Parsons Brinkerhoff

Purpose of Study: This project begins the preliminary engineering work to identify the preferred alignment and right-of-way needed for the ultimate alignment of 163rd Avenue.

Study Area: 163rd Avenue, between Grand Avenue (US-60) and SR-74.

Implications for the Hassayampa Study Area: The recommended alignment alternative(s) will be incorporated into the planned Hassayampa arterial network.

Project Status: The project was scheduled to begin in August 2006.

31. Buckeye Airport Master Plan Update

Lead Agency: Town of Buckeye
Author: Coffman Associates

Purpose of Study: The Buckeye Airport Master Plan Update has been undertaken to evaluate the airport's capabilities and role, to forecast future aviation demand, and to plan timely development of new or expanded facilities that may be required to meet the demand.

Study Area: Buckeye Municipal Planning Area (MPA).

Implications for the Hassayampa Study Area: Four airside and four landside alternatives are being considered. Airside alternatives concern development of the airfield itself, including runway placement; whereas landside alternatives consider adjacent industrial and commercial development as well as terminal facilities for passengers and cargo.

Project Status: As of August 2006, this project is in the Alternatives Evaluation phase.

32. UPRR Study for Reactivation

Lead Agency: UPRR
Author: UPRR

Purpose of Study: The purpose of this study is to evaluate the feasibility of reactivating the UPRR rail line from Palo Verde to Roll, which has been disused since 1996.

Study Area: UPRR rail line from Palo Verde to Roll.

Implications for the Hassayampa Study Area: This rail line traverses the Hassayampa study area. Its reopening would give the UPRR a direct through route across metropolitan Phoenix, likely spurring industrial development along the rail corridor, providing an alternative to the transcontinental Sunset corridor farther south, and leading to construction of an intermodal facility in the Hassayampa study area.

Project Status: The UPRR has received authorization to reopen this line, but has made no decision yet. The decision will be based on cost versus benefit.

4.6.3 Future Studies

33. MAG Commuter Rail Study

Lead Agency: MAG
Author: To be determined

Purpose: This study will investigate conceptual commuter rail options along the UPRR and BNSF railroad lines throughout the Phoenix metropolitan area.

Study Area: Maricopa County, and a portion of Pinal County along the Union Pacific line from the Phoenix area to Picacho (east of Eloy).

Expected Date of Initiation: Fall of 2007

Implications for the Hassayampa Study Area: Commuter rail is being considered as a form of high-capacity transit for the Hassayampa area, and the two studies will be coordinated as much as possible.

34. MAG I-8/I-10 Hidden Valley Roadway Framework Study

Lead Agency: MAG
Author: To be determined

Purpose: The I-8/I-10 Hidden Valley Roadway Framework study will mirror the Hassayampa study, covering an even larger area south and southwest of the Hassayampa Valley. The study will establish a framework for a future transportation network in the study area, and provide feedback to local land use and transportation planners on how alternative development scenarios could be part of the regional transportation solution. This effort will encompass large areas of both Maricopa County and Pinal County. Funding partners will include both counties as well as Buckeye, Goodyear, the City of Maricopa and ADOT.

Study Area: This project encompasses the land between the Gila River on the north, I-8 on the south, 459th Avenue on the west, and SR-87 on the east.

Expected Date of Initiation: January 2007

Implications for the Hassayampa Study Area: The Hidden Valley area abuts the southern boundary of the Hassayampa study area and the issues facing the two areas are similar in many ways, although Hidden Valley has a larger number of established communities. Hence the two studies will be coordinated as much as the difference in schedules allows. Some proposed high-capacity roadways in the Hassayampa area are likely to serve Hidden Valley as well.

Interstate 10 – Hassayampa Valley Roadway Framework Study

Chapter 5

Travel Demand Forecasting and Analysis

September 2007

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

Prepared by

WILSON & COMPANY

In Association With

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5.1 Overview

This chapter summarizes the modeling methodology and travel demand forecasts pertinent to development of the I-10/Hassayampa Valley Roadway Framework Study. As part of this study, it was necessary to develop a special set of travel demand modeling capabilities to support testing and evaluation of long-range roadway network performance. The travel demand methodology and resulting forecasts presented herein provide the basis for: identification of projected roadway deficiencies and requirements; formulation and evaluation of infrastructure improvement alternatives; selection of a preferred roadway network; and development of implementation phasing strategies. All travel demand modeling activities, including model development efforts and model applications associated with this study, were fully coordinated with, and conducted under the direct supervision of, MAG representatives.

5.2 Background and Understanding

5.2.1 Purpose and Need

An expanded and updated version of the MAG regional transportation model was used to forecast the growth in total travel demand and future changes in travel patterns in the study area. The MAG model was also used for testing general roadway framework alternatives to assist in developing a preferred roadway network to serve long-range (Buildout) travel demand. "Buildout" refers not to a specific future year, but rather to an unspecified date when urban development will have reached its highest level or maximum extent.

Adjustments in roadway functional classification and the number of travel lanes were made to provide a reasonable match between the traffic volume assigned to a given roadway link and the link's available capacity. This network adjustment and refinement process was repeated until a roadway network was produced containing an acceptable configuration of roadways that satisfied evaluation criteria established for the study (Chapter 3).

5.2.2 MAG Coordination

Extensive coordination with MAG occurred throughout the study to ensure that model development activities, socioeconomic data development, and model protocols were consistent with MAG's adopted modeling approach. This coordination occurred through a series of study team meetings and specific model coordination meetings. Eleven meetings were conducted between March 2006 and January 2007. Appendix A contains notes documenting the discussions at these meetings.

Key discussions and decisions that occurred at these meetings include:

- The EMME/2 transportation modeling software was originally specified for use in this study, but it was determined later that TransCAD will be the travel demand modeling platform for all of MAG's travel demand modeling activities.
- New Buildout socioeconomic assumptions will be used for the study area, while approved MAG 2030 socioeconomic data will be used for the rest of the region.
- In conducting travel demand forecasting work in the far West Valley, MAG experienced operational problems with the regional model north of the Bell Road alignment, primarily due to a lack of east/west network capacity. MAG compiled the roadway network vision associated with planned development projects to form the "Base Network" for this portion of the study area.
- The current MAG Transportation Analysis Zone structure was viewed as adequate for development of model-generated travel assignments.
- The study focused first on Buildout and did not attempt to build a 2030 land use and socioeconomic scenario from the ground up. The study team instead "backed into" the 2030 scenario from the recommended Buildout roadway framework.
- The study team conducted tests to verify that the MAG model outputs are reasonable. The model outputs for the study area were compared to a similar area in the East Valley, which is already approaching Buildout. The team also examined the projected mix of population and employment for certain master-planned communities located in the study area. This process provided an independent basis for comparison with population and employment data generated by MAG.

- MAG's local funding partners—Maricopa County, Surprise, Buckeye and Goodyear--will be included in all future discussions of the Hassayampa Valley roadway network to ensure consistency with established plans.

5.3 Model Area Definition

5.3.1 Converting from EMME/2 to TransCAD

MAG operates and maintains a regional transportation model that is used to develop and test the air quality conformity of the RTP and the Transportation Improvement Program (TIP) for the MAG planning area. In recent years, the model has been based on EMME/2 computer software. At the onset of this study, MAG expected all model runs to use EMME/2. During the study, however, MAG converted its model from EMME/2 to TransCAD. The TransCAD software, an advanced geographic information system (GIS), permits MAG to create and customize maps, build and maintain geographic datasets, and perform many types of spatial analysis. Because conversion from EMME/2 to TransCAD occurred much faster than originally anticipated, MAG elected to use TransCAD for all future regional studies, including this one. Therefore, all future-year travel demand model runs for the Hassayampa Valley study were carried out using TransCAD.

5.3.2 MAG Modeling Environment

The MAG model is based on the following geographic components, for the purpose of maintaining a socioeconomic database for performing spatial analyses:

- **27 Municipal Planning Areas (MPAs)**. An MPA is defined by the existing corporate limits of an incorporated city or town in Maricopa County, plus any adjacent areas expected to be annexed into the corporate limits in the future.
- **145 Regional Analysis Zones (RAZ).** RAZs are subunits of MPAs. They are the basic units used by the spatial allocation model to prepare subregional projections for Maricopa County.
- **1,864 Socioeconomic Analysis Zones (SAZ)**, also known as Transportation Analysis Zones (TAZ), represent a further division of the RAZ. The SAZ is the smallest unit for which MAG prepares socioeconomic projections on which travel demand forecasts are based. SAZ boundaries are defined using major streets and landmarks.

The MAG regional transportation model also includes a Pinal County component, as transportation needs in Maricopa County are heavily influenced by travel interactions with Pinal County. The current Hidden Valley Roadway Framework Study extends into Pinal County and uses data for SAZs in that county.

5.3.3 Hassayampa Valley Study Area Modeling Environment

The Hassayampa Valley study area encompasses approximately 1,430 square miles (15%) of the 9,223-square-mile MAG regional planning area. The area contains 25 RAZs out of 145 in Maricopa County. Figure 5-1 shows the RAZ boundaries in the study area. Figure 5-2 depicts the 276 SAZs in the study area, which were renumbered as TAZs for use with the MAG model. Appendix B contains socioeconomic data for each SAZ in the study area.

5.4 Description of Socioeconomic Data

The MAG travel demand modeling efforts for this study were based on a common socioeconomic database used throughout its regional planning area. Only the roadway network was altered, with the objective of identifying the best-performing network. MAG concluded that maintaining a constant land use dataset, based on established practices and assumptions, would minimize the complexity of this study and allow the study team to focus on development and evaluation of the candidate roadway network alternatives.

Figure 5-1 Regional Analysis Zone (RAZ) Boundaries: Study Area

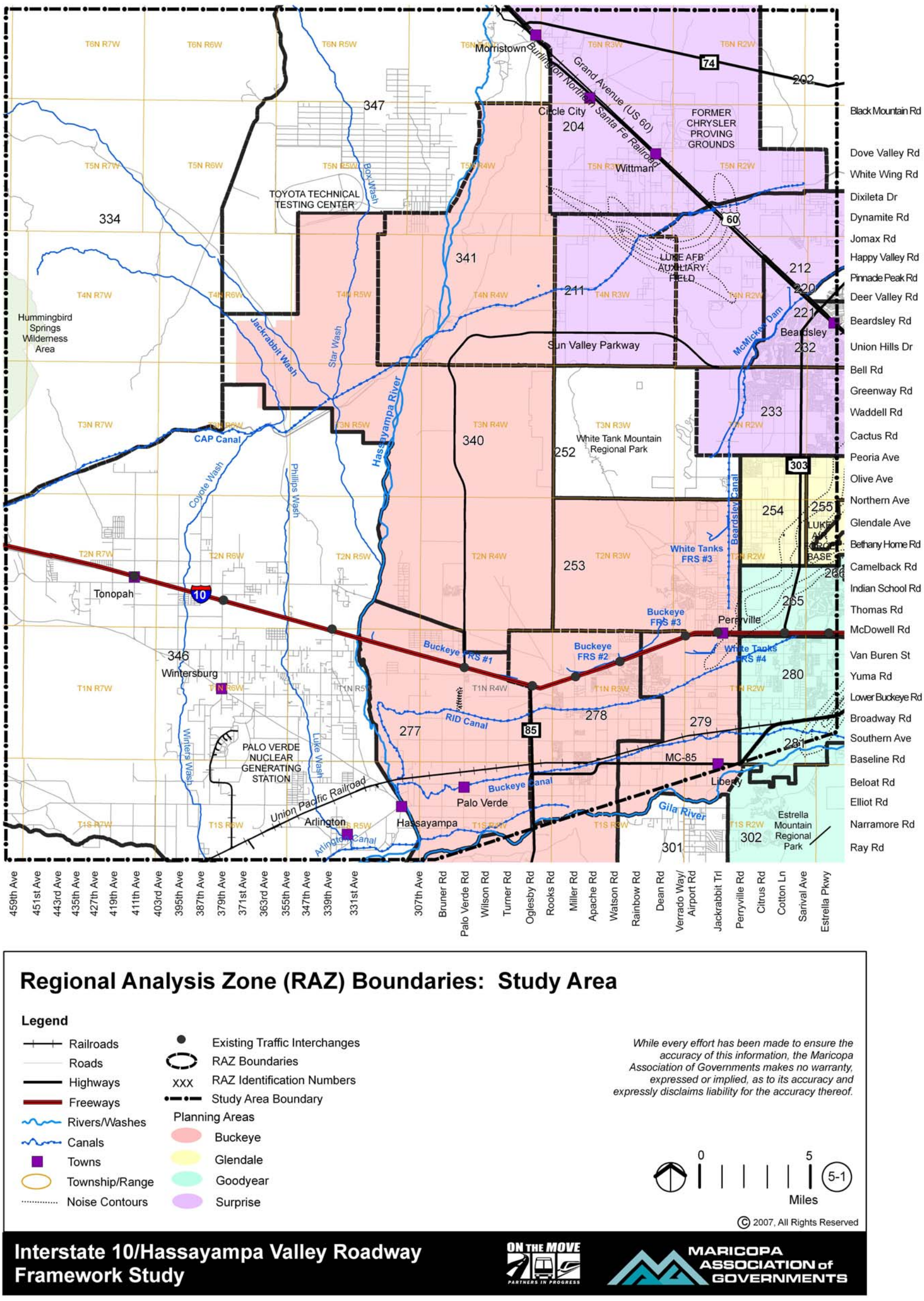
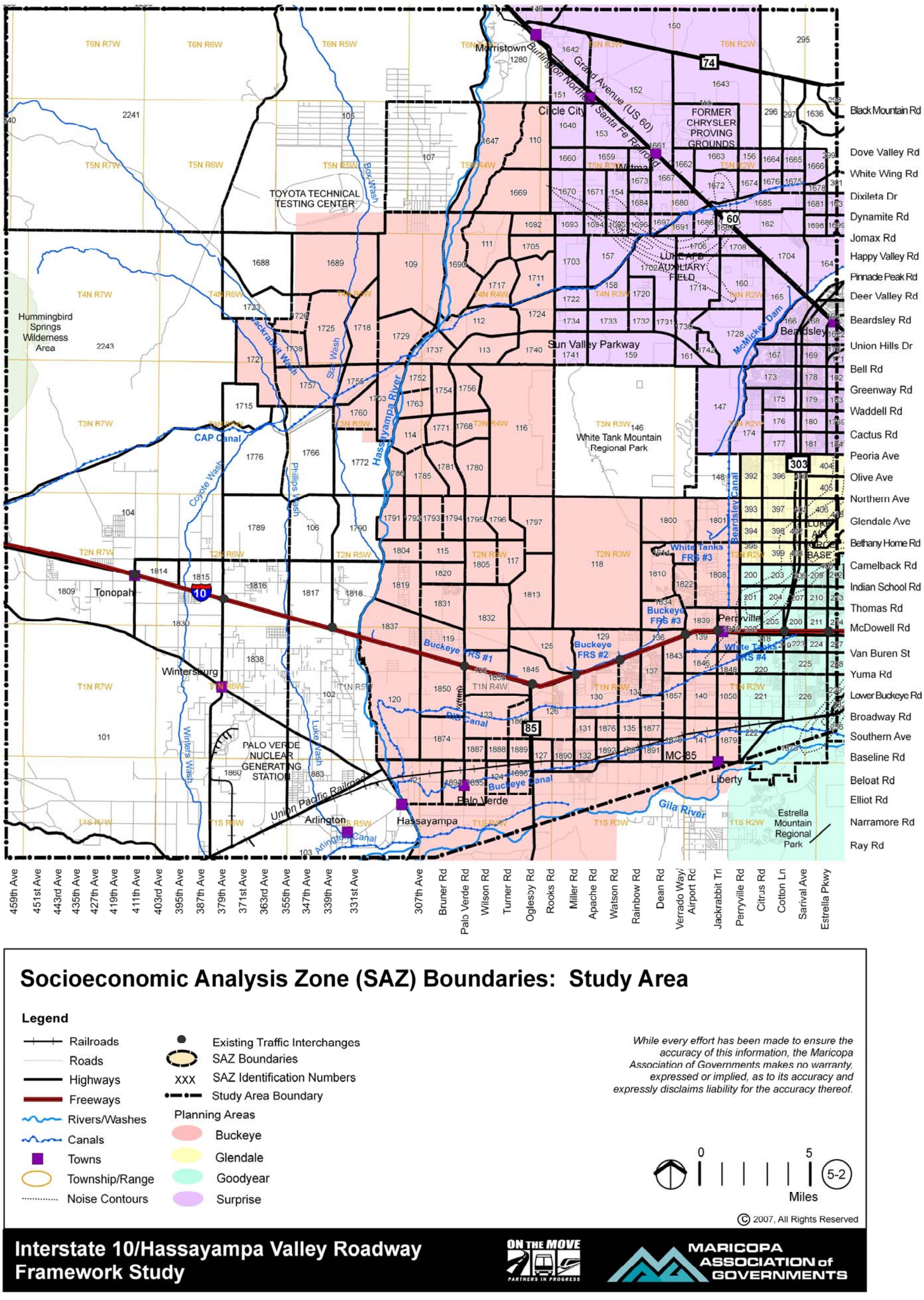


Figure 5-2 Socioeconomic Analysis Zone (SAZ) Boundaries: Study Area



5.4.1 Land Use and Socioeconomic Data Development Process

The MAG Population Technical Advisory Committee is currently conducting an independent update of region-wide population and employment projections as part of the process to update the RTP. As the first step in this update, MAG is developing new Buildout population and employment estimates. These assumptions are based on an amalgamation of (1) expected land development patterns and densities in general plans and comprehensive plans, (2) approved private development plans, and (3) planned or proposed development plans. Each of these sources provides a glimpse of the level of future development in the MAG planning area and, specifically, the density of development for all major land uses. Buildout represents the best current understanding of how the region will develop in the long term. Buildout of the Hassayampa Valley is expected to occur at least 40 to 60 years in the future.

To expedite this study, MAG focused on developing the dataset for the Hassayampa Valley as an initial product in its effort to develop a new Buildout dataset for the entire MAG region. The Buildout population and employment assumptions for this study are based on adopted general and comprehensive plans of MAG member jurisdictions in the study area: Buckeye, Surprise, Goodyear, Glendale and Maricopa County. Planning information was also obtained from Peoria, which borders the study area on the east. MAG is not a land use planning agency, but, as the local MPO, relies on information from its members to compile regional planning data. Initial population and employment estimates were refined by examining current and known future land use and development activities.

The MAG population projections derived from city, town and county data indicate that the study area will be home to nearly 2.8 million people at Buildout. There will be slightly more than one million jobs (1,047,000), or 394 jobs for every 1,000 residents. Interim projections for 2030 show a population of 936,000 and employment of 388,000, equating to 415 jobs per 1,000 residents.

5.4.2 Socioeconomic Data Verification

Accurate forecasts of future travel demand and trip-making depend on the validity of socioeconomic projections. The future magnitude and distribution of population, employment, and development directly affect the number of trips made and travel patterns in and through the study area. A two-step process was used to validate the Buildout socioeconomic datasets used for this study, including:

- Compare study area Buildout estimates with those established for the East Valley
- Compare study area Buildout estimates with expected levels of socioeconomic activity related to committed, approved, planned and proposed master-planned communities

East Valley Comparison

Within the Phoenix metropolitan area, the East Valley communities of Chandler, Gilbert, Guadalupe, Mesa, Queen Creek and Tempe are mature or maturing cities. At Buildout, the study area land use intensity – and therefore population and employment – is expected to be similar to what currently exists in the East Valley. To confirm that MAG's Buildout projections adequately account for expected future development in the study area, the study team performed a reasonableness check by comparing the MAG Buildout population and employment projections for the study area with the year 2030 projections for the six East Valley communities. The East Valley cities are approaching Buildout or expected to reach it in the near- to mid-term. Therefore, it was concluded that the character of development associated with these communities provides a reasonable gauge for Buildout population and employment estimates in the study area.

The first step in this comparison was to quantify existing and future conditions in terms of socioeconomic and roadway network characteristics. The study area is a mosaic of public and private land ownership. Table 5.1 compares public and private land ownership in the study area and the East Valley.

Table 5.1 Existing Ownership Summary by Land Category: Study Area versus East Valley

Land Category	I-10/Hassayampa Valley Study Area		East Valley	
	Acres	Share of Total	Acres	Share of Total
Bureau of Land Management	264,600	28.8%	1,300	0.5%
Bureau of Reclamation	*	0%	1,500	0.6%
County	*	0%	1,500	0.6%
Local and State Parks	29,200	3.2%	4,100	1.7%
Military	2,000	0.2%	*	0%
Private Lands	460,400	50.1%	235,500	95.0%
State Trust Lands	163,200	17.8%	4,000	1.6%
Total	**919,400**	**100%**	**247,900**	**100%**

Source: Arizona State Land Department, Arizona Land Resource Information System (ALRIS), 1988

Notes:
* Negligible

The data in Table 5.1 reveal significant differences between patterns of land ownership in the East Valley and the Hassayampa Valley. The vast majority of land in the East Valley is privately owned, although small areas are held by state and federal agencies along the eastern, northeastern, and northern edges of the East Valley. In contrast, approximately half the land in the Hassayampa Valley study area is publicly held. The BLM controls a large block of land, occupying approximately 265,000 acres or 29% of the study area. The ASLD also controls a large amount of land (approximately 163,000 acres or 18%), but it is scattered among parcels located throughout the study area. Some of these parcels are relatively large, occupying several square miles, while others, especially along the I-10 corridor, are much smaller. Both private and state lands, most of which are likely to develop someday, were included in the total developable land available in the study area.

Although the East Valley is mostly composed of privately held land today, land ownership may have been distributed quite differently several decades ago when the area was less developed. The study team prepared a comparison of land use intensity in the study area and the East Valley, assuming Buildout conditions in the former and 2030 (near-Buildout) conditions in the latter. Table 5.2 compares the two areas with regard to population per acre and dwelling units (DUs) per acre. The table shows an average density of 1.75 DUs per acre under Buildout assumptions, reported in general plans for communities in the Hassayampa Valley. This is about 24% lower than the 2.31 DUs per acre projected for the East Valley in 2030. Table 5.2 also shows that the projected East Valley 2030 population density (population per net developable acre) is 42% higher than the Buildout population density projected for the Hassayampa Valley study area.

In reviewing these differences, the study team noted that the Buildout scenario anticipated by aggregating the general plans in the study area represents the initial vision for future urbanization, given current development activities and trends in which low-density residential development predominates. Expectations reflected in the general plans of the communities may change in the future as the development patters of maturing communities become more prevalent. To put this in context, the East Valley has experienced decades of general plan revisions, updates, and rezoning, as well as redevelopment and infill development activities. In response to these dynamics, communities periodically adjust their general plans. However, the MAG Hassayampa Valley projections provide a reasonable basis at this time for creating a roadway framework that will serve the future population.

Table 5.2 Comparison of Socioeconomic Data: Study Area versus East Valley

Analysis Area	Gross Acres(1)	Net Acres(2)	Population	Pop/ Net Acre	Dwelling Units (DU)	DU/ Net Acre	Employment	Emp/ DU
I-10/Hassayampa study area(3)	919,000	624,000	2,778,000	4.45	1,094,000	1.75	1,047,000	0.96
East Valley comparison area(4)	248,000	239,000	1,512,000	6.33	552,000	2.31	899,000	1.63

Sources: MAG Buildout population and employment estimates for the Hassayampa Valley study area, September 2006; MAG 2030 population and employment estimates, July 2003 for the East Valley area.

Notes:
(1) Total land area of each analysis area.
(2) Net Developable Acres: Sum of private and state trust lands from the ALRIS database.
(3) Projections based on Buildout scenario as defined by study area General Plans.
(4) Projections based on MAG 2030 socioeconomic data adopted for planning purposes.

The study team also examined projected jobs per dwelling unit (DU). As shown in Table 5.2, projected Buildout employment per DU for the study area is less than 60% of that projected for the East Valley in 2030. The lower employment per DU projected for the Hassayampa Valley is influenced by the presence of retirement and "older-adult" communities, and by the current trend toward large-scale residential developments like Douglas Ranch and Verrado. While the current development trend in the study area shows a tendency away from retirement communities and toward more family-oriented communities, it is still not certain that large-scale commercial and industrial development will arise in the study area. There is no current evidence employment per DU will reach the level expected in the East Valley.

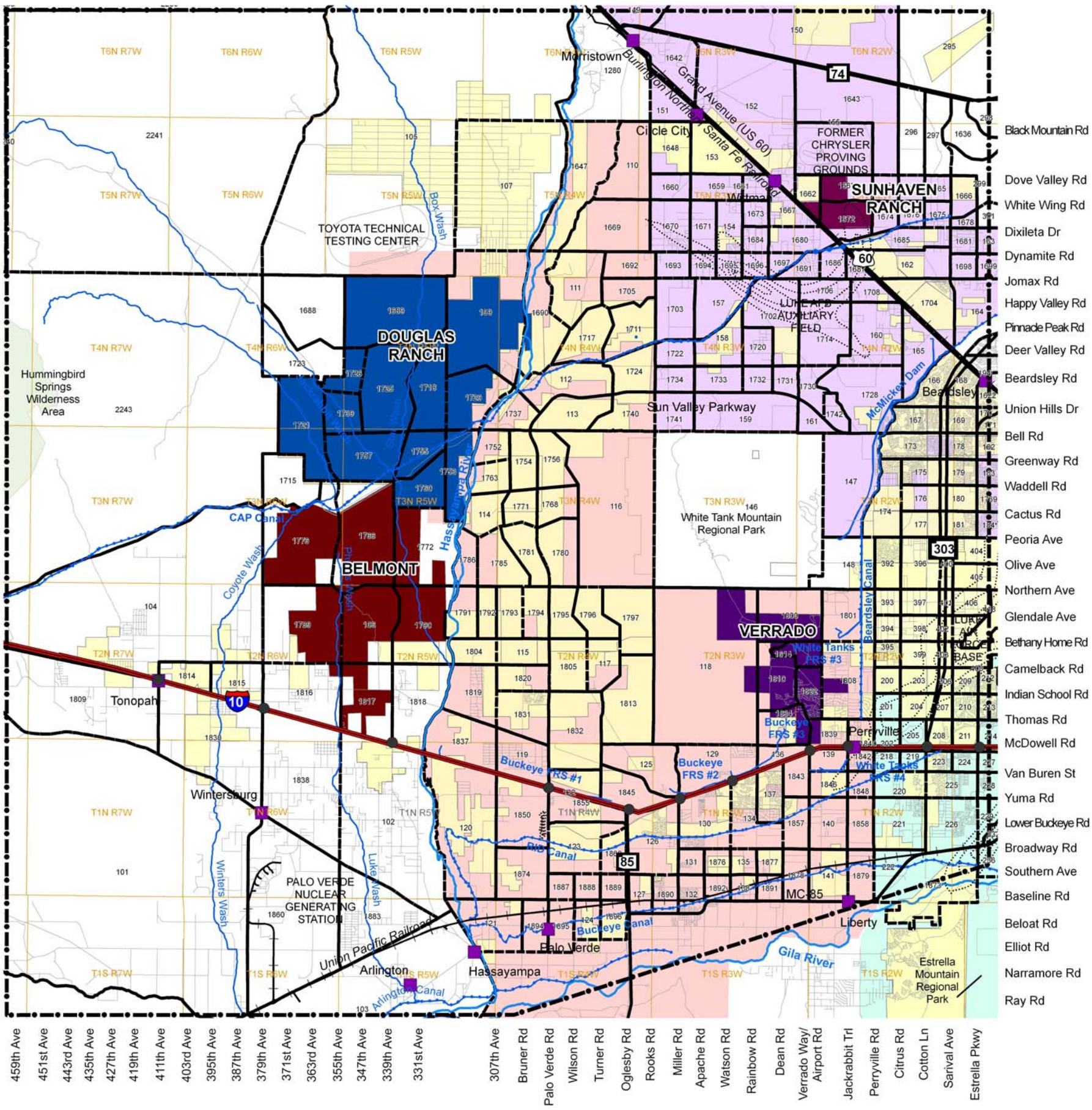
Thus, compared with the East Valley, MAG Buildout projections for the Hassayampa Valley study area reflect the lower population and employment densities of expansive suburban development with a smaller economic base. However, as the Hassayampa Valley matures in future decades, population density estimates may be revised upward to reflect continuing urbanization, and a growing employment base serving the study area population may increase the number of employees per DU. Because the projections show a relatively large disparity between the East Valley and the Hassayampa Valley study area, as part of this study, a socioeconomic sensitivity analysis was conducted using the travel demand model to determine whether a more favorable jobs/housing balance would affect the number of trips leaving the region, and, ultimately, the number of lanes needed on regional high-capacity facilities. The results of the jobs/housing balance sensitivity analysis, as further discussed in Section 5.8, indicate a jobs/housing imbalance will increase roadway capacity needs. They also reveal that general plan updates by communities in the study area should recognize the need to allow for and support development of a diversified economic base that can offer employment opportunities close to home.

Master-Planned Community Comparison

Four master-planned communities – three in the study area and one in the East Valley – were examined to identify the projected amount of employment associated with each. These communities are: Belmont and Douglas Ranch (west of the Hassayampa River), Verrado (north of I-10 and south of the White Tank Mountains), and Sunhaven Ranch (east of US-60 and north of the CAP canal). Figure 5-3 shows the location of these communities and their relationship to MAG SAZs. Appendix B contains socioeconomic data at the SAZ level for the three communities in the study area

Employment projections for these communities were examined to determine the types of employment that would be appropriate for application to this study. Most reported information for the communities did not differentiate between employment types, however. Therefore, the study team adopted a breakdown reflecting the average for employment sectors in the East Valley – 32% retail, 27% office, 24% industrial, 14% public and 3% other--to estimate future employment. The land use percentages were applied to total employment acreage listed for each community, then multiplied by average employees per acre. The calculation resulted in an estimate of the number of employees by employment type for each community (Tables 5.3 through 5.6). Categorization by type is important because some employment sectors tend to pay better than others; e.g., many retail jobs are low-paying. This can affect the jobs/housing balance and, hence, travel demand, depending on housing prices in the area under consideration.

Figure 5-3 Location of Master Planned Communities

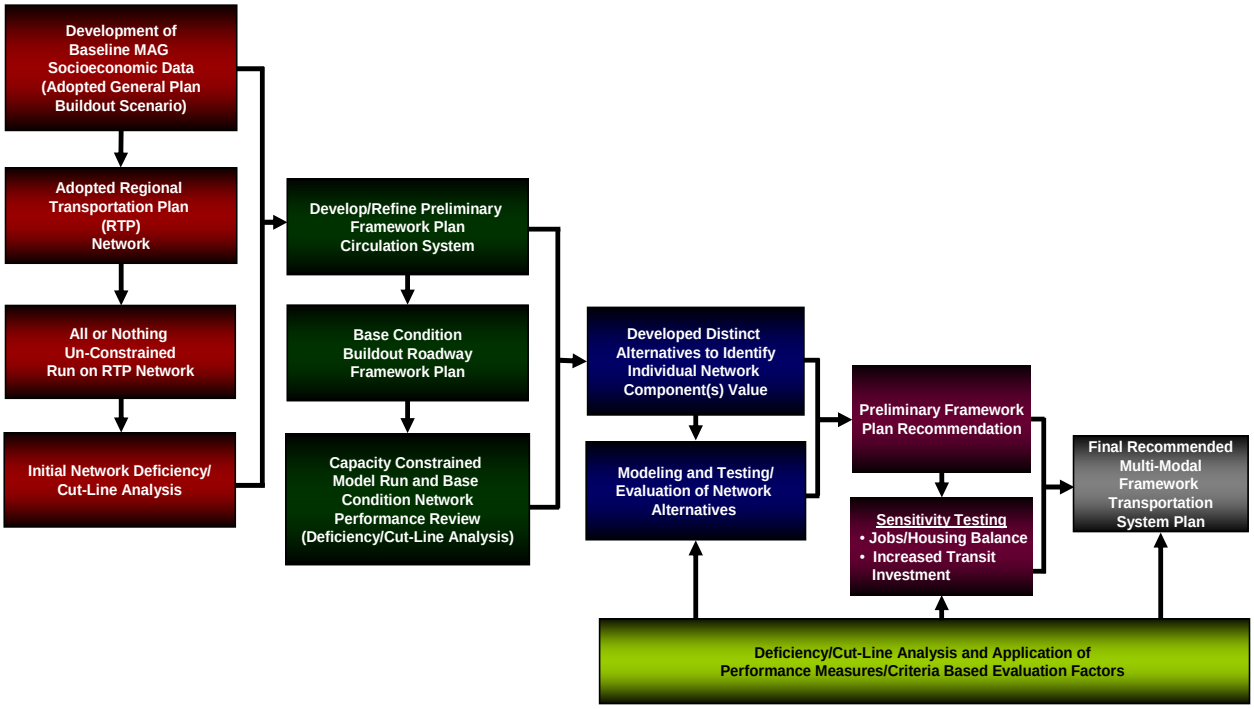


Total employment by community was compared to the amount projected by the MAG socioeconomic modeling process. Tables 5.3 through 5.6 reveal that employment projections generated by the MAG model are much smaller than the separately calculated totals for each master-planned community, except Belmont (Table 5.3). This comparison, like the previous East Valley comparison, demonstrates the need to determine whether (and how much) a more favorable jobs/housing balance would affect the number of trips leaving the region, and ultimately, the number of lanes needed on regional high-capacity facilities. This topic is discussed in more detail in Section 5.8.

5.5 Framework Plan Development Process

The socioeconomic data described above were input to the MAG regional transportation model to generate future travel demand. Figure 5-4 schematically identifies the process used to formulate and identify the components of the future roadway framework plan.

Figure 5-4 I-10/Hassayampa Valley Roadway Framework Study Network Development and Analysis Process



First, the adopted RTP roadway network was used to conduct initial network performance evaluations. Buildout socioeconomic data were coded into the SAZ dataset, and a model run was conducted with no capacity constraints on the RTP roadway network. This "unconstrained" model run provided necessary data to better understand the roadway network needed to accommodate future travel demand under the Buildout scenario. This initial planning-level evaluation was critical to understanding "order of magnitude" roadway needs for the study area.

Table 5.3 Comparative Employment and Land Use Analysis: Belmont Master-Planned Community

Land Use Type	Gross Acres	Net Acres(1)	Net Area (Sq. Ft.)	Floor Area Ratio (FAR)	Net Employment Development (Sq. Ft.)	Employees per 1,000 Sq. Ft.	Estimated No. of Employees
Retail	659	530	23,000,000	0.25 (2)	5,700,000	1.2	6,700
Office	556	440	19,400,000	0.35 (3)	6,800,000	3.1	21,000
Industrial	494	400	17,200,000	0.50 (3)	8,600,000	1.5	13,000
Public	288	230	10,000,000	0.30 (2)	3,000,000	2.6	7,800
Other	62	50	2,180,000	0.65 (2)	1,400,000	0.6	780
						Total	**49,280**
						MAG Model Forecasts Total	46,000
						% Difference	+7%

Source: Wilson & Company, Inc., February 8, 2007

Notes:
(1) Reduced by 20% for public right-of-way (R/W), etc.
(2) FAR based on MAG regional data.
(3) FAR based on knowledge of subregional development trends.

Table 5.4 Comparative Employment and Land Use Analysis: Douglas Ranch Master-Planned Community

Land Use Type	Gross Acres	Net Acres (1)	Net Area (Sq. Ft.)	Floor Area Ratio (FAR)	Net Employment Development (Sq. Ft.)	Employees per 1,000 Sq. Ft.	Estimated No. of Employees
Retail	792	634	27,600,000	0.25 (2)	6,900,000	1.2	8,150
Office	667	534	23,250,000	0.35 (3)	8,140,000	3.1	25,250
Industrial	593	475	20,700,000	0.50 (3)	10,350,000	1.5	15,500
Public	346	275	12,000,000	0.30 (2)	3,600,000	2.6	9,400
Other	74	60	2,600,000	0.65 (2)	1,700,000	0.6	950
						Total	**59,250**
						MAG Model Forecasts Total	38,000
						% Difference	+56%

Source: Wilson & Company, Inc., February 8, 2007

Notes:
(1) Reduced by 20% for public R/W, etc.
(2) FAR based on MAG regional data.
(3) FAR based on knowledge of subregional development trends.

Table 5.5 Comparative Employment and Land Use Analysis: Verrado Master-Planned Community

Land Use Type	Gross Acres	Net Acres(1)	Net Area (Sq. Ft.)	Floor Area Ratio (FAR)	Net Employment Development (Sq. Ft.)	Employees per 1,000 Sq. Ft.	Estimated No. of Employees
Retail	192	154	6,690,000	0.25 (2)	1,670,000	1.2	1,970
Office	162	130	5,650,000	0.35 (3)	1,980,000	3.1	6,000
Industrial	144	115	5,000,000	0.50 (3)	2,500,000	1.5	3,800
Public	84	67	2,900,000	0.30 (2)	880,000	2.6	2,300
Other	18	14	630,000	0.65 (2)	400,000	0.6	225
						Total	**14,295**
						MAG Model Forecasts Total	6,000
						% Difference	+138%

Source: Wilson & Company, Inc., February 8, 2007

Notes:
(1) Reduced by 20% for public R/W, etc.
(2) FAR based on MAG regional data.
(3) FAR based on knowledge of subregional development trends.

Table 5.6 Comparative Employment and Land Use Analysis: Sunhaven Ranch Master-Planned Community

Land Use Type	Gross Acres	Net Acres (1)	Net Area (Sq. Ft.)	Floor Area Ratio (FAR)	Net Employment Development (Sq. Ft.)	Employees per 1000 Sq. Ft.	Estimated No. of Employees
Retail	120	95	4,200,000	0.25 (2)	1,000,000	1.2	1,180
Office	101	80	3,500,000	0.35 (3)	1,200,000	3.1	3,700
Industrial	90	72	3,100,000	0.50 (3)	1,155,000	1.5	2,300
Public	53	42	1,800,000	0.30 (2)	550,000	2.6	1,430
Other	11	9	390,000	0.65 (2)	250,000	0.6	140
						Total	**8,750**
						MAG Model Forecasts Total	6,700
						% Difference	+31%

Source: Wilson & Company, Inc., February 8, 2007

Notes:
(1) Reduced by 20% for public R/W, etc.
(2) FAR based on MAG regional data.
(3) FAR based on knowledge of subregional development trends.

After the preliminary roadway network was developed, the next phase of the study process was to test a base roadway framework under "capacity constrained" conditions. This was followed by identification of roadway network improvement alternatives. Once a set of candidate network alternatives was developed, additional model runs were conducted to evaluate system performance in response to altering individual network components. Evaluation of candidate roadway network alternatives was used to identify a preferred network concept. This network was tested to identify the sensitivity of its performance to a better jobs/housing balance (i.e., a higher ratio of jobs to dwelling units).

5.6 Network Deficiency and Needs Analysis

5.6.1 Baseline Roadway Network at Buildout

The first step in forecasting travel demand for the study area was to conduct an unconstrained traffic assignment using the adopted RTP roadway network. The initial model run was conducted using the baseline RTP roadway network to represent a minimal level of system connectivity within the study area. For the preliminary model run, the regional model was set to allow assignment of trips to the network without any capacity constraints. This resulted in an initial prediction of forecast travel demand on the RTP roadway network and a general indication of the desired travel paths within the study area and to/from surrounding areas.

5.6.2 Methods for Identifying Roadway Network Deficiencies

Desire Line Evaluation

Knowledge gained from the unconstrained model run on the RTP network was used to identify general travel patterns between MPAs in the study area. This information was useful in determining the minimum amount of roadway network capacity that would adequately accommodate projected travel demand under Buildout conditions. Specific data identifying travel patterns between trip origins and trip destinations (termed O-D pairs) in each MPA were organized into trip tables. These tables were then used to establish travel patterns shown in the form of "desire lines."

In the desire line diagram (Figure 5-5), travel between MPAs is represented by a series of lines, with the widths being proportional to the number of (desired) trips. The diagram identifies the daily travel desire lines under Buildout conditions for ten major sub-regions in the Valley. The study area, represented by the Far Northwest Valley sub-region, generates 5.23 million daily (weekday) trips, of which 1.51 million, or 29%, are captured internally. The remaining 3.72 million trips, or 71%, have trip purposes in one of the other nine sub-regions.

Cut-Line Analyses

The second level of assessment involved subregional and focused "cut-line" analyses. Cut-line analysis is a technique that allows a broad assessment of the relationship between network capacity and travel demand. In cut-line analysis, an imaginary line is drawn across (and perpendicular to) all of the major east-west or north-south roadway facilities in a given geographic area. A total cut-line volume is obtained by adding up all the traffic volumes on the individual roadways that cross the cut-line on a typical weekday. Volumes on specific facilities may be high or low because of variations in the model assignment process. The cut-line volume is intended to smooth out these variations by encompassing the total demand for travel in a particular direction over a broad portion of the network.

Figure 5-5 Travel Desire Lines: Far Northwest Valley Subregion at Buildout

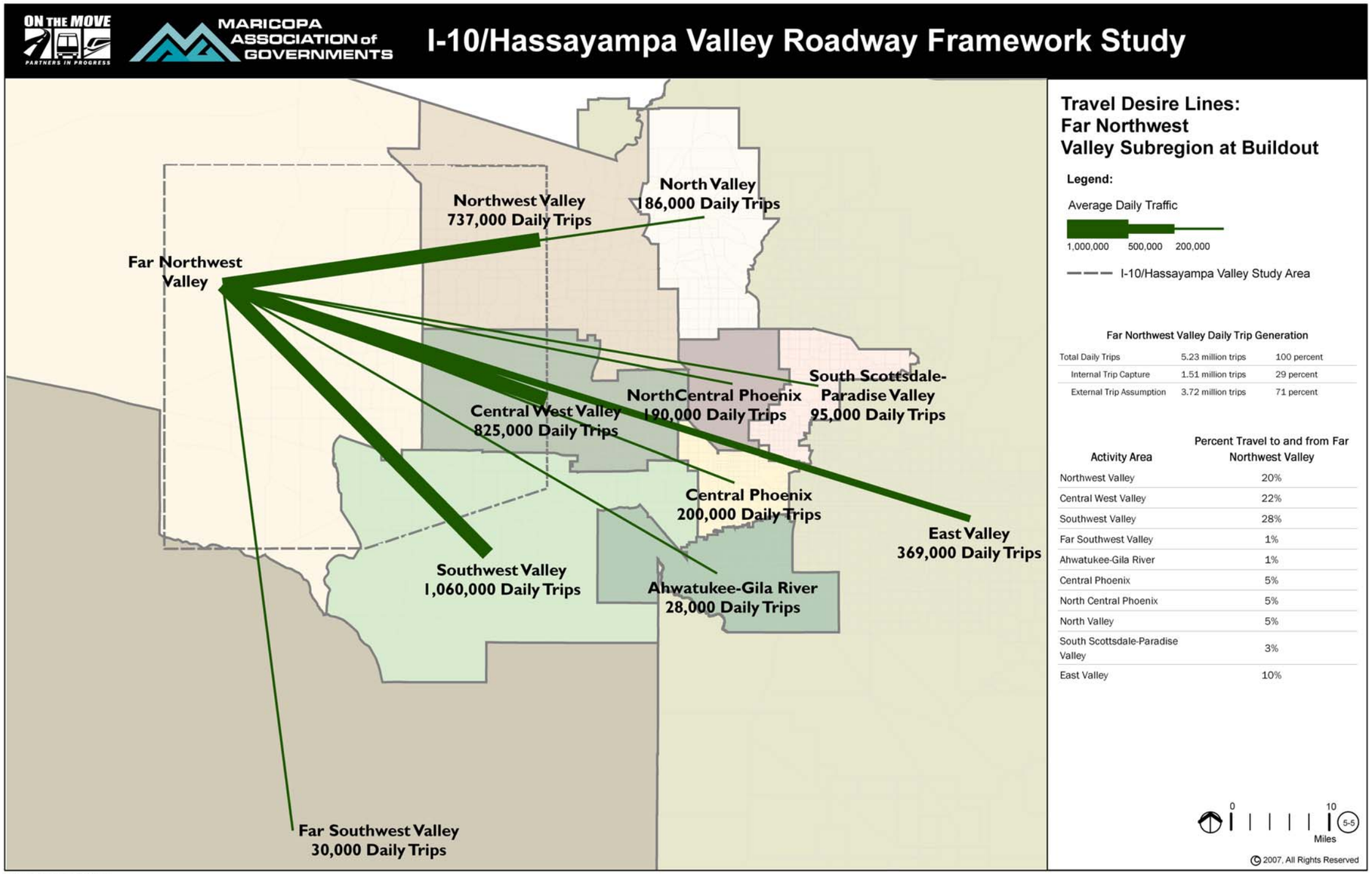


FIGURE NOT TO SCALE
JUNE 12, 2007

The capacity of a given link (roadway segment) in the network is determined by the number of lanes on the link and the functional classification of the roadway. Each roadway crossing the cut-line is reviewed to determine the daily capacity threshold associated with its functional classification at level of service (LOS) "E." The thresholds of major roadways crossing the cut-line are added together to arrive at a total design capacity value for each cut-line. This value is then compared to the total traffic volume crossing the cut-line based on the traffic assignments of the travel demand model. The comparison yields a volume-to-capacity (V/C) ratio, which enables assessment of the adequacy of network capacity relative to the average daily travel demand in the area the network serves. Cut-line analysis and the resulting V/C ratios reveal portions of the roadway network that will experience demand exceeding capacity, resulting in severe congestion during peak travel periods. A cut-line with a projected V/C value greater than one (1.0) represents a location where the aggregate capacity of major roadways crossing the line is insufficient, so that additional capacity (new or widened roads) will be needed to accommodate future demand—unless demand can somehow be reduced.

The LOS concept is used by engineers and planners to measure and describe the operations of various roadway facilities. The LOS grading system qualitatively characterizes traffic conditions associated with varying levels of traffic. These levels range from LOS "A," which indicates free-flow traffic conditions with little or no delay, to LOS "F," which describes severely congested conditions with traffic flows exceeding design capacity, resulting in long queues and delays. LOS "A," "B" and "C" are considered satisfactory. The influence of congestion on traffic flow becomes noticeable at LOS "D." LOS "E" is considered undesirable and is viewed as the limit of tolerable delay. LOS "F" conditions are considered unacceptable. The Highway Capacity Manual, published by the Transportation Research Board, provides techniques for estimating the level of service on various types of transportation facilities. Appendix C includes a table showing the generalized annual average daily traffic volumes that can be accommodated by roadway facilities within five functional classifications.

Buildout Subregional Cut-Line Analysis: West Valley

Six cut-lines--four north-south and two east-west--were identified in relation to major roadways likely to be affected by travel into and out of the study area:

- I-17/SR-101L (north-south)
- SR-303L (north-south)
- Jackrabbit Trail (north-south)
- Hassayampa River (north-south)
- Future White Tank Freeway/SR-303L (east-west)
- I-10 (east-west)

The selection of cut-lines was guided by the presence of major regional roadways and topographic features. Figure 5-6 shows the locations of these cut-lines. Subregional travel into, out of, and through the study area would affect I-17, SR-101L and SR-303L—the nearest north-south freeways east of the Hassayampa Valley study area. Selecting Jackrabbit Trail and the Hassayampa River as cut-lines helped the study team understand the potential impact of the White Tank Mountains barrier on east-west travel patterns.

The forecast traffic volume of each roadway crossing a cut-line was compared to the LOS "E" threshold capacity for the roadway's functional classification (Table 5.7). The total traffic volume of all roadways crossing the cut-line was then compared to the total design capacity at LOS "E."

Figure 5-6 Cut-Line Location Map for Initial Unconstrained Assignment

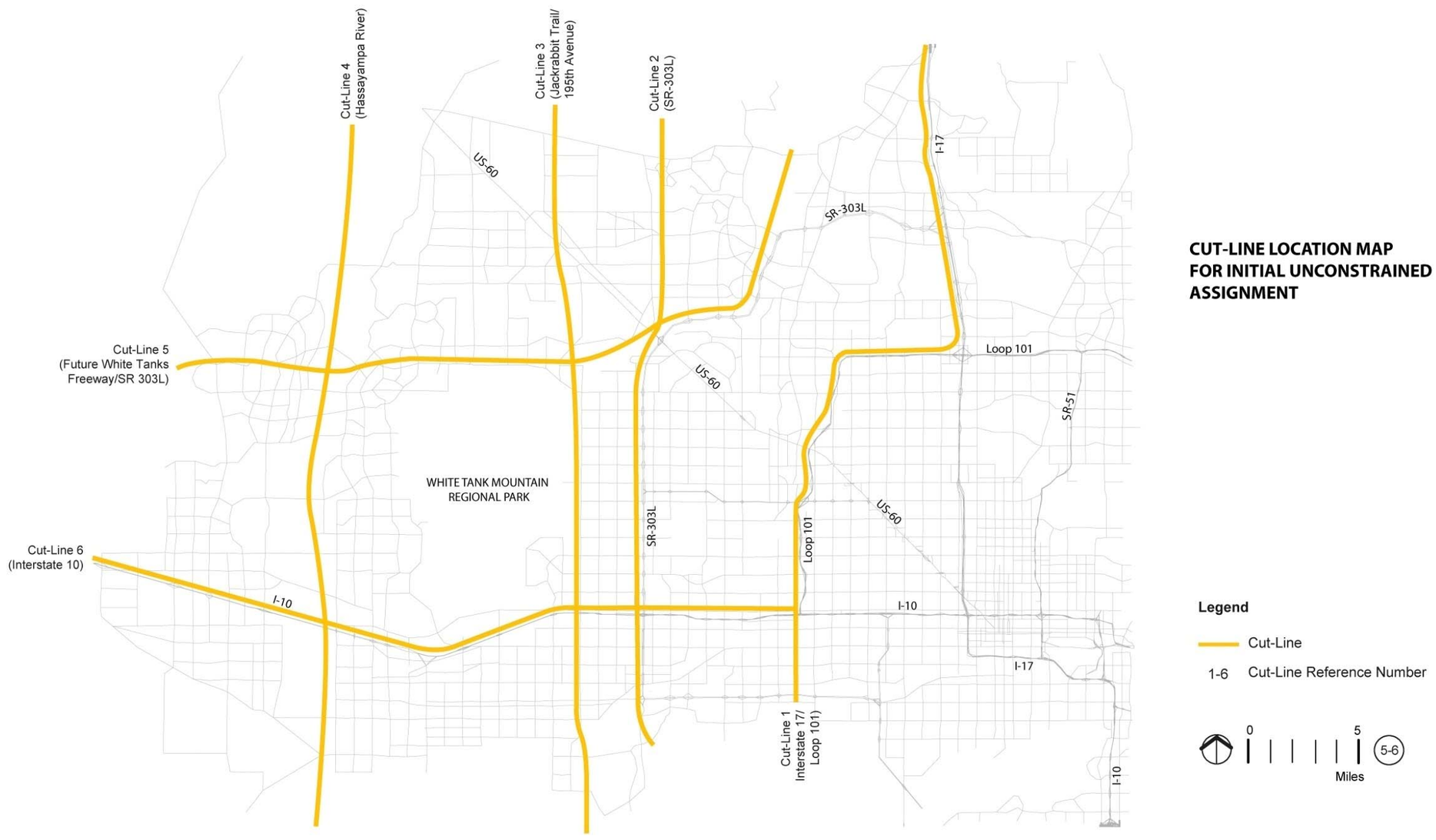


Table 5.7 Unconstrained Subregional Cut-Line Analysis: West Valley

Cut-line	LOS "E" Threshold(1)	Buildout Daily Volume	V/C Ratio(2)
No. 1: I-17/SR-101L (N-S)	2,580,000	4,812,000	1.9
No. 2: SR-303L (N-S)	1,916,000	4,521,000	2.4
No. 3: Jackrabbit Trail (N-S)	2,092,000	3,811,000	1.8
No. 4: Hassayampa River (N-S)	976,000	1,623,000	1.7
No. 5: Future White Tank Freeway/SR-303L (E-W)	1,583,000	2,768,000	1.7
No. 6: I-10 (E-W)	1,887,000	3,432,000	1.8

Source: Wilson & Company, Inc. December 11, 2006

Notes:
(1) LOS: Level of Service.
(2) V/C: Volume to Capacity Ratio.

Under unconstrained conditions, the V/C ratios reveal that forecast traffic volumes (travel demand) across each cut-line are roughly twice as great as the capacity provided by the MAG RTP network. For example, the V/C ratio of 2.4 for Cut-Line 2 (SR-303L) indicates that travel demand on roadways crossing the cut-line would be 2.4 times greater than available roadway capacity, based on an LOS "E" threshold value. All the other cut-lines have V/C ratios greater than 1.6.

Thus, the subregional cut-line analysis shows that the adopted RTP roadway network will not suffice to accommodate the estimated magnitude of traffic expected under Buildout conditions. In other words, the total amount of traffic that both east-west and north-south facilities can accommodate throughout the day, based on the LOS "E" threshold, is considerably less than forecast demand.

Because travel is not uniformly distributed over a 24-hour period but typically peaks in the morning and evening commute hours, a facility that is over capacity on a daily basis would also be expected to experience over-capacity conditions in the peak periods. Therefore, daily V/C ratios exceeding 1.0 show a clear need to consider additional or expanded roadway facilities.

Buildout Focused Cut-Line Analysis: Hassayampa Valley Study Area

A second cut-line analysis was conducted to ascertain more specifically the extent to which study area roadways would be over capacity at Buildout (Table 5.8) To accomplish this second analysis, two cut-lines used for the West Valley analysis above were eliminated and the remaining four were truncated (refer to Figure 5-7). Table 5.8 reveals that the V/C ratios for Cut-Lines A, B and D are greater than the values computed for the West Valley (Table 5.7). In contrast, Cut-Line C has a reduced V/C ratio—-1.3 compared to 1.7. This indicates that the issue of insufficient capacity is associated with the roadway network within—not just outside--the study area.

Figure 5-7 Cut-Line Location Map for Focused Sub-Area Analysis

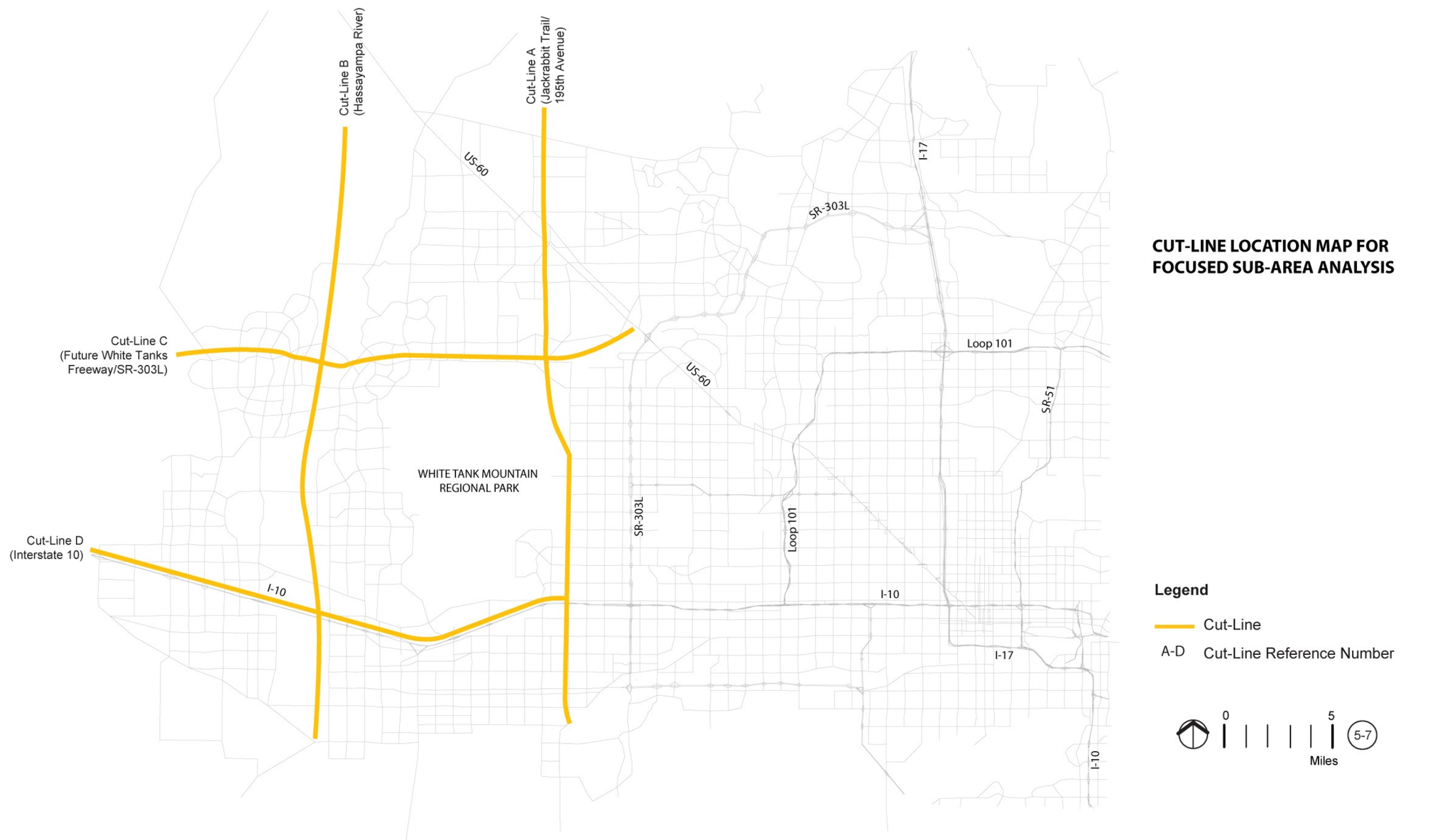


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Table 5.8 Unconstrained Focused Cut-Line Analysis: Hassayampa Valley Study Area

Cut-line	LOS E Threshold(1)	Buildout Daily Volume	V/C Ratio(2)
A. (No. 3) Jackrabbit Trail (N-S)	1,787,000	3,421,000	1.9
B. (No. 4) Hassayampa River (N-S)	640,000	1,369,000	2.1
C. (No. 5) Future White Tank Freeway/SR-303L (E-W)	990,000	1,311,000	1.3
D. (No. 6) I-10 (E-W)	945,000	1,874,000	2.0

Source: Wilson & Company, Inc., December 11, 2006

Notes:
(1) LOS: Level of Service.
(2) V/C: Volume to Capacity Ratio.

By eliminating Cut-Lines 1 and 2, and truncating the other four, the cumulative sum of traffic volumes is more specifically tailored to the study area and permits testing the capacity of the study area roadway network without the influence of traffic in the larger region. It is apparent that travel demand in the study area is forecast to be far greater (in several cases, twice as great) as the capacity provided by the MAG RTP network. The results of the focused cut-line analysis, therefore, indicate that the study area roadway network would experience demand well in excess of capacity under Buildout conditions, and that the identification of additional or expanded roadway facilities will be necessary in advance of development.

Findings of the Cut-Line Analyses

The initial cut-line analysis was based on the unconstrained traffic assignment to the MAG RTP (2026 committed) roadway network. An unconstrained traffic assignment imposes no limits on the amount of travel on network roadways. Therefore, cut-lines for the analysis were selected specifically to (1) aid in examining regional travel effects at the boundaries of the study area and (2) provide a basis for evaluating potential capacity impacts on major roadways within the study area. The initial cut-line analysis clearly showed that the RTP network in the subregion will not have sufficient capacity to accommodate forecast travel demand under Buildout conditions. The second cut-line analysis confirmed the initial analysis and revealed that the capacity deficit in the study area will be worse than in the larger subregion, if the MAG RTP network alone is provided.

The findings of the cut-line analyses support the purpose and need for this study by showing that with only the RTP roadway network in place under Buildout conditions, severe capacity deficiencies will exist. Appendix C contains a complete record of the West Valley and Focused Study Area cut-line analyses by roadway segment. Threshold values presented in Generalized Annual Average Daily Traffic Volumes for Specified Level of Service Categories were used to establish the capacity of each roadway functional classification included in the cut-line analysis.

5.7 Conceptual Roadway Network for the Buildout Forecast

The preceding analyses indicate that expected development levels and forecast traffic volumes associated with Buildout of the study area will exceed the capacity of elements of the RTP roadway network. Therefore, a conceptual network was developed to provide needed additional capacity. This framework of high-capacity and arterial corridors was configured to accommodate projected growth and development under Buildout conditions. Development of the conceptual roadway network relied on an extensive understanding of the traffic flows and patterns associated with general and comprehensive plans, master-planned communities, and known development plans. Approximately 140 interviews and meetings with private and public stakeholders helped guide formulation of the Hassayampa Valley conceptual framework.

The conceptual roadway network provides definition to a system of roads that can meet the future needs of the Hassayampa Valley Study Area as well as the West Valley subregion. A major objective in developing the network was to establish equilibrium; i.e., to establish a balanced pattern and flow of traffic that recognized roadway design constraints and the impact of these constraints on future travel demand. The results of the cut-line analyses of unconstrained traffic flow on the MAG RTP roadway network were used to identify possible network improvements. This was accomplished by examining forecast V/C ratios to determine the location and extent of deficiencies on individual roadways (refer to Appendix C). This review identified where additional traffic lanes or changes in functional classification were necessary to accommodate forecast traffic volumes. Opportunities for high-capacity corridor improvements were then defined for each cut-line link.

The cut-line analyses at the subregional (West Valley) level revealed that 386 new high-capacity travel lanes (beyond those funded in the RTP) will be required on roadways crossing the cut-lines to accommodate unconstrained travel demand at Buildout. Table 5.9 identifies 29 high-capacity corridors—existing and new--where 188 new travel lanes could be added to the subregional roadway network to alleviate capacity problems. These new lanes would increase network capacity by 44%, while supplying 49% of the additional capacity needed to meet overall demand. The resulting overall average V/C ratio across all cut-lines would improve (decline) from 1.9 to 1.3 with these additions to network capacity. Nevertheless, Table 5.9 indicates that 213 additional travel lanes would still be needed to eliminate all capacity problems in the subregion. (In this discussion, the "number of additional travel lanes" refers to the total number of lanes crossing the various cut-lines included in the analysis. The number of new lanes is cumulative across all the cut-lines affected. For example, if I-10 crosses two cut-lines, and the highway is widened by two lanes as it crosses each cut-line, the resulting number of lanes added to the roadway network is four.)

Table 5.9 Subregional Cut-Line and Volume to Capacity (V/C) Analysis

Cut-Line		Total Cut-Line Traffic Volume Summary						High-Capacity Corridor Solutions				
No.	**Name**	**RTP Network Capacity**	**Forecast Buildout Volume**	**V/C Ratio**	**Volume in Excess of Capacity**	**Daily Planning Level Threshold Volume per Lane (LOS E)**	**New Lanes Required**	**Candidate High-Capacity Corridor Construction/Improvement Opportunity**	**Total New/ Added Lanes**	**Total Lane Deficiency**	**Estimated New Capacity**	**Estimated Resulting V/C**
1	I-17/SR-101L	2,580,000	4,812,000	1.9	2,232,000	25,750	87	Add New River Freeway (10 Lanes) Widen SR-303L (4 New Lanes) Add New White Tank Freeway Extension (10 New Lanes) Improve Northern to Freeway (2 New Lanes) Widen I-10 (4 New Lanes) Widen SR-801 (4 New Lanes)	34	53	3,456,000	1.4
2	SR-303L	1,916,000	4,521,000	2.4	2,605,000	25,750	101	Improve SR-74 to Freeway (4 New Lanes) Add New White Tank Freeway (10 New Lanes) Improve Northern to Freeway (2 New Lanes) Widen I-10 (4 New Lanes) Widen SR-801 (4 New Lanes)	24	77	2,534,000	1.8
3	Jackrabbit Trail	2,092,000	3,811,200	1.8	1,719,000	25,750	67	Improve SR-74 to Freeway (4 New Lanes) Add New White Tank Freeway (10 New Lanes) Add Northern Avenue Freeway (10 New Lanes) Widen I-10 (4 New Lanes) Widen SR-801 (4 New Lanes)	32	35	2,916,000	1.3
4	Hassayampa River	976,000	1,623,000	1.7	647,000	25,750	25	Add SR-74 Freeway Extension (10 New Lanes) Add New White Tank Freeway (10 New Lanes) Add Northern Avenue Freeway Extension (6 New Lanes) Widen I-10 (4 New Lanes) Add SR-801 (10 New Lanes)	40	(none)	2,006,000	0.8
5	Future White Tank Freeway/SR-303L	1,580,000	2,768,000	1.8	1,188,000	25,750	46	Add SR-74 Freeway Extension (10 New Lanes) Add New White Tank Freeway (10 New Lanes) Improve Grand Avenue to Freeway (4 New Lanes) Add New Hassayampa Freeway (10 New Lanes)	34	12	2,456,000	1.1
6	I-10	1,887,000	3,432,000	1.8	1,545,000	25,750	60	Widen SR-101L (2 New Lanes) Widen SR-303L (4 New Lanes) Add New Hassayampa Freeway (10 New Lanes) Add New White Tank Western Freeway Extension (8 New Lanes)	24	36	2,505,000	1.4
				Avg.								Avg.
Subregional Totals:		11,031,000	20,967,000	1.9	9,936,000		386		188	213	15,873,000	1.3
									Source: Wilson & Company, December 13, 2006			

Source: Table 3. Model Development Process/Initial Analysis Results Presentation, MAG, December 14, 2006, I-10/Hassayampa Valley Roadway Framework Study, prepared by Wilson & Company

A similar assessment was undertaken in order to identify new capacity opportunities within the study area. Table 5.10 shows that, left unchanged, the MAG RTP roadway network in the study area would operate at a V/C of 1.8 under Buildout conditions. In the same manner applied to the larger West Valley subregion, potential improvements to high-capacity corridors were identified for the study area. Table 5.10 shows that an additional 139 new travel lanes in 15 high-capacity corridors would be necessary to accommodate unconstrained travel demand at Buildout. Opportunities for 108 high-capacity lanes on roadways crossing the four cut-lines were identified in these high-capacity corridors. The added travel lanes represent 77% of the additional required capacity. The resulting aggregate V/C ratio for the study area would be 1.1, representing a significant improvement.

In sum, the cut-line analyses at the subregional and focused study area levels revealed a number of opportunities to enhance the MAG RTP roadway network and accommodate much of the forecast travel demand. These potential solutions, defined with the aid of cut-line analyses, have been integrated into the conceptual transportation network and alternatives described in Chapter 6. It is also clear that additional roads and travel lanes can be only a partial solution in the long run. Local land use planning and partnerships with developers should be structured to improve the jobs/housing balance, particularly in master-planned communities. Improving the jobs/housing balance will increase the number of trips that stay in the study area (capture rate) and reduce the number of long-distance commute trips to areas beyond the study area (external trips). Measures to reduce travel demand, such as public transit, non-motorized transportation, ridesharing and telecommuting, can play an important part in reducing long-range traffic volumes in the study area.

Chapter 6 describes the conceptual network and specific network alternatives in detail. Appendix D compares the size of the conceptual network to the roadway systems in other metropolitan areas.

5.8 Network Performance Sensitivity Analysis

The preceding analyses yielded the hypothesis that a better balance between employment and housing (i.e., a higher ratio of jobs to dwelling units) in the study area would improve trip capture. Increasing trip capture for the study area, in turn, would reduce travel demand on study area and subregional roadways and mitigate capacity problems. Therefore, a sensitivity analysis was conducted to evaluate the performance of the MAG RTP roadway network, assuming a more balanced relationship between jobs and housing. The sensitivity analysis was designed to evaluate and quantify the impact of improved internal trip capture on external travel demand and resulting traffic volumes.

Network performance with a more favorable jobs/housing balance was evaluated using the six cut-lines identified for the subregional (West Valley) analysis. This assessment assumed that more jobs would be located in the West Valley and, therefore, external travel desires would be reduced. Table 5.11 reveals that a decrease in travel demand associated with an improved jobs/housing balance would significantly reduce the number of identified network deficiencies. There would be a corresponding decrease in the need for additional lanes in high-capacity corridors crossing the six cut-lines. Without an improved jobs/housing balance, there was a need for 386 new high-capacity travel lanes (refer to Table 5.9). With the assumption of an improved jobs/housing balance, Table 5.11 shows that the need for additional lanes drops to 157. As an example, Table 5.11 indicates the unconstrained traffic volume at the Jackrabbit Trail cut-line would be approximately 2,744,000. This represents a 28% decrease from the forecast of approximately 3,811,000 in the initial unconstrained travel demand assignment (Table 5.9).

Thus, Table 5.11 reveals that an increase in internal employment opportunities would reduce the amount of traffic flowing into and out of the West Valley subregion. A similar effect would occur with any condition that reduces the desire to travel out of the study area (for example, high-capacity and frequent transit service, carpooling, vanpooling, telecommuting). In the particular scenario tested, the aggregate annual average traffic volume for the six cut-lines of almost 21 million vehicles daily (as shown in Table 5.9) would drop to 15.1 million, yielding an overall V/C ratio of 1.4 for the MAG RTP roadway network. If all of the candidate high-capacity corridor improvement opportunities incorporated in the conceptual roadway framework were added, a V/C ratio of 0.95 would be achieved for the subregional roadway network.

Table 5.10 Focused Sub-Area Cut-Line and Volume to Capacity (V/C) Analysis

Cut-Line		Total Cut-Line Traffic Volume Summary						High-Capacity Corridor Solutions				
No.	**Name**	**RTP Network Capacity**	**Forecast Buildout Volume**	**V/C Ratio**	**Volume in Excess of Capacity**	**Daily Planning Level Threshold Volume per Lane (LOS E)**	**New Lanes Required**	**Candidate High-Capacity Corridor Construction/Improvement Opportunity**	**Total New/ Added Lanes**	**Total Lane Deficiency**	**Estimated New Capacity**	**Estimated Resulting V/C**
A	Jackrabbit Trail	1,787,000	3,421,000	1.9	1,634,000	25,750	63	Improve SR-74 to Freeway (4 New Lanes) Add New White Tank Freeway (10 New Lanes) Add Northern Avenue Freeway (10 New Lanes) Widen I-10 (4 New Lanes) Widen SR-801 (4 New Lanes)	32	31	2,611,000	1.3
B	Hassayampa River	640,000	1,369,000	2.1	729,000	25,750	28	Add SR-74 Freeway Extension (10 New Lanes) Add New White Tank Freeway (10 New Lanes) Add Northern Avenue Freeway Extension (6 New Lanes) Widen I-10 (4 New Lanes) Add SR-801 (10 New Lanes)	40	(none)	1,670,000	0.8
C	Future White Tank Freeway/SR-303L	990,000	1,311,000	1.3	321,000	25,750	12	Improve Grand Avenue to Freeway (4 New Lanes) Add New Hassayampa Freeway (10 New Lanes)	14	(none)	1,351,000	1.0
D	I-10	945,000	1,874,000	2.0	929,000	25,750	36	Widen SR-303L (4 New Lanes) Add New Hassayampa Freeway (10 New Lanes) Add New White Tank Western Freeway Extension (8 New Lanes)	22	14	1,512,000	1.2
				Avg.								Avg.
Subregional Totals:		4,362,000	7,975,000	1.8	3,613,000		139		108	45	7,144,000	1.1

Source: Wilson & Company, December 11, 2006.

Source: Table 6. Model Development Process/Initial Analysis Results Presentation, MAG, December 14, 2006

Table 5.11 Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis with Modified Jobs/Housing Balance

Cut-Line		Total Cut-Line Traffic Volume Summary [1]						High-Capacity Corridor Solutions				
No.	Name	Capacity	Volume	V/C Ratio	Volume in Excess of Capacity	Daily Planning Level Threshold Volume per Lane (LOS E)	New Lanes Required	Candidate High-Capacity Corridor Construction/Improvement Opportunity	Total New/ Added Lanes	Total Lane Deficiency	Estimated New Capacity	Estimated Resulting V/C
1	I-17/SR-101L	2,580,000	3,465,000	1.3	885,000	25,750	34	Add New River Freeway (10 Lanes) Widen SR-303L (4 New Lanes) Add New White Tanks Freeway Extension (10 New Lanes) Improve Northern to Freeway Status (2 New Lanes) Widen I-10 (4 New Lanes) Widen SR-801 (4 New Lanes)	34	(none)	3,456,000	1.0
2	SR-303L	1,916,000	3,255,000	1.7	1,339,000	25,750	52	Improve SR-74 to Freeway (4 New Lanes) Add New White Tanks Freeway (10 New Lanes) Improve Northern to Freeway (2 New Lanes) Widen I-10 Freeway (4 New Lanes) Widen SR-801 Freeway (4 New Lanes)	24	28	2,534,000	1.3
3	Jackrabbit Trail	2,092,000	2,744,000	1.3	652,000	25,750	25	Improve SR-74 to Freeway Status (4 New Lanes) Add New White Tanks Freeway (10 New Lanes) Add Northern Avenue Freeway (10 New Lanes) Widen I-10 Freeway (4 New Lanes) Widen SR-801 Freeway Facility (4 New Lanes)	32	(none)	2,916,000	0.9
4	Hassayampa River	976,000	1,169,000	1.2	193,000	25,750	7	Add SR-74 Freeway Extension (10 New Lanes) Add New White Tanks Freeway (10 New Lanes) Add Northern Avenue Freeway Extension (6 New Lanes) Widen I-10 Freeway (4 New Lanes) Add SR-801 Freeway Facility (10 New Lanes)	40	(none)	2,006,000	0.6
5	Future White Tanks Freeway/SR-303L	1,583,000	1,993,000	1.3	410,000	25,750	16	Add SR-74 Freeway Extension (10 New Lanes) Add New White Tanks Freeway (10 New Lanes) Improve Grand Avenue to Freeway Status (4 New Lanes) Add New Hassayampa Valley Freeway (10 New Lanes)	34	(none)	2,459,000	0.8
6	I-10	1,887,000	2,471,000	1.3	584,000	25,750	23	Widen SR-101L Freeway (2 New Lanes) Widen SR-303L Freeway (4 New Lanes) Add New Hassayampa Valley Freeway (10 New Lanes) Add New White Tanks Western Freeway Extension (8 New Lanes)	24	(none)	2,505,000	1.0
				Avg.								Avg.
	Subregional Totals:	11,034,000	15,097,000	1.4	4,063,000		157		188	28	15,876,000	0.9

Source: Wilson & Company, December 13, 2006.

Note:

(1) Estimated Volume Level in Excess of Capacity with Modified Jobs/Housing Balance in "Far Northwest Valley" Planning Area.

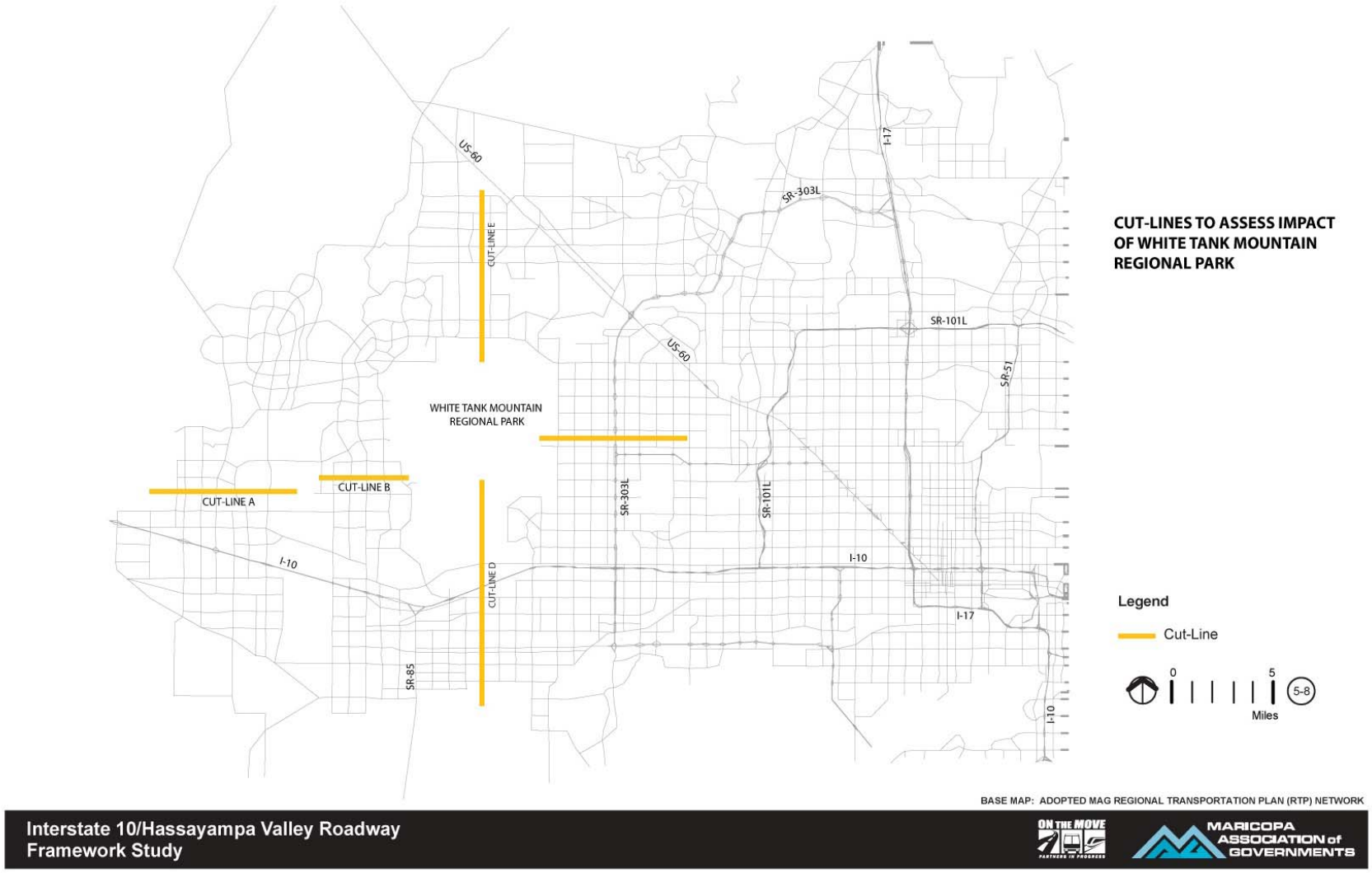
Source: Table 4. Model Development Process/Initial Analysis Results Presentation, MAG, December 14, 2006, I-10/Hassayampa Valley Roadway Framework Study, prepared by Wilson & Company

5.9 Evaluation of Year 2030 Travel Demand

An assessment was conducted to forecast the potential state of the Buildout network under year 2030 travel demand conditions. The recommended Conceptual Transportation Framework developed in this study (Chapter 6) includes new regional freeways and parkways designed to (1) mitigate network deficiencies revealed by the cut-line analyses and (2) respond to the issues and concerns raised by study area stakeholders. The White Tank Mountains form a barrier to both north-south and east-west travel, but especially the latter. Therefore, five new cut-lines were delineated to assist in evaluating the impact of the mountains on travel in the study area (Figure 5-8).

Running the MAG regional travel demand model with 2030 socioeconomic data shows that the recommended Conceptual Transportation Framework would provide adequate capacity to accommodate traffic levels expected in the study area in 2030 (Table 5.12). The recommended Conceptual Transportation Framework provides 227 total lanes of travel (across the various cut-lines) with a capacity of over 3,000,000 vehicles per day. The forecast total traffic volume in 2030--approximately 1,500,000 vehicles per day--is slightly less than one-half the capacity. The worst conditions would exist in relation to Cut-Lines C and D, but overall conditions at these two cut-lines would still be well under capacity. But one facility—SR-303L freeway at Cut-Line C--would be slightly over capacity with a V/C ratio of 1.04.

Figure 5-8 Cut-Line Location Map to Assess Impact of White Tank Mountain Regional Park



The adopted MAG RTP roadway network does not include 36 lanes of north-south oriented freeway and parkway facilities incorporated in the recommended Conceptual Transportation Framework to serve areas east and west of the White Tank Mountains (refer to Figure 5-8). It also does not include 59 lanes of freeway and parkway facilities that have been recommended to serve east-west travel north and south of the White Tank Mountains. Therefore, an analysis was undertaken to evaluate the potential for capacity problems associated with the MAG RTP network in 2030.

Table 5.13 shows that construction of only the RTP network would result in an overall V/C ratio of 1.20 in 2030 across north-south Cut-Line D, located south of the mountains. East-west arterial roadways crossing Cut-Line D would operate just below capacity, with a V/C ratio of 0.96. However, I-10, the only freeway crossing Cut-Line D, would present severe capacity problems, with a forecast V/C of 1.80. SR-303L, the only freeway crossing east-west Cut-Line C, would have an even worse V/C ratio of 2.36. Because the RTP network has far fewer freeways and parkways than does the Conceptual Roadway Framework, the overall V/C ratio for east-west roadways crossing Cut-Lines D and E will approach 80% of capacity by 2030.

The results of this analysis of year 2030 travel demand indicate that 2030 traffic conditions in certain corridors under the adopted MAG RTP roadway network will be at or over capacity. The forecast conditions are serious enough to conclude that the capacity provided by this currently planned system will not be adequate to serve forecast travel demand. Further, the analysis demonstrates that improvements to benefit traffic crossing two cut-lines—C and D—prior to 2030 will be critical.

Table 5.12 Cut-Line Analysis Summary - Year 2030 Conditions: Recommended Roadway Network

Cut-Line	Facility Type Description	Total Lanes	Daily per Lane Capacity	Total Cut-line Capacity	Year 2030 Model Volume Estimate	Volume-to-Capacity (V/C) Ratio
A	Freeway	6	24,850	149,100	31,000	0.21
A	Parkway	12	22,250	267,000	21,000	0.08
A	Arterial	12	10,900	130,800	3,000	0.02
Cut-Line Total				**546,900**	**55,000**	**0.10**
B	Parkway	12	22,250	267,000	40,000	0.15
B	Arterial	16	10,900	174,400	10,000	0.06
Cut-Line Total				**441,400**	**50,000**	**0.11**
C	Freeway	10	25,750	257,500	268,000	1.04
C	Parkway	6	22,250	133,500	36,000	0.27
C	Arterial	44	10,900	479,600	293,000	0.61
Cut-Line Total				**870,600**	**597,000**	**0.69**
D	Freeway	19	25,750	489,250	352,000	0.72
D	Parkway	18	22,250	400,500	109,000	0.27
D	Arterial	16	10,900	174,400	31,000	0.18
Cut-Line Total				**1,064,150**	**492,000**	**0.46**
E	Freeway	12	24,850	298,200	107,000	0.36
E	Parkway	24	22,250	534,000	152,000	0.28
E	Arterial	20	10,900	218,000	29,000	0.13
Cut-Line Total				**1,050,200**	**288,000**	**0.27**
Sum of North-South travel (Cut-Lines A, B, & C)				1,858,900	702,000	0.38
Sum of East/West travel (Cut-Lines D & E)				2,114,350	780,000	0.37

Source: MAG Regional Travel Demand Model Run with 2030 Socioeconomic Data; Wilson & Company, July 2007

Table 5-13 Cut-Line Analysis Summary - Year 2030 Conditions: Adopted Regional Transportation Plan Roadway Network

Cut-Line	Facility Type Description	Total Lanes	Daily per Lane Capacity	Total Cut-line Capacity	Buildout Model Volume Estimate	Volume-to-Capacity (V/C) Ratio
A	Arterial	28	10,900	305,200	55,000	0.18
Cut-Line Total				**305,200**	**55,000**	**0.18**
B	Arterial	24	10,900	261,600	50,000	0.19
Cut-Line Total				**261,600**	**50,000**	**0.19**
C	Freeway	6	24,850	149,100	352,000	2.36
C	Arterial	46	10,900	501,400	140,000	0.28
Cut-Line Total				**650,500**	**492,000**	**0.76**
D	Freeway	6	24,850	149,100	268,000	1.80
D	Parkway	2	22,250	44,500	36,000	0.81
D	Arterial	28	10,900	305,200	293,000	0.96
Cut-Line Total				**498,800**	**597,000**	**1.20**
E	Freeway	0	24,850	0	0	0.00
E	Parkway	6	22,250	133,500	152,000	1.14
E	Arterial	46	10,900	501,400	136,000	0.27
Cut-Line Total				**634,900**	**288,000**	**0.45**
Sum of North-South travel (Cut-Lines A, B, & C)				1,217,300	597,000	0.49
Sum of East/West travel (Cut-Lines D & E)				1,133,700	885,000	0.78

Source: MAG Regional Travel Demand Model Run with 2030 Socioeconomic Data; Wilson & Company, July 2007

APPENDIX A
MAG MEETING NOTES

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, March 31, 2006, 11:00 am

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Contract Matters**
2. **Modeling Matters**
   - MAG Coordinator for modeling activities
   - Initiating coordination of model update process (Dan)
   - MAG's new modeling platform and timetable
   - Early action items for modeling update (Dan)
   - TransCAD and its possible use on this project
   - Availability of MAG population projections
   - Model zone structure for the Study Area
   - Production of model plots
3. **Upcoming Meetings**
   - Planning for upcoming Developer Stakeholder Meeting (John)
   - Protocol for efficient contact and communication with community members, property owners, and developers (John)
4. **Project/Task Scheduling**
   - NTP date and team member availability
   - Finalizing subconsultant scopes and contracts with DMJM Harris
   - Identifying new developments in the Study Area since the SRT Scoping Meeting
   - Initiation of transportation and land use data collection
   - Evaluation of funding options
5. **Next Steps**
   - Developer Stakeholder Meeting
   - Important Issues to address
     - Regional Background
     - Buildout Year
     - Transit
     - Peer City comparisons
   - Resources/Needs to complete project

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, March 31, 2006

Location: DMJM Harris

Attendees:
Bob Hazlett, MAG
Ethan Rauch, DMJM Harris
Dan Marum, Wilson & Company
John McNamara, DMJM Harris
Mark Peterson, Wilson & Company

1. Contract

The MAG contract with DMJM Harris will be ready for signature Monday or Tuesday.

2. Modeling and Related Issues

- Mark Schlappi is retiring October 15. He will designate someone to coordinate modeling for this project.
- Bob wants to run a "million person scenario" for our study area. On April 20, MAG will announce the new modeling platform to replace EMME-2. The timing for this may or may not mesh with our project schedule. We will need our forecast output by the end of May, and the new 2030 forecasts may not be available in time. Also, MAG must expand the model area westward. Bob would like to extend it all the way to the County line.
- Mark P noted that in previous propjets, we've been delayed for months waiting for modeling results. We can't afford to let that happen now. We already know the Buckeye Buildout scenario blows up in EMME-2. Bob is confident that the new software (not announced yet) will be able to run this scenario, because it doesn't' depend on integers. This issue needs to be resolved by the end of next week (April 7).
- Bob suggested that consultant staff visit the MAG office once the model input data are available, and have an informal workshop so everyone will be on the same page. Wilson & Company has access to TransCAD, in case MAG selects it as the new modeling software. TransCAD can complete a model run in four hours, instead of four days required by EMME-2. Bob would like to use TransCAD, but we can't wait three months for it. MAG's customers will expect to have alternatives ready for discussion by Labor Day.
- No new population projections will be available until October. We'll work with the old 2003 numbers.
- MAG has already set up RAZs for the entire County, and these were provided to the consultant team (Wilson). The group agreed to hold a two-day internal workshop primarily on modeling issues. John asked what else we can accomplish then and what homework should be done in advance.
- MAG will give us whatever MAGNET (?) layers we don't have, and we can use these to produce plots.

Action Items

- We need to develop an itemized list of scenarios to be modeled.
- Bob will see Eric, get a recommendation on which platform to use for our project, and then provide direction to Schlappi.
- The consultants need to start piecing together the network and TAZ boundaries with the RAZs.

3. Timetable for Upcoming Meetings

- April 11, 10:00 AM at MAG: Internal Modeling Discussion (Dan, Mark P., and MAG staff only)
- April 11, 12:30 PM at MAG: Project Kick-Off Meeting
- Within two weeks of Notice to Proceed (NTP), around April 19th: Developer Stakeholder Meeting
- Week of April 24th: Project Team Workshop (two days)

4. Next Steps

- Developer Stakeholder Meeting (PSA & DMJM Harris)
  - List of Invitees

- Agenda
- Location
- Information Requested
- Handout Information
- Structure/Protocol (PSA)

- Issues of Concern to Address
  - Regional Background at I-10/Hassayampa Buildout year
    - Land Use
    - Network
  - Level of Transit Investment
  - Peer City Relevance: Atlanta, Chicago, Dallas, Houston
- Resources Needed (John's list) and Suggested Responsibilities (by Ethan – not discussed at meeting)
  - Jobs/Housing Balance Targets (DMJM Harris)
  - Jobs/Housing to Date (Wilson)
  - Existing Conditions Maps
    - Environmental (DMJ Harris)
    - TAZ./RAZ (Wilson – Coordinate production with DMJM Harris)
    - Network (Wilson – Coordinate production with DMJM Harris)
    - Landforms (DMJM Harris)
    - Land Use (DMJM Harris)
    - Employment Centers (DMJM Harris)
  - General Plans (DMJM Harris)
  - MAG Forecast Maps (Wilson)
  - Peer Cities (metro area) data – Atlanta, Chicago, Dallas, Houston (DMJM Harris)
    - Socioeconomic Base
    - Jobs/Housing
    - Trip Lengths
    - Transit Service per Capita
    - Mode Split (Auto/Transit)
    - Lane Miles (Freeway & Arterial) per Capita
    - Vehicle Miles of Travel (VMT)
  - Developer Project Info (DMJM Harris)

Meeting Agenda

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Thursday, April 6, 2006, 1:00 to 2:30 pm

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Transportation Analysis Zone Structure**
   - Adequacy of current MAG TAZ structure
   - TAZ structure of Far West Valley
   - Possible modifications to TAZ structure
2. **Development of Roadway Network**
   - Creating the Base Roadway Network
   - Boundaries of the Base Roadway Network
3. **Modeling Assumptions relating to Socioeconomic Projections**
   - Limits on SED coding
   - New SED projections from MAG
   - Developing a Long-Range/Buildout SED projection for the Study Area

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Thursday, April 6, 2006

Location: MAG

Attendees:
Bob Hazlett, MAG
Don Worley, MAG
Dan Marum, Wilson & Company
Mark Schlappi, MAG
Anubahr Bagley, MAG

1. Transportation Analysis Zone Structure

- The transportation analysis zone (TAZ) structure in the Far West Valley dates back to year 2003, prior to the Regional Transportation Plan (RTP) Phase I Work Program and modeling effort.
- Recently, MAG expanded the TAZ structure in this area to cover the entire county with large zones extending to the far western boundary of Maricopa County.
- For the majority of the I-10/Hassayapmp Study Area, the current MAG TAZ structure appears to be adequate.
  - The I-10/Hassayampa Team should try to avoid creating new TAZ structure boundaries as we develop future network alternatives.
  - The MAG Regional Transportation Model should be able to accommodate our new network alternatives without modifying the base TAZ system.
  - MAG will produce a new map depicting the most recent development base roadway network with a layer illustrating the update TAZ system for our review at the "Study Kick-Off" meeting (TBD).
- Slight modifications to the TAZ structure may be required in the following areas:
  - North and West of Tonopah (TAZ 104)
  - Belmont development area (MAG currently is digitizing the latest development information for this project)
  - Douglas Ranch development area (MAG currently is researching the most recent development information for this project and this information will be incorporated in MAG's database)

2. Aspects of Roadway Network

- In conducting travel demand forecasting work in the Far West Valley, MAG has experienced operational problems with the regional model north of the Bell Road alignment, primarily due to a lack of east/west network capacity. The latest roadway network vision for each development project will be compiled by MAG to form the "Base Network" for the I-10/Hassayampa Roadway Framework Study.
- This base roadway network also will form the boundary for a majority of the revised TAZ structure.

3. Modeling Assumptions: Socioeconomic Data

- For future socioeconomic data (SED) coding purposes, the I-10/Hassayampa Team should limit any individual TAZ population level to less than 30,000 persons or 10,000 dwelling units.
- MAG is beginning the process of developing new SED projections for the far western portion of the County. Final population and employment forecast, approved by local jurisdictions, will not be available until Fall, 2006.
- The I-10/Hassayampa Team will be responsible for develop a single Long-Range/Buildout SED forecast for the Study Area, building on recent general plan Buildout population and employment forecasts development by Buckeye and Surprise as part of the Sun Valley Parkway and Patton/Jomax Corridor Studies being conducted by MCDOT.

Action Items

- Dan to provide Bob Hazlett and other members of the I-10/Hassayampa Team with a copy of the most recent SED forecasts being used for the Sun Valley Parkway Corridor Study and the Patton/Jomax Corridor Study.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, June 9, 2006, 3:00 pm

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Stakeholder Contacts**
   - Response to the Development Forum
   - Need for "Lines on Paper"
   - Issues associated with White Tanks Tunnel
2. **Project Mapping Requirements**
3. **Project Scope Activities Review**
   - Working Paper No. 2
   - Land Use data requirements
   - Jobs/Housing Balance in the Study Area
4. **Environmental Issues**
5. **Other Business**
   - Working Paper No. 1
   - Next Team Meeting

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, June 9, 2006

Location: DMJM Harris

Attendees:
Bob Hazlett, MAG
John McNamara, DMJM Harris
Kammy Horne, DMJM Harris
Dan Marum, Wilson & Company
Jackie Pfeiffer, DMJM Harris
Ethan Rauch, DMJM Harris
Mark Peterson, Wilson & Company

1. Previous Meeting Minutes

The minutes from both May 31 meetings are fine. Bob will send them out to the SRT.

2. Stakeholders

We've received positive feedback from MAG staff on the Development Forum. Bob said that we should show the developers some "lines on maps" at the second Forum. Attendees at the first Forum wanted to see lines on paper. Some people have expressed interest in a White Tanks Tunnel, tunneling under the mountains as an extension of Northern Parkway for at least five miles. Steve Cleveland and Carroll Reynolds are interested. We need to address the issue in our study.

Action Items

- Dan pointed out that before we even consider a tunnel, we'll need a deficiency analysis to demonstrate the need for such a huge and expensive project.
- John will attend a meeting at MAG on June 13 to learn about tunneling options under consideration for the South Mountain Freeway (SR 202).
- Peggy should make sure we have a WestMarc and a GPEC representative on the SRT, but that will be the limit of membership.

3. Mapping

Jackie and John went through the maps produced so far, which are on the conference room wall. Jackie still needs MAG land use data for her maps. We want the underlying land use layer from MAG. John: In the next few weeks, we will complete the maps and add text to complete the next two working papers.

Action Items

- Jackie will map jobs and population by RAZ, as well as population and employment density. The additional maps, plus the ones already on the wall, will be the mapping element of Working Paper 2.
- Bob will provide Jackie topographic maps at the 100' contour level.
- DMJM Harris will map drainage and slope analysis. Jackie's maps will also show the air quality nonconformity boundaries.

4. Project Scope & Activities

John suggested, and Bob approved, the following adjustments to the planning process in our scope of work:

- ❑ We will go ahead with Working Paper 2 using draft land use data, since it's a moving target and it's hard to define a "final" data set.
- ❑ The land use data will be based on our filling in the blanks on development maps as best we can; there will be no "trend" and "compact" scenarios. We are not in a position to address urban form in this study.
- ❑ We will focus on Buildout and not attempt to build a 2030 land use and socioeconomic scenario from the ground up. However, when the time comes to develop a detailed implementation plan, we will back into 2030 and other interim years from the recommended Buildout roadway framework. The phased prioritization for these interim years will be based primarily on a qualitative analysis. John suggested that

this can be accomplished at an internal project team workshop. We will have to make judgments as to when specific geographic areas will build out and therefore, when projects will be required. We will "ratchet back" qualitatively from Buildout to 2030.

When we do this prioritization of projects, we will need to do at least one test model run to make sure our scenario works. Our sensitivity run will test the adequacy of the jobs/housing balance. Mark: We need to know early on whether we're looking at a "disastrous" bedroom scenario or a realistic balance between employment and housing.

5. Environmental Issues

Kammy and the group discussed the appropriate topics of the "50,000-foot" discussion of environmental issues. At this level we can say little or nothing about cultural resources or hazardous materials, except obvious things like known Superfund sites.

Action Items

Dan and Ethan can begin work on Task 4 (Existing and Expected Future Transportation Conditions).

6. Other Business

- Ethan gave Bob a draft of Working Paper 1, including the stakeholder outreach/consent plan. This document has not yet undergone internal QC at DMJM Harris.
- The next team meeting is scheduled for Friday, June 23, 2:00 at DMJM Harris.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, June 23, 2006, 3:00 pm

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Status of Related Studies**
   - Availability of Related Studies
   - Relevancy of Related Studies
2. **Mapping and GIS Issues**
   - Review of available mapping
   - Clarification of mapping data
   - Status of MAG mapping
3. **Socioeconomic Data and Modeling**
   - Protocols and Procedures for assisting MAG
   - Status of socioeconomic data for cities and the County
   - Sources of socioeconomic data for cities and the County
   - Compilation of Land Use information for the Study Area
4. **Peer Cities Comparison**
5. **Proposed White Tanks Tunnel**
6. **Development Forum**
   - Big Ideas Maps
   - Structure of Forum
7. **Stakeholder Interviews**
8. **Newsletter**
9. **Related Projects**
   - Buckeye General Plan Update progress
   - Estrella Mountain Ranch
   - Hidden Valley RFP
10. **Other Business**

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, June 23, 2006

Location: DMJM Harris

Attendees:
Bob Hazlett, MAG
Dan Marum, Wilson & Company
Jackie Pfeiffer, DMJM Harris
Curt Dunham, MAG
John McNamara, DMJM Harris
Ethan Rauch, DMJM Harris

1. Summaries of Related Studies

Jackie distributed her draft summaries of Related Transportation & Land Use Studies and Study Area Land Use Issues. These drafts are for reference only and have not yet been through the DMJM Harris QA/QC process. Jackie asked for help filling gaps in her information on related studies. The group went through her list of studies and identified resources for doing so: where to find information and whom to call. John asked Jackie to obtain the White Tank Regional Park Master Plan, even though it may be out of date. She has the MCDOT Trails Plan, and she can map the trails in our area although there aren't many. She should also get the MAG Open Space Study, which is about ten years old. Ethan has the current MAG Regional Bike Map.

Action Items

- Jackie to obtain the White Tank Regional Park Master Plan.
- Jackie to get the MAG Open Space Study.

2. Mapping and GIS

Jackie also went over the latest collection of maps on the conference room walls. There are a few new ones, but no major changes to the older maps. She gave CDs with the base maps to Bob and John. Randy Overmyer hasn't told her yet whether the old Chrysler Proving Grounds have a new name. Bob will have answers for her Monday on where the rest of the MAG mapping is.

Action Items

- Bob to provide status to Jackie regarding MAG mapping activities.

3. Socioeconomic Data and Modeling (Dan)

- We need to establish protocols and procedures for assisting MAG with modeling and providing socioeconomic inputs.
- We think the socioeconomic data we have from Buckeye and Surprise is pretty good, but it needs to be proofed and, in the case of Surprise, checked for consistency with the City's General Plan. Surprise received authorization from MAG to use its new socioeconomic data, which is a big step forward. MAG must step in and provide a substitute for the nonexistent Buckeye General Plan.
- We need to hold a modeling coordination meeting with MAG staff ASAP; this can happen in Bob's absence. Whoever Mark Schlappi assigns to our project will attend that meeting. Bob or Eileen O'Connell will tell us who that person is.
- Bob said that we'll need to troubleshoot the Buckeye and Maricopa County socioeconomic data, but not Glendale's or Goodyear's. We should just ask Anubhav whether the Glendale and Goodyear data match their general plans.
- We'll stick with EMME-2 for this study. An internal workshop will be held once Dan has all the necessary data from the jurisdictions. We need closure on the socioeconomic data and the first cut at a network by July 14.
- Proposed versus entitled development by zone is important. We know that Buckeye has a spreadsheet, and we should request something similar from Randy for Surprise. We know much more about Goodyear, and most of the development is south of the Gila River anyway. We will need a final

reasonableness check with Bob and Rita. Anubhav will make himself available for a day if Dan needs him.

- John: We will use the various land use plans to create our own generalized land use scenario for the entire Study Area.
- Dan proposed a full-day network and land use workshop for the week of July 3 or July 10. We can use Anubhav if Bob hasn't returned yet. Judy Tadlock has Bob's calendar and can schedule his meetings.

Action Items

- Establish protocols and procedures for assisting MAG with modeling and providing socioeconomic input
- Set up meeting with MAG staff to discuss modeling.
- Query Anubhav regarding Glendale and Goodyear data.
- Request development information from Randy for Surprise.
- Schedule network and land use workshop.

4. Peer Cities

Dan handed out several tables on peer cities: socioeconomic, highway and transit data comparisons. Ethan will look at the transit data and provide comments. John asked Dan to add Chicago to Tables B and C, as metro Phoenix will grow to the current population of the Chicago area.

Action Items

- Ethan to look at the transit data and provide comments.
- Dan to add Chicago to Tables B and C.

5. "Tunnel Talk" (Hatch Mott presentation at MAG, 6/13/06)

Bob and Ethan attended this presentation. Tunneling through the White Tanks can't be dismissed at this stage, but would be a huge challenge, especially because the Arizona State Land Department (ASLD) owns the land on both sides. Hatch Mott is a resource if we need them; MAG could write a change order for an issue paper from them.

6. Second SRT Meeting and Development Forum (7/20/06)

John: We need to spend one to two days sketch planning, to produce "big idea maps" for the second Development Forum. Bob suggested meeting for one day while he's away, and again to refine the concepts after he returns. Dan is available June 30, July 6 and July 7. Bob encourages breakout groups at the Forum. If we can come up with several network scenarios, perhaps one group could be assigned to critique each scenario. Our time is not limited to 90 minutes; we can have up to three hours for the Forum. Curt Lueck should hit "3P" (public/private partnerships) hard. Dan suggested a "peer cities" comparison of various transportation investment levels (high, medium and low).

Action Items

- Schedule sketch planning sessions.
- Curt to focus on "3P" process.

7. Stakeholder Interviews

Curt Dunham is still looking to schedule these for July 13, 14 and 15.

8. Newsletter

As noted in the minutes from the June 16 meeting between Bob, Peggy and Ethan, PSA should get the newsletter production schedule to Bob before he leaves on Wednesday.

Action Items

- PSA to prepare Newsletter production schedule; transmit to Bob before Wednesday.

9. Related Projects

- Curt Dunham said that the Buckeye General Plan Update is on schedule, and currently in the goals/visioning phase. The charrette in May was very successful and the community showed a strong interest in transit: both light rail within the community and commuter rail connecting the area with Phoenix.
- John gave an update on Estrella Mountain Ranch.
- The Hidden Valley RFP is expected out by the end of July, with responses due by the end of August, selection in September and contracting in October and November.

10. Style

Bob doesn't like the word "ongoing," a false present participle formed from a nonexistent verb. We should also hyphenate all numbered routes.

11. Other Business

Bob will be away June 28-July 10. In his absence, Eileen O'Connell is our contact person. We should also feel free to call Eric if we need to.

Action Items

- John will call the study sponsors in a week, to check how things are going and provide continuity in study communications.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Wednesday, June 28, 2006, 12:30 pm

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Introductions and Task Overview**

2. **Socioeconomic Data Status and Delivery to I-10/Hassayampa Team**
   (Review MAG Buildout Data)
   - Buckeye
   - Maricopa County
   - Surprise
   - Glendale
   - Goodyear

3. **Discuss Protocol with MAG Modeling Team** (DMJM/WCI)
   - Process for Review/Edit/Approval of Socioeconomic Data
   - Network Development Process and Input Format
   - MAG Modeling Support Team Confirmation
     - Anubhav Bagley – Socioeconomic Data
     - Roger Roy – Network Coding, Model Execution, Model Output
   - I-10/Hassayampa Team Model Coordination
     - Michael Gorton – SE Data, Network Development, Model Assumptions

4. **Next Steps**
   - Secure SE Data in Electronic Format
   - Finalize Peer City Comparisons
   - I-10/Hassayampa Team and MAG Staff Network/Land Use Workshop
   - Finalize Study Area Buildout SE Data
   - Develop Consensus Base Alternative Network
   - Schedule Base Model Run

5. **Other Business**
   - Identify Network/Land Use Workshop Date, Time and Location

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Wednesday, June 28, 2006

Location: Maricopa Association of Governments

Attendees:
Roger Roy, MAG
Anubhav Bagley, MAG
Michael Gorton, Wilson & Company
Ethan Rauch, DMJM Harris
Dan Marum, Wilson & Company

1. Socioeconomic Data Status

Anubhav outlined the status of the MAG Buildout socioeconomic data for the following jurisdictions within the I-10/Hassayampa Study Area:

- Buckeye - MAG has a meeting planned with Buckeye on July 7 to discuss the status of the Buildout socioeconomic data
- Maricopa County - Matt Holm has approved the data that includes the most recent developments
- Surprise - The City of Surprise wants to upgrade rural residential to 3 dwelling units per acre. MAG has meeting planned with Surprise the week of July 3
- Glendale - Data is done and approved by the City
- Peoria – Peoria provided Wilson & Company updated Buildout dwelling unit forecasts. Anubhav will coordinate with the City of Peoria on incorporating these new estimates into the revised Buildout data.

Action Items

- Wilson & Company to provide Anubhav the City of Peoria Buildout Dwelling Unit Forecasts.

2. Modeling Protocol

The group reviewed the process for providing input to MAG on network alternatives. Options discussed include providing annotated hard copy maps showing the recommended network improvements and using ArcView to code model improvements for export to EMME/2 format.

Action Items

- Wilson & Company to provide Roger Roy the model networks provided by MAG to verify currency.

3. Next Steps

MAG anticipates that work to complete Buildout data with Buckeye and Surprise will be complete near the end of July. The I-10/Hassayampa Project Team noted that it would like to review the SE data as it becomes available. The jurisdictions need to authorize MAG to release the data for use in this study.

4. Other Business

As Maricopa County has approved its data, it may be useful to schedule a workshop to discuss this dataset as soon as possible. There is a need to identify a date for a Network/Land Use Workshop. Anubhav noted that Maricopa County needed to authorize the release of the data.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Thursday, August 3, 2006, 9:00 to 11:00 am

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Introductions and Task Overview**

2. **Review Minutes from June 28, 2006, Model Coordination Meeting**

3. **Socioeconomic Data Status Update**

   (Review MAG Buildout Data)

   - Buckeye
   - Peoria
   - Maricopa County
   - Surprise
   - Glendale
   - Goodyear

4. **SED Review Process**

   - Spot review of socioeconomic data/reasonableness check
   - Realistic jobs/housing balance review

5. **Model Process Overview**

   - Test Buildout land use using current MAG mode network and TAZ structure using all-or-nothing assignment (no capacity restraint) to determine travel O-D patterns
   - Develop "spider" map showing district-to-district travel O-D patterns from Buildout land use
   - Test Conceptual Roadway Framework from Development Forum using Buildout land use using all-or-nothing assignment for initial network performance evaluation

6. **Wickenburg Bypass Route**

   - ADOT comments on North-South Freeway location in context of CANAMEX and Wickenburg Bypass

7. **Other Business**

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Thursday, August 3, 2006

Location: MAG

Attendees:
Bob Hazlett, MAG
John McNamara, DMJM Harris
Ethan Rauch, DMJM Harris
Dan Marum, Wilson & Company
Jackie Pfeiffer, DMJM Harris

1. Introduction and Task Overview
The Project Team determined the task was moving along appropriately, based on the scope and schedule. The most critical activities coming up related to development of the base population and employment data to support running of the travel demand model by MAG.

2. Review of Minutes
The minutes from the previous meeting were reviewed and accepted.

3. SED Status Update
MAG introduced recently developed Buildout SED for the following communities:

- Buckeye
- Peoria
- Maricopa County
- Surprise
- Glendale
- Goodyear

4. SED Review
The community data were discussed by the Project Team. This newly developed data will be used by WCI to test the validity of model outputs. WCI will conduct to tests to verify the model outputs are reasonable. The model outputs for the Study Area will be compared to a similar area in the East Valley, which already is at the "Buildout" stage. WCI also will examine the projected mixture of population and employment for certain Master Planned Communities located in the Study Area. This will be an independent interpretation to compare known population and employment data against that generated by MAG.

Action Items
WCI to conduct to tests to verify reasonableness of MAG projections.

5. Model Process Review

- A discussion followed regarding how to document the information developed through the SED review for presentation at the Funding Partners Meeting and Study Review Team Meeting in December.
- Those present established a framework for the presentation and agreed on a schedule that would facilitate completion of MAG model runs in time for WCI to prepare a presentation for the December meetings.
- Modeling Process. The following Modeling Sequence was established:
  - 1st – Develop a "Buildout" Forecast based on an "All-or-Nothing" traffic assignment (i.e., no capacity restraint) to allow an opportunity to determine where traffic originates or is destined.
  - 2nd – Develop this forecast on the MAG travel model as it exists now – no changes to TAZs –to develop the travel demand for the Hassayampa Valley.
  - 3rd – Develop a second All-or-Nothing traffic assignment, using the MAG travel demand model and based on the conceptual roadway framework as presented at the Development Forum

Action Items

- Wilson to coordinate with MAG to secure initial travel demand model output.

6. Wickenburg Bypass

Input from ADOT was reviewed relative to potential effects on the travel demand model.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Tuesday, August 15, 2006, 1:30 pm

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Framework Enhancements**
2. **Second Development Forum**
   - Review of First Forum
   - CANAMEX issues
3. **Stakeholder Meetings**
   - Contact with developers of Belmont
   - Information to City Councils
   - Upcoming Public Forums
   - Presentations to MAG Committees
   - Maricopa County Planning and Development
   - Stakeholder Consent/Outreach Plan
4. **Press Coverage**
   - Coordination with MAGazine
   - Modeling Update activities
5. **Working Paper No. 2, Land Use, Environmental Overview, Etc.**
   - Status of draft report
   - Adequacy of information/missing data
   - Special concerns and issues
6. **Working Paper No. 3, Evaluation Criteria**
7. **Working Paper No. 4, Transportation Conditions**
8. **Working Paper No. 5, Modeling and Forecasting**
9. **Other Business**
   - Progress on Working Papers
   - Timing of Working Paper review process
   - Future Meeting requirements

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Tuesday, August 15, 2006

Location: DMJM Harris

Attendees:
Bob Hazlett, MAG
Jackie Pfeiffer, DMJM Harris
Dan Marum, Wilson & Company
John McNamara, DMJM Harris
Kammy Horne, DMJM Harris

1. Meeting Agenda

Meeting participants agreed at the beginning that we won't cover the framework enhancements today. This is more of a process meeting.

2. Second Development Forum (July 26th)

- Everyone was impressed with our preparation and quality of presentation.
- The only fly in the ointment was Bob Miller's unexpected complaint about our handling of CANAMEX.
- Others at ADOT disagree with Bob on this, and also on future interchange spacing. Disarray and lack of internal communication at ADOT is a major problem.
- Lorenzo Valdez, who represented Maricopa County Development Planning & Finance Group, acted like a shill for developers.

Action Items

- We will move ahead while MAG management works on resolving these issues with ADOT.
- Bob has the Thank You letters to elected officials, and will send them out.

3. Stakeholder meetings

- Even though Belmont had representatives at the August 1st meeting at Eldorado, John will follow up to see if they want an individual meeting.
- Peggy also is working to schedule several other requested meetings.
- Status reports to the City Councils will happen in October, but before the first Public Forum.
- To hold a Public Forum in October, we need a date by the end of August so we can reserve a room, work on logistics and get commitments from speakers. We are seeking speakers to cover three special topics: access management (Phil Demosthenes), context sensitive solutions and best practices.
- Presentations to MAG committees (TRC, TPC) may also occur in October.
- We should meet with Maricopa County Planning & Development within the next two weeks. We must make sure that Tim Oliver, Mike Sabatini and Lorenzo Valdez are invited.
- The Development Forums have worked so well that we should consider a similar format for similar events. John suggested using interviews, briefings and Forums as our primary stakeholder consent activities for the remainder of the project. Bob and John asked Peggy to update the stakeholder consent/outreach plan accordingly.

Action Items

- John to contact Belmont regarding individual meeting.
- Ethan will distribute the August 1st meeting notes as soon as he receives them from Terry Walker.
- Peggy will get WestMarc rescheduled later.
- Peggy to schedule through Matt Holm a meeting with Maricopa County Planning and Development.
- Peggy will also schedule a meeting with Bill Vachon and Ken Davis of FHWA.
- Peggy to update the stakeholder consent/outreach plan.

4. Press coverage:

- Peggy suggested that we take the initiative in generating press coverage by feeding appropriate stories to the press.
- Bob said that Kelly will want to publish articles about this project in the MAGazine.
- Modeling update:
  - Bob said Vladimir is coding our network as we speak.
  - Our team will have an opportunity to check everything when it's done.
  - We are meeting the schedule shown in item 4 of the agenda.

Action Items

- Peggy to talk with Kelly at MAGazine about article discussing this project.

5. Working paper #2 (Land Use, Environmental Overview, etc.)

- We have a nearly complete draft.
- Two items are missing: socioeconomic data & forecasts (which Anubhav will provide), and Master Plan development information from Surprise.
- Ethan did his review of the report and John is now reviewing the third draft. Kammy looked at the environmental section.
- Peggy said we need to include land fissures and subsidence in our area. We will also need to take this into account later when we estimate costs.
- Peggy also mentioned a historic stagecoach route from Wickenburg to Buckeye.
- Dan said we should also look into the criteria for historic railroad corridors, to see if any in the study area might qualify.

Action Items

- Peggy to provide Team with an old UA report from the 1970s.
- Jackie to coordinate with Peggy regarding information relating to fissures and subsidence in the study area.
- Jackie to coordinate with Peggy regarding information about historic stage coach routes in the study area.
- Jackie to investigate possibility of historic rail corridors in the study area.

6. Working paper #3 (Evaluation Criteria)

Working Paper #3 will require review by the sponsors and SRT.

Action Items

- Ethan will begin working on this.

7. Working paper #4 (Transportation Conditions)

Jackie has been making good progress on this Working Paper. Ethan will help her finish it.

8. Working paper #5 (Modeling and Forecasting)

- Wilson can prepare an outline; the detailed scope of work for this task is a good place to start.
- Wilson should feel free to get as much done as they can before the modeling results come in.

9. Other Business

- Working papers (general)
  - Bob requested drafts of working papers 1 through 5 on the website by September 30th.
  - We need to give him a deadline for anything we ask him to review.
- Meetings currently on the calendar
  - Jeff Chain and Eddie Gutzman, 3:30 today
  - Murray Johnson, 11:00 this Friday (the 18th) at DMJM
  - Project team workshop, 8/24 at 1:30, DMJM (Ethan can't attend)
  - John Thomas, 8/25 at 1:00, DMJM
  - Communities Southwest, 8/25 at 2:30, DMJM
  - Continuation of project team workshop, 8/28 at 1:00, DMJM
  - Funding partners' meeting at MAG, 9/1, 1:00-3:00

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, October 6, 2006, 2:30 pm

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Development of Roadway Network**
   - Status of "Deer Valley Freeway"
   - Issues relating to Turner Boulevard
   - Modeling conflicts with MCDOT
2. **Buckeye/SR-801**
3. **Belmont Development**
   - Status of Development
   - Traffic Interchange issues relating to this development
5. **Verrado Development**
6. **Federal Highways Administration (FHWA) meeting debrief**
7. **SED Validation**
8. **Other Business**
   - Presentation to MAG TRC and TPC
   - Presentation to City Managers and Intergovernmental Coordinators
   - Other Meetings

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, October 6, 2006

Location: MAG

Attendees:
Bob Hazlett, MAG
Ethan Rauch, DMJM Harris
Tom Chlebanowski (Town of Buckeye Traffic Engineer)
John McNamara, DMJM Harris
Dan Marum, Wilson & Company

1. Evolving Roadway Framework

- The latest unofficial draft of the roadway framework was posted on the wall. The only major piece we're still nervous about is the "Deer Valley Freeway." This is the one major corridor with unresolved issues. We've met with all the major developers except one or two—including Belmont. Eric Anderson wants to talk with Terry Johnson and Dave Moody about making the Northern Ave. Parkway a freeway, since we're already in the freeway cost range of approximately $50M per mile. Eric would move Northern Avenue from the Arterial to the Freeway Life Cycle Program. This is a major change to the RTP.
- Peggy's e-mail says we need to meet with Greg Keller again about "tweaking" Turner Boulevard (don't call it a parkway) as well as Jackrabbit Trail. John offered to prepare a short paper defining typical facility types and intersection/TI types, with illustrations of typical cross-sections.
- Dan said that we have issues with MCDOT on three corridors: Jackrabbit, Patton/Jomax, and Jomax East. The last is a new corridor study that URS is just starting.
- John said that we need to meet (separately) with Tim Oliver and Greg Keller ASAP to deal with the issues mentioned above. Other meetings should also be scheduled (see action items below).

Actions Items

- Population/employment spot checks (John, Jackie, Dan, Ethan)
- Meet with Tim Oliver on SR 804/805 with respect to the Jackrabbit, Patton/Jomax and Jomax East corridors. We'll invite Randy Overmyer and an appropriate person from Peoria. Bob will arrange this.
- John will set up a meeting with Greg Keller on the Turner and Jackrabbit corridors.
- After the Keller and Oliver meetings, we will schedule a larger SR 804/805 meeting involving MCDOT, FCDMC, Surprise and Buckeye.

2. Buckeye/SR-801 Coordination

This is an issue raised by Peggy and Suparna. HDR wants to talk about it again. Bob: Let's stay away from this and avoid getting involved in SR-801 east of SR-85. John: Let Peggy run interference through her work on the Buckeye General Plan. However, John and Rodney Bragg will do a quick drawing of the proposed SR-303/801 TI.

Action Items

- Check out Festival Ranch in relation to SR 804. Tom C. will do this.
- DMJM Harris will prepare a short paper on typical facility types (e.g., arterial, parkway/boulevard, freeway) with intersections/TIs and illustrated cross-sections.
- John and Rodney will create a quick sketch of 303/801/MC-85 TI configuration.

3. Belmont

- Ethan summarized yesterday's Maricopa County Planning & Zoning Commission meeting, where the commissioners voted 4-2 to recommend approval of the developer's request for a major plan amendment.
- We need to meet with Paul Gilbert to see if we can get the Belmont TI moved over to match the latest MAG/ADOT/FHWA scheme. There's an existing TI at 339th Avenue and one already approved at 347th Avenue. We think the TI approval expires after eight years, but we need to check whether this time limit

applies to 347th. In any event, FHWA can rescind an approval. The next TI to the west will be at 359th or 363rd Avenue.

Action Items

- John will set up a Belmont meeting with Paul Gilbert.
- Clarify status of 347th Avenue TI approval.

4. Verrado

Peggy thinks we should follow up with them, but no one at this meeting was sure why. John described his meeting with Verrado, which Peggy didn't attend. John will talk to her, but he doesn't think anything else needs to be done now.

5. FHWA/ADOT Meeting on I-10 TIs

- John summarized the October 3 meeting with Bill Vachon and Ken Davis of FHWA.
- We need to talk to Belmont about a parallel C/D arterial on the north side of I-10, which ADOT prefers to frontage roads.
- Tom C said we should examine the potential role of the Salome Highway (south of I-10) in our framework. The team felt this was an excellent idea. We will ask Jackie to add Salome Highway to our map, and figure out how this roadway fits into our network.

Action Items

- Look into integrate Salome Highway into roadway framework. (DMJM Harris)

6. Socioeconomic Data Validation and Spot Checking

Wilson has questions about the data, but Anubhav has been too swamped to look into them. Dan handed out several tables comparing the Hassayampa Study Area with the East Valley. Dan needs to talk with John and Ethan about spot checking, a process that Jackie has begun. She has already found trouble spots in Douglas Ranch.

Action Items

- Wilson will write up its socioeconomic conclusions for use in Working Paper 2. We need to get this document out ASAP, as it will serve as a model for others.

7. Other Business

- Bob and John will prepare a brief (15 minutes?) presentation to the MAG TRC and TPC. The date is uncertain.
- Present to the city managers and intergovernmental coordinators of Study Area jurisdictions. This should be done before the TRC and TPC.
- Funding partners meeting October 20, 9:00 at MAG.
- SR-804 presentation to Peoria, Glendale and Surprise.
- Schedule a "pseudo" environmental overview meeting for early November. Include Arizona Game & Fish, U.S. Fish & Wildlife, ADEQ, BLM, ASLD, and U.S. Bureau of Reclamation.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, October 20, 2006, 9:00 am

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Stakeholder Meetings**
   - Scheduling
   - Meeting logistics
2. **Project Progress Review**
3. **Working Paper No. 2, Land Use, Environmental Overview, Etc.**
   - Status of draft report
   - Adequacy of information/missing data
   - Special concerns and issues
4. **Working Paper No. 3, Evaluation Criteria**
5. **Working Paper No. 4, Transportation Conditions**
   - Coordination with Funding Partners
   - Status of network
   - Mapping
6. **Working Paper No. 5, Modeling and Forecasting**
   - Review of Conceptual Roadway Network
   - Clarification of network elements
   - Screenline analysis process and status
7. **Funding Options**

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, October 20, 2006

Location: MAG

Attendees:
Bob Hazlett, MAG
Ethan Rauch, DMJM Harris
Dan Marum, Wilson & Company
Randy Overmyer, City of Surprise
John McNamara, DMJM Harris
Jackie Pfeiffer, DMJM Harris
Tom Chlebanowski of Buckeye
Tim Oliver, MCDOT

1. Stakeholder Meetings

At today's meeting of the Hassayampa funding partners, several meetings were scheduled and a couple were identified that need to be scheduled ASAP. Also, a Development Forum was expanded to include the public; it will be held Thursday, December 14. This Forum will require reserving a room for the entire day. Space for up to 250 people will be needed, so our best bet is probably the two adjoining rooms at Estrella Community College.

Action Items

- John is to schedule the following meetings for Oct. 24, 25, or 26 if possible. (They need to occur before his vacation.)
  1. Meeting with Belmont (Paul Gilbert)
  2. Meeting with Stardust Development (developer for Tartesso; Bob Spears)
- The following meetings have been scheduled. Please put them on your calendar. (Bob will e-mail notices/invitations.)
  1. Funding partners Nov. 9, 9:00 am
  2. Funding partners Nov. 30, 9:00 am (Curt Lueck to attend)
  3. SRT Dec 7, 9:00 am and possibly through lunch (Curt Lueck to attend)
- Peggy to work on setting up arrangements for the expanded Development Forum.

2. Project Progress Review

Bob reviewed progress on each element of the scope of work.

3. Working Paper No. 2, Land Use, Environmental Overview Etc.

- To complete the Working Paper No. 2, we still need information on major developments from Surprise. Randy has talked to John about this issue.
- Jackie has created an Environmental Atlas of around two dozen maps that is unique to this project. This atlas will be used to effect review by governmental agencies and organizations. It will allow us to get a head start on the SAFETEA-LU requirement for environmental coordination.

Action Items

- Randy will give Study Team something on major developments in Surprise to fill the gap; although, it may involve some assumptions.
- Jackie and Ethan will run the atlas by the various environmental resource agencies responsible for this area.

4. Working Paper No. 3, Evaluation Criteria

- Bob is reviewing the draft memo on the evaluation framework, which will then go to the funding partners.

5. Working Paper No. 4, Transportation Conditions

- Tim expressed strong concern that the funding partners are not being given enough input into decision-making. This group needs to meet much more often than every two or three months. All of the

funding agencies must work together to identify fatal flaws. For example, none of our maps should show Sun Valley Parkway as a potential freeway – this is simply not realistic given the available right-of-way and the results of MCDOT's planning process with the local community.

- Tim has been blindsided because others have seen lines on a map that MCDOT has not reviewed or agreed to.
- The funders must approve all network and alignment concepts before we bring them to other stakeholders, and MCDOT must participate in all decisions.
- Tim added that the County currently (and for the foreseeable future) is responsible for roads in unincorporated territory, including those that lie within MPAs. Therefore, MCDOT must be given a voice in all long-term planning for these facilities, even if they may someday be annexed. The usual practice is for the County to improve a road before it is annexed into a city or town.

Action Items

- Bob to make sure that Tim's concerns are addressed and that MCDOT is included in all future discussions.

6. Working Paper No. 5, Modeling and Forecasting

- The entire group looked at the latest Conceptual Roadway Network Map and made edits.
  - Tim agreed with the planned traffic interchange locations previously approved by ADOT and FHWA.
  - Tim emphasized that Northern Avenue will never be more than a Parkway.
  - Tim and Randy disagreed about the potential future status of Jackrabbit Trail. Surprise envisions its portion as a 200' parkway with six lanes and a wide median, while Tim noted that the upcoming MCDOT corridor study has it scoped as an Arterial, and there may not be room for anything more.
- Dan handed out a map showing proposed screenlines at which to measure future travel demand versus capacity. Tim suggested extending the east-west screenlines to SR-101L. We also will add a north-south screenline along this freeway.
- Additional comments on the Conceptual Roadway Network Map:
  - Do we need multiple north-south parkways north of Sun Valley Parkway? If not, keep Turner, but possibly move it to support Surprise.
  - Is it possible to turn Turner Parkway into SR-85 through Tartesso? Yes, the developer is OK with this and so is ADOT.
  - The County Planning & Zoning Commission forwarded Belmont's Major Plan Amendment to the Board of Supervisors. However the developer's proposed TI spacing is not acceptable to the County or ADOT. We need to know the kind of road the developer is proposing along the 347th Avenue alignment. The Hassayampa Freeway/I-10 system interchange at 363rd Avenue is OK.
  - We won't be able to do anything in Whispering Ranch. Move the Hassayampa Freeway west (out of Whispering Ranch) and reroute it through Douglas Ranch along the Gold Arterial to connect with the western Wickenburg Bypass.
  - Reroute SR-74 along the south Wickenburg Bypass.
  - Divert Hassayampa River Parkway along east Hassayampa Freeway alternative.
  - The White Tanks Freeway won't go on the Sun Valley Parkway alignment.
  - Move the White Tanks Freeway onto Jomax. Pass through Festival Ranch at "narrow throat." Split off from Hassayampa Freeway near Douglas Ranch Town Center. Take it east through Peoria, where it should connect with SR-101L.
  - Connect Jackrabbit to Deer Valley Freeway. Connect with Surprise Parkway to SR-74. Or: Northern curves and turns into Jackrabbit. "Tees" into Northern curve?

Action Items

- Check the Turner location through Tartesso with Bob Spears of Stardust Development
- John to contact Belmont right away regarding the 347th Avenue alignment.
- Talk with Douglas Ranch regarding rerouting Hassayampa Freeway along the Gold Arterial alignment.
- Randy to provide Surprise alignments for 211th Avenue.
- DMJM Harris, at the request of Bob, to draw up the revised roadway network created at this meeting. It then will be used to do an all-or-nothing traffic assignment.

3. Funding Options

The need to start talking about funding options was identified. The Transportation Improvement District has just been applied in Pima County. We should explore the institutional framework for a special transportation district and the use of impact fees. The County can't consider a community facilities district because of liability issues.

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Wednesday, November 22, 2006, 11:00 am

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Preliminary Modeling Results**
2. **Cross-Sections/Plans**
3. **Plans to Prepare**

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Wednesday, November 22, 2006

Location: MAG

Attendees:
Bob Hazlett, MAG
Ethan Rauch, DMJM Harris
Dan Marum, Wilson & Company
Curtis Lueck, CLA
Michael Kies, DMJM Harris
John McNamara, DMJM Harris
Jackie Pfeiffer, DMJM Harris
Michael Gorton, Wilson & Company
Robert Gladwin, DMJM Harris
Rodney Bragg, DMJM Harris

1. Preliminary Modeling Results

- Buildout socioeconomic data for Hassayampa study area
- 2030 socioeconomic data for rest of MAG region
- 2030 network as known
- Major issues per red lines on maps

Action Items

- Prepare screenline analysis for funding partners' meeting.

2. Cross-Sections/Plans to be done:

- Major arterial (7-lane), also per city/municipality
- Boulevard arterial or parkway (8-lane, 200' R/W)
- Freeway with frontage roads (10 lanes + HOV)
- Freeway without frontage roads (10 lanes + HOV)

3. Plans to be prepared:

- Boulevard arterial/major arterial intersection
- Boulevard arterial/freeway TI
- Freeway with frontage roads
- Check out:
  - Michigan highways org
  - Oblique photos of Michigan boulevard arterial
  - City of Tucson: 40k x 40k arterial intersection triggers grade separation study

Action Items

- Curt Lueck to consider funding boulevard arterials as regional facilities.
- 3-step graphic process: Rodney/Mike draft; revise draft graphics; Bob G. add urban design improvements

MEETING AGENDA

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, January 19, 2007, 9:00 am

Maricopa Association of Governments
302 North First Avenue, Suite 300
Phoenix, AZ 85003

MAG Project Manager: Bob Hazlett
602-452-5026

ITEM #

1. **Preliminary Alternatives Review**

2. **Study Are Travel Demand Model Performance Measures**
   - Daily VMT per lane mile
   - Percent VMT on freeways
   - Percent freeway lane miles at LOS E or worse in PM peak period
   - Percent arterial lane miles at LOS E or worse in PM peak period
   - Average PM peak period freeway travel speed
   - Average PM peak period arterial travel speed
   - Total VHT
   - Percent congested PM peak VMT

3. **Next Steps**
   - Initial Preferred Network
   - Future Modeling Activities and Sensitivity Testing
     - Jobs-Housing Balance
     - Transit Investment
   - Final Draft Preferred Alternative
   - Interim Year SED and Network Modeling

MEETING NOTES

I-10/HASSAYAMPA TRANSPORTATION FRAMEWORK STUDY MODEL COORDINATION MEETING

Friday, January 19, 2007

Location: MAG

Attendees:
Bob Hazlett, MAG
Ethan Rauch, DMJM Harris
Dan Marum, Wilson & Company
John McNamara, DMJM Harris
Jackie Pfeiffer, DMJM Harris
Michael Gorton, Wilson & Company

1. Preliminary Alternatives

WCI presented the results of travel demand modeling relative to the Evaluation of Alternatives Process. Results were based on performance measures included in the Evaluation Criteria: Safety and Mobility. Specific direction was provided by the Project Team members to refine the Evaluation Criteria to match the level of detail, i.e., model outputs, provided by the travel demand model runs for each alternative. An additional criterion was included for evaluation.

2. Travel Demand Model Performance

The Project Team provided WCI with direction relating to evaluating the performance of network alternatives, particularly with respect to east-west travel in the Study Area, which appeared to create the greatest congestion problems. In addition to the criteria listed and adopted, the Project Team advised WCI to prepare a north-south "cut-line" or "screen-line" analysis to provide a basis for examining east-west travel in the Study Area. The analysis would be designed to capture variations among the alternatives relative to east-west travel and gauge the performance of each roadway system under varying assumptions of jobs and housing.

3. Next Steps

- A general discussion ensued regarding future activities. The Project Team felt sensitivity testing provided by "cut-line" analysis was adequate to understand the effects of the jobs/housing balance. Nevertheless, a qualitative method for identifying and testing the jobs/housing balance in the Study Area was defined. An estimating process was established that was consistent with the level of detail available.
- The issue of a major transit investment was discussed. The examination of a transit investment for the Study Area was seen as premature. A conceptual set of transit services would be defined, building on previously conducted and current MAG studies in the region. This would provide the foundation for more detailed multimodal studies of the Study Area in the future.
- Discussion was initiated relative to the Final Preferred Alternative Roadway Network and Study Area Framework Plan. Continuing information regarding the modeling process and modeling outputs, in the future, would be part and parcel of the Evaluation of Alternatives Process. Therefore, subsequent issues relating to the modeling effort would be presented in the context of the evaluation of alternatives, specifically with respect to the Safety and Mobility criteria.

APPENDIX B
Population and Employment Data by Socioeconomic Analysis Zone

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE												
109	8764	13.69	226	17	190	14	-36	-0.69%	44812	3272	44622	7.93%
110	2899	4.53	0	0	0	0	0	NA	12316	2719	12316	NA
111	3134	4.90	4	1	13	3	9	4.24%	15907	3248	15894	7.99%
112	2920	4.56	0	0	1742	382	1742	NA	26466	5801	24724	7.01%
113	2026	3.17	0	0	4985	1575	4985	NA	15674	4952	10689	4.14%
114	1401	2.19	0	0	4506	2058	4506	NA	6706	3063	2200	1.57%
115	1305	2.04	0	0	2499	1225	2499	NA	10914	5352	8415	5.02%
116	11761	18.38	0	0	1439	78	1439	NA	39931	2173	38492	7.44%
117	1492	2.33	2	1	0	0	-2	-8.00%	9023	3870	9023	NA
118	15314	23.93	0	0	0	0	0	NA	80	3	80	NA
119	2210	3.45	530	153	2939	851	2409	5.56%	12639	3659	9700	4.98%
120	7459	11.66	1388	119	15116	1297	13728	6.65%	39039	3349	23923	3.53%
121	3018	4.72	94	20	1264	268	1170	6.89%	1308	277	44	0.14%
122	1285	2.01	65	32	3339	1663	3274	7.69%	9788	4875	6449	3.93%
123	2787	4.35	581	133	10777	2475	10196	7.18%	21428	4921	10651	2.65%
124	984	1.54	14	9	717	467	703	7.69%	2132	1387	1415	3.97%
125	2653	4.15	4	1	578	139	574	7.89%	5839	1409	5261	6.56%
126	3280	5.12	2638	515	16401	3200	13763	5.78%	22389	4369	5988	1.23%
127	951	1.49	139	94	4143	2787	4004	7.48%	4719	3175	576	0.52%
128	956	1.49	197	132	4156	2784	3959	7.28%	3379	2263	-777	-0.82%
129	3044	4.76	243	51	3927	826	3684	7.07%	6991	1470	3064	2.25%
130	2885	4.51	2695	598	20870	4630	18175	6.17%	25945	5756	5075	0.87%
131	635	0.99	2	2	4255	4288	4253	7.99%	5840	5885	1585	1.26%
132	954	1.49	3537	2373	7545	5061	4008	2.89%	11938	8008	4393	1.80%
133	955	1.49	2416	1620	5110	3426	2694	2.86%	7404	4964	2294	1.47%
134	2457	3.84	1283	334	14109	3675	12826	6.67%	16911	4405	2802	0.72%
135	639	1.00	92	92	5488	5495	5396	7.74%	4889	4895	-599	-0.46%
136	739	1.16	0	0	0	0	0	NA	75	65	75	NA
137	1414	2.21	2628	1190	9493	4297	6865	4.53%	12585	5697	3092	1.12%
138	659	1.03	49	48	896	870	847	7.17%	836	811	-60	-0.28%
139	799	1.25	102	82	544	436	442	5.47%	3209	2570	2665	5.68%
140	1882	2.94	907	308	8835	3004	7928	6.51%	11884	4040	3049	1.18%
141	1910	2.98	211	71	9816	3290	9605	7.66%	13622	4565	3806	1.30%
1614	880	1.37	30	22	2295	1670	2265	7.79%	3463	2520	1168	1.62%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE (Continued)												
1647	4950	7.73	32	4	353	46	321	6.67%	18553	2399	18200	7.70%
1669	3728	5.82	14	2	4693	806	4679	7.95%	17741	3046	13048	4.65%
1689	8592	13.42	0	0	0	0	0	NA	30344	2260	30344	NA
1690	3594	5.62	373	66	605	108	232	1.90%	16374	2916	15769	7.43%
1692	1299	2.03	16	8	3001	1479	2985	7.92%	6477	3192	3476	2.93%
1705	1298	2.03	0	0	0	0	0	NA	6775	3340	6775	NA
1711	2137	3.34	220	66	5369	1608	5149	7.37%	13528	4051	8159	3.45%
1717	2044	3.19	144	45	1336	418	1192	6.44%	12547	3928	11211	6.46%
1718	2788	4.36	0	0	455	104	455	NA	19442	4463	18987	7.63%
1721	5255	8.21	0	0	0	0	0	NA	22487	2739	22487	NA
1724	1740	2.72	0	0	10761	3959	10761	NA	13850	5095	3089	1.00%
1725	4144	6.48	272	42	0	0	-272	-8.00%	28566	4412	28566	NA
1726	1180	1.84	0	0	0	0	0	NA	8319	4511	8319	NA
1729	2783	4.35	0	0	0	0	0	NA	19870	4569	19870	NA
1737	1506	2.35	0	0	751	319	751	NA	11057	4699	10306	6.98%
1739	1446	2.26	0	0	0	0	0	NA	7822	3463	7822	NA
1740	1847	2.89	0	0	456	158	456	NA	9063	3140	8607	7.23%
1752	1017	1.59	0	0	1487	936	1487	NA	5517	3472	4030	4.60%
1753	2420	3.78	0	0	2757	729	2757	NA	9335	2469	6578	4.35%
1754	1460	2.28	0	0	4111	1802	4111	NA	15278	6699	11167	4.61%
1755	1536	2.40	0	0	3213	1339	3213	NA	9541	3976	6328	3.97%
1756	1675	2.62	0	0	1274	487	1274	NA	13515	5165	12241	6.62%
1757	3296	5.15	272	53	983	191	711	4.53%	23371	4538	22388	7.35%
1760	2000	3.13	0	0	4033	1290	4033	NA	13879	4440	9846	4.40%
1763	1200	1.87	0	0	1849	986	1849	NA	7004	3736	5155	4.66%
1768	1325	2.07	0	0	0	0	0	NA	11731	5665	11731	NA
1771	1063	1.66	0	0	3570	2149	3570	NA	11491	6919	7921	4.21%
1780	2222	3.47	0	0	0	0	0	NA	16649	4796	16649	NA
1781	1575	2.46	0	0	0	0	0	NA	7230	2938	7230	NA
1785	2044	3.19	0	0	5595	1752	5595	NA	11392	3566	5797	2.73%
1786	1074	1.68	0	0	3607	2150	3607	NA	2734	1629	-873	-1.10%
1791	1326	2.07	0	0	746	360	746	NA	5706	2753	4960	6.15%
1792	931	1.45	0	0	1224	842	1224	NA	7929	5452	6705	5.86%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE (Continued)												
1793	1299	2.03	0	0	61	30	61	NA	9726	4792	9665	7.90%
1794	1291	2.02	0	0	0	0	0	NA	12608	6251	12608	NA
1795	1430	2.23	0	0	0	0	0	NA	6345	2840	6345	NA
1796	1491	2.33	0	0	0	0	0	NA	13789	5918	13789	NA
1797	2702	4.22	0	0	0	0	0	NA	9410	2229	9410	NA
1800	3197	5.00	1	0	588	118	587	7.97%	12073	2417	11485	7.26%
1801	2593	4.05	1047	258	4142	1022	3095	4.77%	15811	3902	11669	4.68%
1804	1105	1.73	0	0	129	75	129	NA	8491	4919	8362	7.76%
1805	1883	2.94	0	0	1413	480	1413	NA	14460	4915	13047	6.58%
1808	3854	6.02	2972	494	13838	2298	10866	5.17%	23451	3894	9613	2.06%
1810	2213	3.46	0	0	2928	847	2928	NA	6776	1960	3848	3.17%
1813	3873	6.05	0	0	7114	1175	7114	NA	31435	5194	24321	5.05%
1819	2504	3.91	376	96	3679	940	3303	6.52%	9624	2460	5945	3.58%
1820	1297	2.03	0	0	3292	1625	3292	NA	12686	6260	9394	4.70%
1822	1132	1.77	0	0	7312	4132	7312	NA	8756	4949	1444	0.72%
1831	2240	3.50	58	17	11556	3302	11498	7.92%	16371	4677	4815	1.38%
1832	3903	6.10	2350	385	14902	2443	12552	5.82%	33917	5561	19015	3.12%
1834	1756	2.74	0	0	4958	1807	4958	NA	7963	2902	3005	1.86%
1837	3135	4.90	257	52	774	158	517	4.01%	6709	1370	5935	6.35%
1839	1085	1.70	912	538	4136	2439	3224	5.11%	6273	3700	2137	1.64%
1840	735	1.15	476	414	2617	2277	2141	5.54%	3541	3082	924	1.20%
1843	1025	1.60	1086	678	547	342	-539	-2.64%	3047	1903	2500	5.56%
1845	1940	3.03	16	5	1629	537	1613	7.84%	1976	652	347	0.77%
1846	941	1.47	298	203	4804	3268	4506	7.07%	10735	7302	5931	3.05%
1848	642	1.00	270	269	3400	3392	3130	6.82%	8828	8807	5428	3.55%
1850	3267	5.10	218	43	824	161	606	4.65%	1046	205	222	0.95%
1855	1660	2.59	211	81	2532	976	2321	6.77%	4622	1782	2090	2.34%
1857	1281	2.00	292	146	9728	4862	9436	7.53%	14047	7020	4319	1.45%
1858	1287	2.01	94	47	9526	4736	9432	7.84%	12084	6008	2558	0.95%
1868	994	1.55	5	3	1673	1077	1668	7.95%	5129	3302	3456	4.06%
1874	2536	3.96	34	9	2084	526	2050	7.74%	4518	1140	2434	2.95%
1876	646	1.01	125	124	4792	4745	4667	7.59%	5860	5803	1068	0.80%
1877	642	1.00	140	139	4677	4660	4537	7.53%	5499	5479	822	0.65%
1878	1282	2.00	93	46	6590	3289	6497	7.78%	7742	3864	1152	0.64%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE (Continued)												
1879	1294	2.02	53	26	4561	2255	4508	7.82%	8054	3982	3493	2.22%
1887	644	1.01	13	13	660	656	647	7.69%	705	701	45	0.26%
1888	645	1.01	4	4	281	279	277	7.78%	1058	1051	777	4.64%
1889	643	1.00	14	14	2841	2828	2827	7.92%	5510	5485	2669	2.56%
1890	942	1.47	188	128	5081	3453	4893	7.43%	5812	3949	731	0.54%
1891	643	1.00	26	26	3443	3429	3417	7.88%	3549	3534	106	0.12%
1892	641	1.00	302	301	503	502	201	2.00%	806	804	303	1.85%
1894	1282	2.00	66	33	3045	1520	2979	7.66%	3198	1597	153	0.20%
1895	1282	2.00	36	18	2445	1221	2409	7.77%	3123	1559	678	0.97%
1896	971	1.52	74	49	1246	821	1172	7.10%	4644	3060	3398	4.62%
EL MIRAGE												
240	604	0.94	3468	3677	7551	8007	4083	2.96%	5450	5779	-2101	-1.29%
243	844	1.32	8440	6403	11153	8461	2713	1.11%	12230	9279	1077	0.37%
GLENDALE												
392	1276	1.99	2028	1017	9627	4829	7599	5.22%	10061	5046	434	0.18%
393	637	0.99	773	777	1054	1060	281	1.23%	1882	1892	828	2.26%
394	638	1.00	815	818	1258	1262	443	1.71%	2086	2092	828	1.98%
395	631	0.99	1311	1330	2430	2466	1119	2.39%	2853	2895	423	0.64%
396	1936	3.02	1974	653	4130	1366	2156	2.83%	6612	2186	2482	1.85%
397	944	1.47	1191	808	1106	750	-85	-0.30%	1987	1347	881	2.28%
398	944	1.47	712	483	1206	818	494	2.06%	1679	1139	473	1.31%
399	948	1.48	411	277	838	566	427	2.73%	970	655	132	0.58%
400	622	0.97	202	208	1395	1436	1193	5.98%	684	704	-711	-2.74%
401	330	0.52	54	105	231	448	177	4.97%	240	466	9	0.15%
402	335	0.52	32	61	93	178	61	3.90%	122	233	29	1.08%
403	333	0.52	5	10	4	8	-1	-0.89%	8	15	4	2.67%
404	1223	1.91	30	16	1673	875	1643	7.72%	1389	727	-284	-0.74%
405	1560	2.44	11	5	1844	757	1833	7.91%	1820	747	-24	-0.05%
406	921	1.44	450	313	581	404	131	1.02%	979	681	398	2.04%
407	538	0.84	118	140	123	146	5	0.17%	246	292	123	2.67%
408	1577	2.46	13	5	13	5	0	0.00%	27	11	14	2.80%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
GOODYEAR												
200	640	1.00	14	14	3104	3103	3090	7.93%	2553	2552	-551	-0.78%
201	641	1.00	4	4	164	164	160	7.62%	129	129	-35	-0.96%
202	770	1.20	530	440	506	420	-24	-0.19%	873	725	367	2.13%
203	921	1.44	12	8	1143	794	1131	7.83%	923	641	-220	-0.85%
204	814	1.27	0	0	0	0	0	NA	0	0	0	NA
205	772	1.21	2374	1968	4226	3502	1852	2.24%	0	0	-4226	-8.00%
206	353	0.55	0	0	0	0	0	NA	39	71	39	NA
207	469	0.73	136	186	2679	3657	2543	7.23%	2308	3150	-371	-0.60%
208	778	1.22	262	216	4447	3658	4185	7.11%	3478	2861	-969	-0.98%
209	635	0.99	110	111	1807	1821	1697	7.08%	5076	5114	3269	3.80%
210	631	0.99	1157	1174	4235	4297	3078	4.57%	4335	4398	100	0.09%
211	762	1.19	592	497	3375	2834	2783	5.61%	2825	2373	-550	-0.71%
212	782	1.22	252	206	2774	2270	2522	6.67%	6515	5331	3741	3.22%
213	634	0.99	2120	2139	2759	2783	639	1.05%	5257	5303	2498	2.49%
214	775	1.21	598	494	3406	2812	2808	5.61%	3284	2712	-122	-0.15%
218	553	0.86	1204	1394	3208	3715	2004	3.63%	3142	3639	-66	-0.08%
219	507	0.79	740	935	884	1117	144	0.71%	995	1257	111	0.47%
220	1239	1.94	955	493	6186	3195	5231	5.86%	8311	4293	2125	1.17%
221	2564	4.01	1246	311	15074	3763	13828	6.78%	20662	5158	5588	1.25%
222	1136	1.77	28	16	671	378	643	7.36%	802	452	131	0.71%
223	504	0.79	574	729	5128	6514	4554	6.39%	7874	10003	2746	1.69%
224	497	0.78	384	495	3040	3915	2656	6.21%	4367	5624	1327	1.43%
225	1270	1.98	3250	1638	9907	4994	6657	4.05%	16280	8206	6373	1.95%
226	2543	3.97	2747	691	12655	3184	9908	5.15%	15659	3940	3004	0.85%
227	494	0.77	330	428	1759	2281	1429	5.47%	2400	3112	641	1.23%
228	628	0.98	19	19	4391	4471	4372	7.93%	6565	6685	2174	1.59%
232	974	1.52	364	239	89	59	-275	-4.86%	436	287	347	5.29%
236	2084	3.26	68	21	72	22	4	0.23%	138	42	66	2.51%
1873	4885	7.63	930	122	14356	1881	13426	7.03%	16047	2102	1691	0.44%
PEORIA												
295	25268	39.48	1	0	633	16	632	7.97%	6628	168	5995	6.61%
296	2161	3.38	0	0	879	260	879	NA	12731	3770	11852	6.97%
297	1842	2.88	0	0	1558	541	1558	NA	8581	2981	7023	5.54%
298	2046	3.20	0	0	312	98	312	NA	5284	1653	4972	7.11%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
PEORIA (Continued)												
299	2196	3.43	0	0	1654	482	1654	NA	6112	1782	4458	4.59%
301	503	0.79	0	0	646	821	646	NA	843	1072	197	1.06%
1636	1844	2.88	0	0	232	81	232	NA	5352	1858	5120	7.34%
SURPRISE												
147	4964	7.76	344	44	765	99	421	3.04%	22756	2934	21991	7.48%
149	17172	26.83	214	8	3493	130	3279	7.08%	85472	3186	81979	7.37%
150	28603	44.69	26	1	6586	147	6560	7.94%	142831	3196	136245	7.29%
151	1641	2.56	592	231	3084	1203	2492	5.42%	8993	3507	5909	3.91%
152	9472	14.80	231	16	6397	432	6166	7.44%	43536	2942	37139	5.95%
153	2437	3.81	248	65	6253	1642	6005	7.39%	18712	4915	12459	3.99%
154	1277	2.00	49	25	2818	1412	2769	7.73%	3858	1933	1040	1.25%
155	3799	5.94	0	0	31210	5258	31210	NA	52566	8856	21356	2.04%
156	645	1.01	0	0	545	541	545	NA	3156	3131	2611	5.64%
157	2353	3.68	150	41	4197	1142	4047	7.45%	14207	3864	10010	4.35%
158	1792	2.80	0	0	9162	3273	9162	NA	16449	5876	7287	2.28%
159	3794	5.93	0	0	1928	325	1928	NA	7701	1299	5773	4.80%
160	3220	5.03	678	135	5873	1167	5195	6.34%	12889	2562	7016	2.99%
161	741	1.16	0	0	908	785	908	NA	3057	2641	2149	4.34%
162	2407	3.76	84	22	9283	2468	9199	7.86%	18643	4956	9360	2.68%
163	707	1.11	37	33	1879	1700	1842	7.69%	3203	2899	1324	2.08%
164	2304	3.60	693	192	7186	1996	6493	6.59%	16279	4522	9093	3.10%
165	2351	3.67	335	91	4437	1208	4102	6.88%	9600	2614	5163	2.94%
166	1414	2.21	1798	814	8062	3648	6264	5.08%	9111	4123	1049	0.49%
167	1220	1.91	3836	2012	10756	5642	6920	3.79%	12122	6358	1366	0.48%
168	1249	1.95	4028	2063	3767	1930	-261	-0.27%	8727	4470	4960	3.18%
169	886	1.39	2930	2116	2995	2162	65	0.09%	6653	4804	3658	3.03%
170	224	0.35	451	1286	1442	4112	991	4.19%	1612	4597	170	0.45%
171	405	0.63	4014	6350	3472	5493	-542	-0.58%	8266	13077	4794	3.27%
173	1467	2.29	4176	1822	14270	6226	10094	4.38%	19461	8491	5191	1.23%
174	2172	3.39	662	195	10518	3099	9856	7.05%	22083	6506	11565	2.84%
175	953	1.49	1106	743	8147	5472	7041	6.09%	11273	7572	3126	1.29%
176	954	1.49	786	527	5849	3923	5063	6.10%	7972	5347	2123	1.23%
177	963	1.50	786	522	7891	5244	7105	6.55%	10824	7193	2933	1.25%
178	902	1.41	6458	4580	8471	6008	2013	1.08%	16756	11885	8285	2.63%
179	904	1.41	2266	1604	7280	5155	5014	4.20%	13255	9385	5975	2.33%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
SURPRISE (Continued)												
180	905	1.41	140	99	5741	4062	5601	7.62%	13306	9414	7565	3.18%
181	900	1.41	842	599	7157	5089	6315	6.32%	9801	6969	2644	1.25%
182	654	1.02	2767	2709	4318	4228	1551	1.75%	6293	6162	1975	1.49%
183	634	0.99	2404	2425	5445	5493	3041	3.10%	10542	10635	5097	2.55%
184	642	1.00	1980	1974	4287	4274	2307	2.94%	5654	5637	1367	1.10%
1622	591	0.92	895	968	3627	3924	2732	4.83%	4060	4393	433	0.45%
1642	2667	4.17	371	89	5020	1205	4649	6.90%	12055	2893	7035	3.30%
1643	6030	9.42	0	0	1277	136	1277	NA	30925	3282	29648	7.37%
1648	2004	3.13	0	0	2410	770	2410	NA	12515	3997	10105	5.42%
1659	1284	2.01	40	20	1819	906	1779	7.66%	6238	3109	4419	4.39%
1660	986	1.54	0	0	554	360	554	NA	5075	3294	4521	6.43%
1661	679	1.06	180	170	2681	2527	2501	6.99%	3007	2834	326	0.46%
1662	876	1.37	2	1	9153	6683	9151	8.00%	4105	2997	-5048	-3.05%
1663	1287	2.01	0	0	1058	526	1058	NA	11957	5948	10899	6.70%
1664	637	0.99	0	0	823	827	823	NA	3342	3359	2519	4.84%
1665	640	1.00	178	178	2296	2297	2118	6.85%	2994	2995	698	1.06%
1670	1969	3.08	79	26	1604	521	1525	7.25%	3840	1248	2236	3.29%
1671	1284	2.01	16	8	628	313	612	7.60%	3556	1772	2928	5.60%
1672	1723	2.69	0	0	3929	1460	3929	NA	14666	5449	10737	4.62%
1673	647	1.01	55	54	2380	2354	2325	7.64%	3182	3147	802	1.15%
1674	744	1.16	0	0	710	611	710	NA	3543	3049	2833	5.33%
1675	659	1.03	199	193	1979	1921	1780	6.54%	2808	2726	829	1.39%
1676	639	1.00	0	0	588	589	588	NA	3068	3074	2480	5.43%
1678	239	0.37	16	43	520	1394	504	7.52%	1261	3381	741	3.33%
1680	1515	2.37	248	105	679	287	431	3.72%	6083	2569	5404	6.39%
1681	715	1.12	323	289	2225	1991	1902	5.97%	2605	2330	380	0.63%
1684	648	1.01	122	120	1051	1038	929	6.34%	1169	1154	118	0.43%
1685	1823	2.85	300	105	2621	920	2321	6.36%	12459	4373	9838	5.22%
1686	808	1.26	0	0	137	108	137	NA	354	280	217	3.54%
1687	480	0.75	208	277	320	427	112	1.70%	527	703	207	1.96%
1691	731	1.14	1873	1639	1566	1371	-307	-0.71%	3029	2651	1463	2.55%
1693	847	1.32	67	51	4178	3155	4111	7.75%	4426	3342	248	0.23%
1694	636	0.99	310	312	653	657	343	2.85%	935	941	282	1.42%
1695	639	1.00	18	18	92	92	74	5.38%	129	129	37	1.34%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
SURPRISE (Continued)												
1696	625	0.98	305	312	396	405	91	1.04%	295	302	-101	-1.17%
1697	543	0.85	580	684	439	518	-141	-1.11%	1001	1181	562	3.12%
1698	625	0.98	51	52	2438	2495	2387	7.67%	4171	4269	1733	2.10%
1699	590	0.92	230	250	2548	2765	2318	6.68%	2537	2753	-11	-0.02%
1702	3373	5.27	628	119	6193	1175	5565	6.53%	8440	1602	2247	1.23%
1703	2284	3.57	109	31	4267	1196	4158	7.60%	10931	3063	6664	3.51%
1704	2545	3.98	720	181	12529	3150	11809	7.13%	23158	5823	10629	2.38%
1706	1124	1.76	59	34	193	110	134	4.25%	227	129	34	0.65%
1708	881	1.38	97	70	2010	1460	1913	7.26%	3124	2270	1114	1.74%
1714	2985	4.66	70	15	637	137	567	6.42%	840	180	203	1.10%
1720	1099	1.72	84	49	4394	2558	4310	7.70%	5235	3048	841	0.70%
1722	969	1.51	0	0	55	36	55	NA	4926	3254	4871	7.82%
1728	3911	6.11	119	19	3857	631	3738	7.52%	11894	1946	8037	4.08%
1730	1018	1.59	0	0	3174	1995	3174	NA	8896	5592	5722	3.79%
1731	701	1.10	0	0	3951	3608	3951	NA	11009	10053	7058	3.77%
1732	747	1.17	0	0	3450	2955	3450	NA	5893	5047	2443	2.09%
1733	1187	1.85	2	1	6820	3677	6818	8.00%	8725	4704	1905	0.98%
1734	955	1.49	0	0	211	141	211	NA	4187	2806	3976	7.23%
1741	1443	2.26	0	0	905	401	905	NA	4058	1799	3153	5.08%
1742	659	1.03	0	0	732	710	732	NA	5537	5374	4805	6.13%
MARICOPA COUNTY												
101	63684	99.51	172	2	831	8	659	5.26%	20343	204	19512	7.37%
102	13324	20.82	982	47	6592	317	5610	5.93%	25599	1230	19007	4.72%
103	22123	34.57	512	15	913	26	401	2.25%	20739	600	19826	7.33%
104	30637	47.87	175	4	2781	58	2606	7.05%	39070	816	36289	6.94%
105	56094	87.65	98	1	706	8	608	6.05%	10817	123	10111	7.02%
106	3872	6.05	0	0	833	138	833	NA	21948	3627	21115	7.41%
107	12271	19.17	255	13	1203	63	948	5.20%	3105	162	1902	3.53%
146	24701	38.60	0	0	0	0	0	NA	0	0	0	NA
148	2720	4.25	15	4	9776	2301	9761	7.98%	9345	2199	-431	-0.18%
194	965	1.51	3898	2584	3477	2305	-421	-0.46%	8184	5426	4707	3.23%
1280	7360	11.50	286	25	4623	402	4337	7.07%	10060	875	5437	2.96%
1688	7352	11.49	0	0	249	22	249	NA	10151	884	9902	7.62%
1715	2506	3.92	0	0	0	0	0	NA	1855	474	1855	NA
1723	2741	4.28	0	0	0	0	0	NA	3480	812	3480	NA
1766	5730	8.95	0	0	879	98	879	NA	28975	3236	28096	7.53%

Population Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
MARICOPA COUNTY (Continued)												
1772	4170	6.52	0	0	1098	169	1098	NA	11254	1727	10156	6.58%
1776	5983	9.35	0	0	559	60	559	NA	28032	2999	27473	7.69%
1789	5760	9.00	29	3	2114	235	2085	7.78%	27774	3086	25660	6.87%
1790	4091	6.39	7	1	2040	319	2033	7.95%	12516	1958	10476	5.76%
1809	11925	18.63	122	7	1041	56	919	6.32%	9218	495	8177	6.38%
1814	1274	1.99	6	3	3049	1532	3043	7.97%	9273	4659	6224	4.04%
1815	1969	3.08	24	8	1351	439	1327	7.72%	5703	1853	4352	4.94%
1816	4223	6.60	219	33	1262	191	1043	5.63%	16348	2477	15086	6.85%
1817	3612	5.64	29	5	555	98	526	7.21%	16187	2868	15632	7.47%
1818	3748	5.86	34	6	803	137	769	7.35%	11726	2002	10923	6.97%
1830	8411	13.14	314	24	1872	142	1558	5.70%	10600	807	8728	5.60%
1838	8636	13.49	637	47	2809	208	2172	5.04%	17024	1262	14215	5.73%
1860	13386	20.92	62	3	488	23	426	6.20%	11316	541	10828	7.34%
Study Area Total	**830839**	**1298**	**138107**	**87721**	**948389**	**453738**	**810282**	**5.97%**	**2862392**	**945511**	**1914003**	**4.02%**

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE												
109	8764	13.69	4	0	1591	116	1587	7.96%	24334	1777	22743	7.02%
110	2899	4.53	0	0	0	0	0	NA	6891	1521	6891	NA
111	3134	4.90	0	0	140	29	140	NA	6919	1413	6779	7.68%
112	2920	4.56	49	11	2287	501	2238	7.66%	16153	3540	13866	6.02%
113	2026	3.17	86	27	3037	959	2951	7.56%	14241	4499	11204	5.19%
114	1401	2.19	0	0	282	129	282	NA	2447	1118	2165	6.35%
115	1305	2.04	0	0	524	257	524	NA	4058	1990	3534	6.17%
116	11761	18.38	21	1	370	20	349	7.14%	24442	1330	24072	7.76%
117	1492	2.33	0	0	156	67	156	NA	4282	1836	4126	7.44%
118	15314	23.93	2	0	457	19	455	7.93%	2742	115	2285	5.71%
119	2210	3.45	135	39	827	239	692	5.75%	8467	2451	7640	6.58%
120	7459	11.66	64	5	3086	265	3022	7.67%	21982	1886	18896	6.03%
121	3018	4.72	3	1	447	95	444	7.89%	4874	1033	4427	6.66%
122	1285	2.01	649	323	2692	1341	2043	4.89%	7768	3869	5076	3.88%
123	2787	4.35	136	31	3357	771	3221	7.38%	19276	4427	15919	5.63%
124	984	1.54	133	87	1054	686	921	6.21%	6191	4029	5137	5.67%
125	2653	4.15	2	0	227	55	225	7.86%	2061	497	1834	6.41%
126	3280	5.12	1384	270	5884	1148	4500	4.95%	18655	3640	12771	4.16%
127	951	1.49	111	75	1726	1161	1615	7.03%	6976	4693	5250	4.83%
128	956	1.49	106	71	563	377	457	5.46%	1626	1089	1063	3.88%
129	3044	4.76	114	24	1419	298	1305	6.81%	2508	527	1089	2.22%
130	2885	4.51	1239	275	4431	983	3192	4.50%	14706	3262	10275	4.30%
131	635	0.99	2	2	1093	1101	1091	7.97%	2380	2398	1287	2.96%
132	954	1.49	600	402	1723	1156	1123	3.87%	4795	3217	3072	3.77%
133	955	1.49	466	312	1968	1319	1502	4.94%	4188	2808	2220	2.88%
134	2457	3.84	302	79	1714	447	1412	5.60%	7321	1907	5607	4.96%
135	639	1.00	319	319	521	522	202	1.92%	2780	2783	2259	5.47%
136	739	1.16	19	16	2516	2178	2497	7.88%	2759	2388	243	0.37%
137	1414	2.21	354	160	392	177	38	0.41%	7614	3447	7222	7.22%
138	659	1.03	819	795	864	839	45	0.21%	6522	6330	5658	6.13%
139	799	1.25	276	221	3288	2634	3012	6.76%	10892	8724	7604	4.29%
140	1882	2.94	416	141	1078	367	662	3.54%	6327	2151	5249	5.67%
141	1910	2.98	150	50	1559	522	1409	6.60%	9424	3158	7865	5.73%
1614	880	1.37	2	1	675	491	673	7.95%	1972	1435	1297	3.92%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE (Continued)												
1647	4950	7.73	0	0	21	3	21	NA	9140	1182	9119	7.96%
1669	3728	5.82	0	0	902	155	902	NA	9470	1626	8568	6.61%
1689	8592	13.42	1	0	54	4	53	7.71%	12795	953	12741	7.93%
1690	3594	5.62	0	0	163	29	163	NA	7650	1362	7487	7.67%
1692	1299	2.03	0	0	652	321	652	NA	3589	1769	2937	5.54%
1705	1298	2.03	0	0	284	140	284	NA	3546	1748	3262	6.81%
1711	2137	3.34	70	21	962	288	892	6.91%	5857	1754	4895	5.74%
1717	2044	3.19	0	0	127	40	127	NA	4939	1546	4812	7.60%
1718	2788	4.36	0	0	1884	432	1884	NA	11823	2714	9939	5.80%
1721	5255	8.21	0	0	0	0	0	NA	13821	1683	13821	NA
1724	1740	2.72	0	0	1035	381	1035	NA	5988	2203	4953	5.64%
1725	4144	6.48	0	0	158	24	158	NA	11077	1711	10919	7.77%
1726	1180	1.84	0	0	27	15	27	NA	4271	2316	4244	7.90%
1729	2783	4.35	0	0	0	0	0	NA	8282	1904	8282	NA
1737	1506	2.35	0	0	1623	690	1623	NA	5931	2520	4308	4.56%
1739	1446	2.26	0	0	0	0	0	NA	6216	2752	6216	NA
1740	1847	2.89	1	0	1547	536	1546	7.99%	10973	3801	9426	6.02%
1752	1017	1.59	0	0	171	108	171	NA	2672	1682	2501	7.04%
1753	2420	3.78	0	0	611	162	611	NA	3960	1047	3349	5.86%
1754	1460	2.28	0	0	618	271	618	NA	5848	2564	5230	6.47%
1755	1536	2.40	0	0	988	412	988	NA	4153	1731	3165	4.93%
1756	1675	2.62	4	2	670	256	666	7.91%	5995	2291	5325	6.39%
1757	3296	5.15	0	0	94	18	94	NA	21199	4116	21105	7.93%
1760	2000	3.13	0	0	1419	454	1419	NA	6030	1929	4611	4.95%
1763	1200	1.87	0	0	223	119	223	NA	2815	1501	2592	6.83%
1768	1325	2.07	0	0	727	351	727	NA	6199	2993	5472	6.32%
1771	1063	1.66	0	0	792	477	792	NA	4513	2717	3721	5.61%
1780	2222	3.47	0	0	842	243	842	NA	8529	2457	7687	6.56%
1781	1575	2.46	0	0	1288	523	1288	NA	13945	5667	12657	6.65%
1785	2044	3.19	0	0	976	306	976	NA	8134	2546	7158	6.29%
1786	1074	1.68	0	0	126	75	126	NA	1496	892	1370	6.76%
1791	1326	2.07	0	0	172	83	172	NA	2103	1015	1931	6.79%
1792	931	1.45	0	0	302	208	302	NA	3045	2094	2743	6.56%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE (Continued)												
1793	1299	2.03	0	0	411	202	411	NA	4231	2084	3820	6.58%
1794	1291	2.02	0	0	3255	1614	3255	NA	26951	13362	23696	6.28%
1795	1430	2.23	0	0	2965	1327	2965	NA	27889	12484	24924	6.46%
1796	1491	2.33	0	0	657	282	657	NA	5526	2372	4869	6.30%
1797	2702	4.22	0	0	179	42	179	NA	4498	1065	4319	7.39%
1800	3197	5.00	4	1	487	97	483	7.87%	5833	1168	5346	6.77%
1801	2593	4.05	153	38	5079	1253	4926	7.53%	7497	1850	2418	1.54%
1804	1105	1.73	0	0	758	439	758	NA	5235	3033	4477	5.98%
1805	1883	2.94	0	0	2140	727	2140	NA	12312	4185	10172	5.63%
1808	3854	6.02	370	61	1290	214	920	4.43%	9073	1507	7783	6.01%
1810	2213	3.46	2	1	1416	409	1414	7.98%	3696	1069	2280	3.57%
1813	3873	6.05	0	0	1218	201	1218	NA	12565	2076	11347	6.59%
1819	2504	3.91	120	31	330	84	210	3.73%	4509	1152	4179	6.91%
1820	1297	2.03	0	0	332	164	332	NA	4486	2214	4154	6.90%
1822	1132	1.77	2	1	1754	991	1752	7.98%	4254	2404	2500	3.33%
1831	2240	3.50	267	76	2229	637	1962	6.29%	9738	2782	7509	5.02%
1832	3903	6.10	420	69	1949	320	1529	5.16%	17522	2873	15573	6.40%
1834	1756	2.74	2	1	902	329	900	7.96%	3576	1303	2674	4.78%
1837	3135	4.90	32	7	467	95	435	6.97%	3164	646	2697	5.94%
1839	1085	1.70	370	218	3275	1932	2905	6.38%	6625	3907	3350	2.71%
1840	735	1.15	456	397	1196	1041	740	3.58%	3226	2807	2030	3.67%
1843	1025	1.60	199	124	2874	1795	2675	6.96%	14081	8792	11207	5.29%
1845	1940	3.03	165	54	297	98	132	2.29%	913	301	616	4.07%
1846	941	1.47	104	71	2576	1752	2472	7.38%	6126	4167	3550	3.26%
1848	642	1.00	210	209	278	277	68	1.11%	3071	3064	2793	6.67%
1850	3267	5.10	655	128	2723	533	2068	4.90%	25317	4960	22594	6.45%
1855	1660	2.59	185	71	3506	1352	3321	7.20%	17548	6767	14042	5.34%
1857	1281	2.00	36	18	3271	1635	3235	7.83%	5509	2753	2238	2.04%
1858	1287	2.01	48	24	2725	1355	2677	7.72%	4874	2423	2149	2.26%
1868	994	1.55	33	21	2155	1387	2122	7.76%	5715	3680	3560	3.62%
1874	2536	3.96	39	10	1603	405	1564	7.62%	24253	6120	22650	7.01%
1876	646	1.01	12	12	1462	1448	1450	7.87%	2244	2222	782	1.69%
1877	642	1.00	134	134	617	615	483	5.15%	2863	2853	2246	5.16%
1878	1282	2.00	20	10	2446	1221	2426	7.87%	7654	3820	5208	4.13%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
BUCKEYE (Continued)												
1879	1294	2.02	173	86	892	441	719	5.40%	6396	3163	5504	6.04%
1887	644	1.01	1	1	165	164	164	7.90%	2101	2088	1936	6.83%
1888	645	1.01	22	22	68	68	46	4.09%	355	352	287	5.43%
1889	643	1.00	13	13	1246	1240	1233	7.83%	4271	4252	3025	4.39%
1890	942	1.47	110	75	1208	821	1098	6.66%	5064	3441	3856	4.92%
1891	643	1.00	140	139	484	482	344	4.41%	2764	2752	2280	5.62%
1892	641	1.00	1046	1044	910	908	-136	-0.56%	3993	3984	3083	5.03%
1894	1282	2.00	12	6	354	177	342	7.48%	4674	2333	4320	6.87%
1895	1282	2.00	166	83	272	136	106	1.94%	6489	3240	6217	7.36%
1896	971	1.52	180	119	1387	914	1207	6.16%	6787	4473	5400	5.29%
EL MIRAGE												
240	604	0.94	536	568	1571	1666	1035	3.93%	2569	2724	998	1.93%
243	844	1.32	440	334	950	721	510	2.94%	3639	2761	2689	4.69%
GLENDALE												
392	1276	1.99	484	243	827	415	343	2.09%	4078	2045	3251	5.30%
393	637	0.99	10	10	84	84	74	6.30%	322	324	238	4.69%
394	638	1.00	27	27	128	128	101	5.21%	387	388	259	4.02%
395	631	0.99	140	142	577	586	437	4.88%	799	811	222	1.29%
396	1936	3.02	198	65	7003	2315	6805	7.56%	7923	2620	920	0.49%
397	944	1.47	54	37	3583	2429	3529	7.76%	5551	3764	1968	1.72%
398	944	1.47	622	422	1672	1134	1050	3.66%	2430	1648	758	1.48%
399	948	1.48	55	37	376	254	321	5.96%	1077	727	701	3.86%
400	622	0.97	2401	2472	4338	4466	1937	2.30%	5755	5924	1417	1.12%
401	330	0.52	930	1805	1723	3344	793	2.39%	3882	7535	2159	3.08%
402	335	0.52	82	157	469	896	387	5.62%	441	842	-28	-0.25%
403	333	0.52	21	40	470	905	449	7.32%	453	872	-17	-0.15%
404	1223	1.91	322	168	265	139	-57	-0.78%	1649	863	1384	5.78%
405	1560	2.44	58	24	3285	1348	3227	7.72%	4551	1867	1266	1.29%
406	921	1.44	88	61	1040	723	952	6.75%	1128	784	88	0.32%
407	538	0.84	20	24	980	1165	960	7.68%	684	813	-296	-1.42%
408	1577	2.46	408	166	553	224	145	1.21%	2934	1191	2381	5.46%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
GOODYEAR												
200	640	1.00	16		647	647	631	7.61%	1584	1584	937	3.36%
201	641	1.00	17	17	233	233	216	6.91%	2264	2260	2031	6.51%
202	770	1.20	416	346	1973	1639	1557	5.21%	3433	2852	1460	2.16%
203	921	1.44	263	183	2684	1865	2421	6.57%	2963	2059	279	0.40%
204	814	1.27	412	324	1322	1039	910	4.20%	3586	2820	2264	3.69%
205	772	1.21	2597	2152	888	736	-1709	-3.92%	3180	2636	2292	4.51%
206	353	0.55	8	15	317	575	309	7.61%	1395	2529	1078	5.04%
207	469	0.73	50	68	381	520	331	6.14%	1321	1803	940	4.42%
208	778	1.22	71	58	895	736	824	6.82%	2372	1951	1477	3.62%
209	635	0.99	32	32	1105	1113	1073	7.55%	3439	3465	2334	4.11%
210	631	0.99	259	263	464	471	205	2.27%	1616	1640	1152	4.43%
211	762	1.19	90	76	1449	1217	1359	7.06%	3049	2561	1600	2.85%
212	782	1.22	244	200	472	386	228	2.55%	3599	2945	3127	6.14%
213	634	0.99	186	188	322	325	136	2.14%	1547	1561	1225	5.24%
214	775	1.21	141	116	4137	3416	3996	7.47%	5290	4368	1153	0.98%
218	553	0.86	99	115	210	243	111	2.87%	1241	1437	1031	5.68%
219	507	0.79	494	624	784	990	290	1.82%	5188	6554	4404	5.90%
220	1239	1.94	151	78	999	516	848	5.90%	3309	1709	2310	4.29%
221	2564	4.01	1382	345	2326	581	944	2.04%	8939	2231	6613	4.70%
222	1136	1.77	578	326	1149	648	571	2.65%	8243	4645	7094	6.04%
223	504	0.79	176	224	736	935	560	4.91%	2532	3216	1796	4.40%
224	497	0.78	114	147	883	1137	769	6.17%	2030	2614	1147	3.15%
225	1270	1.98	510	257	3428	1728	2918	5.93%	6056	3053	2628	2.22%
226	2543	3.97	1332	335	10919	2747	9587	6.26%	19040	4791	8121	2.17%
227	494	0.77	498	646	1187	1539	689	3.27%	3097	4016	1910	3.57%
228	628	0.98	279	284	1947	1983	1668	5.99%	6430	6548	4483	4.28%
232	974	1.52	871	573	2651	1743	1780	4.04%	3497	2299	846	1.10%
236	2084	3.26	900	276	6820	2095	5920	6.13%	22373	6871	15553	4.26%
1873	4885	7.63	392	51	5549	727	5157	6.94%	11595	1519	6046	2.82%
PEORIA												
295	25268	39.48	1	0	328	8	327	7.95%	2687	68	2359	6.26%
296	2161	3.38	1	0	399	118	398	7.96%	4800	1421	4401	6.77%
297	1842	2.88	1	0	935	325	934	7.98%	5628	1955	4693	5.72%
298	2046	3.20	1	0	678	212	677	7.98%	3213	1005	2535	5.21%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
PEORIA (Continued)												
299	2196	3.43	1	0	573	167	572	7.97%	2353	686	1780	4.87%
301	503	0.79	0	0	199	253	199	NA	404	514	205	2.72%
1636	1844	2.88	29	10	176	61	147	5.74%	2068	718	1892	6.75%
SURPRISE												
147	4964	7.76	180	23	3	0	-177	-7.74%	8177	1054	8174	7.99%
149	17172	26.83	5	0	1909	71	1904	7.96%	30370	1132	28461	7.05%
150	28603	44.69	64	1	4106	92	4042	7.75%	53383	1194	49277	6.86%
151	1641	2.56	30	12	700	273	670	7.34%	3012	1175	2312	4.98%
152	9472	14.80	220	15	4488	303	4268	7.25%	26241	1773	21753	5.66%
153	2437	3.81	8	2	3801	998	3793	7.97%	13262	3483	9461	4.44%
154	1277	2.00	3	2	546	274	543	7.91%	3154	1580	2608	5.64%
155	3799	5.94	95	16	6154	1037	6059	7.76%	21230	3577	15076	4.40%
156	645	1.01	0	0	0	0	0	NA	1120	1111	1120	NA
157	2353	3.68	16	4	778	212	762	7.68%	11703	3183	10925	7.00%
158	1792	2.80	0	0	2875	1027	2875	NA	5502	1965	2627	2.51%
159	3794	5.93	8	1	894	151	886	7.86%	3593	606	2699	4.81%
160	3220	5.03	124	25	2855	567	2731	7.33%	9728	1933	6873	4.37%
161	741	1.16	2	2	5	4	3	3.43%	1085	938	1080	7.93%
162	2407	3.76	9	2	2050	545	2041	7.93%	8848	2352	6798	4.99%
163	707	1.11	4	4	482	436	478	7.87%	1102	997	620	3.13%
164	2304	3.60	198	55	2050	569	1852	6.59%	7041	1956	4991	4.39%
165	2351	3.67	42	11	651	177	609	7.03%	4655	1267	4004	6.04%
166	1414	2.21	146	66	404	183	258	3.75%	3123	1413	2719	6.17%
167	1220	1.91	549	288	780	409	231	1.39%	4763	2498	3983	5.75%
168	1249	1.95	334	171	721	369	387	2.93%	2929	1500	2208	4.84%
169	886	1.39	352	254	401	290	49	0.52%	2012	1453	1611	5.34%
170	224	0.35	40	114	18	51	-22	-3.03%	385	1098	367	7.29%
171	405	0.63	320	506	692	1095	372	2.94%	1887	2985	1195	3.71%
173	1467	2.29	1206	526	1404	613	198	0.61%	7210	3146	5806	5.39%
174	2172	3.39	197	58	1662	490	1465	6.30%	8447	2489	6785	5.37%
175	953	1.49	139	93	1045	702	906	6.12%	9284	6236	8239	6.38%
176	954	1.49	192	129	2783	1867	2591	6.97%	5805	3894	3022	2.82%
177	963	1.50	232	154	1918	1275	1686	6.27%	5495	3652	3577	3.86%
178	902	1.41	892	633	1150	816	258	1.01%	4432	3143	3282	4.70%
179	904	1.41	282	200	595	421	313	2.86%	7143	5058	6548	6.77%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
SURPRISE (Continued)												
180	905	1.41	36	25	6028	4265	5992	7.91%	15821	11193	9793	3.59%
181	900	1.41	40	28	1883	1339	1843	7.67%	5127	3646	3244	3.70%
182	654	1.02	564	552	947	927	383	2.03%	2973	2911	2026	4.13%
183	634	0.99	504	508	564	569	60	0.45%	2390	2411	1826	4.95%
184	642	1.00	39	39	2363	2356	2324	7.74%	4398	4385	2035	2.41%
1622	591	0.92	746	807	1848	2000	1102	3.40%	2994	3240	1146	1.89%
1642	2667	4.17	70	17	2106	505	2036	7.49%	5925	1422	3819	3.80%
1643	6030	9.42	3	0	860	91	857	7.94%	11552	1226	10692	6.89%
1648	2004	3.13	1	0	1050	335	1049	7.98%	4845	1547	3795	5.15%
1659	1284	2.01	88	44	505	252	417	5.63%	2283	1138	1778	5.10%
1660	986	1.54	0	0	0	0	0	NA	1812	1176	1812	NA
1661	679	1.06	35	33	373	352	338	6.63%	1314	1239	941	4.46%
1662	876	1.37	1	1	8799	6425	8798	8.00%	5787	4226	-3012	-1.65%
1663	1287	2.01	0	0	403	200	403	NA	4969	2472	4566	6.80%
1664	637	0.99	0	0	241	242	241	NA	1187	1193	946	5.30%
1665	640	1.00	8	8	598	598	590	7.79%	970	970	372	1.90%
1670	1969	3.08	3	1	2461	800	2458	7.98%	9083	2952	6622	4.59%
1671	1284	2.01	0	0	538	268	538	NA	6893	3436	6355	6.84%
1672	1723	2.69	1	0	1724	641	1723	7.99%	11047	4104	9323	5.84%
1673	647	1.01	4	4	639	632	635	7.90%	1100	1088	461	2.12%
1674	744	1.16	0	0	207	178	207	NA	1257	1082	1050	5.74%
1675	659	1.03	3	3	107	104	104	7.56%	783	760	676	6.08%
1676	639	1.00	0	0	170	170	170	NA	1091	1093	921	5.84%
1678	239	0.37	2	5	164	440	162	7.81%	450	1206	286	3.73%
1680	1515	2.37	238	101	51	22	-187	-5.18%	2171	917	2120	7.63%
1681	715	1.12	26	23	526	471	500	7.25%	847	758	321	1.87%
1684	648	1.01	2	2	1166	1151	1164	7.97%	1962	1937	796	2.04%
1685	1823	2.85	18	6	1587	557	1569	7.82%	4279	1502	2692	3.67%
1686	808	1.26	2	2	2000	1583	1998	7.98%	8840	6999	6840	5.05%
1687	480	0.75	116	155	2199	2932	2083	7.20%	4056	5408	1857	2.38%
1691	731	1.14	101	88	228	200	127	3.09%	1957	1713	1729	6.33%
1693	847	1.32	7	5	1112	840	1105	7.90%	3897	2943	2785	4.45%
1694	636	0.99	26	26	1825	1837	1799	7.78%	4208	4237	2383	3.16%
1695	639	1.00	112	112	650	651	538	5.65%	5408	5417	4758	6.28%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
SURPRISE (Continued)												
1696	625	0.98	31	32	515	527	484	7.09%	5077	5195	4562	6.53%
1697	543	0.85	58	68	247	291	189	4.96%	2736	3227	2489	6.68%
1698	625	0.98	4	4	685	701	681	7.91%	1471	1505	786	2.92%
1699	590	0.92	65	71	715	776	650	6.67%	996	1081	281	1.31%
1702	3373	5.27	129	24	3286	624	3157	7.40%	14630	2776	11344	5.07%
1703	2284	3.57	10	3	1214	340	1204	7.87%	3875	1086	2661	4.18%
1704	2545	3.98	78	20	2282	574	2204	7.47%	9167	2305	6885	4.81%
1706	1124	1.76	5	3	1653	941	1648	7.95%	9170	5223	7517	5.56%
1708	881	1.38	433	315	1040	756	607	3.30%	2849	2070	1809	3.72%
1714	2985	4.66	84	18	945	203	861	6.69%	8613	1847	7668	6.42%
1720	1099	1.72	46	27	1223	712	1177	7.42%	1781	1037	558	1.49%
1722	969	1.51	0	0	104	69	104	NA	1763	1165	1659	7.11%
1728	3911	6.11	68	11	1123	184	1055	7.09%	11337	1855	10214	6.56%
1730	1018	1.59	2	1	699	439	697	7.95%	4666	2933	3967	5.92%
1731	701	1.10	32	29	809	739	777	7.39%	4250	3881	3441	5.44%
1732	747	1.17	0	0	1013	868	1013	NA	1899	1626	886	2.43%
1733	1187	1.85	94	51	1304	703	1210	6.92%	4153	2239	2849	4.18%
1734	955	1.49	180	121	955	640	775	5.46%	2580	1729	1625	3.68%
1741	1443	2.26	0	0	5	2	5	NA	1440	639	1435	7.94%
1742	659	1.03	1	1	217	211	216	7.93%	1965	1907	1748	6.41%
MARICOPA COUNTY												
101	63684	99.51	72	1	2124	21	2052	7.48%	15444	155	13320	6.07%
102	13324	20.82	530	25	3904	188	3374	6.09%	18525	890	14621	5.22%
103	22123	34.57	532	15	2368	69	1836	5.06%	16018	463	13650	5.94%
104	30637	47.87	120	3	1644	34	1524	6.91%	23612	493	21968	6.96%
105	56094	87.65	11	0	226	3	215	7.26%	5331	61	5105	7.35%
106	3872	6.05	0	0	1410	233	1410	NA	32778	5417	31368	7.34%
107	12271	19.17	2	0	406	21	404	7.92%	1423	74	1017	4.45%
146	24701	38.60	0	0	0	0	0	NA	37	1	37	NA
148	2720	4.25	4	1	3191	751	3187	7.98%	4684	1102	1493	1.52%
194	965	1.51	156	103	130	86	-26	-0.73%	2550	1691	2420	7.22%
1280	7360	11.50	6	1	1260	110	1254	7.92%	4867	423	3607	4.71%
1688	7352	11.49	2	0	100	9	98	7.69%	5056	440	4956	7.69%
1715	2506	3.92	1	0	0	0	-1	-8.00%	921	235	921	NA
1723	2741	4.28	0	0	20	5	20	NA	1819	425	1799	7.83%
1766	5730	8.95	0	0	1099	123	1099	NA	21320	2381	20221	7.22%

Employment Estimates by Socioeconomic Analysis Zone: I-10/Hassayampa Study Area (Continued)

Socioeconomic Analysis Zone	Acres	Square Miles	Year									
			2005		2030				Buildout			
							Change 2005-2030				Change 2030-Buildout	
			Total	Per Square Mile	Total	Per Square Mile	Total Increase	Average Annual Percent Increase	Total	Per Square Mile	Total Increase	Average Annual Percent Increase
MARICOPA COUNTY (Continued)												
1772	4170	6.52	0	0	704	108	704	NA	6949	1067	6245	6.53%
1776	5983	9.35	2	0	830	89	828	7.96%	15858	1696	15028	7.20%
1789	5760	9.00	1	0	547	61	546	7.97%	20449	2272	19902	7.58%
1790	4091	6.39	0	0	348	54	348	NA	9684	1515	9336	7.44%
1809	11925	18.63	56	3	1235	66	1179	7.31%	13537	727	12302	6.66%
1814	1274	1.99	116	58	2826	1420	2710	7.37%	15442	7758	12616	5.52%
1815	1969	3.08	146	47	1245	405	1099	6.32%	4549	1478	3304	4.56%
1816	4223	6.60	6	1	867	131	861	7.89%	14835	2248	13968	7.12%
1817	3612	5.64	0	0	2921	517	2921	NA	16740	2966	13819	5.62%
1818	3748	5.86	4	1	1748	298	1744	7.96%	8077	1379	6329	5.15%
1830	8411	13.14	144	11	2284	174	2140	7.05%	13821	1052	11537	5.73%
1838	8636	13.49	182	13	1662	123	1480	6.42%	18618	1380	16956	6.69%
1860	13386	20.92	2362	113	2973	142	611	0.92%	23564	1127	20591	6.21%
Study Area Total	**830839**	**1298**	**47908**	**29429**	**379221**	**181420**	**331313**	**6.21%**	**1936381**	**691859**	**1557160**	**5.38%**

APPENDIX C
Detailed Results of Cut-Line Analyses

Table C-1
Summary of Generalized Annual Average Daily Volumes for the Phoenix Urban Area
I-10/Hassamyampa Valley Roadway Framework Study

FREEWAY					
Interchange Spacing Less Than Two Miles					
Number of Through Lanes*	Level of Service				
	A	B	C	D	E
6	43,200	70,000	101,300	131,200	**149,100**
8	58,900	95,500	138,100	178,900	**203,200**
10	74,700	120,900	175,100	226,400	**257,500**
12	90,400	146,400	211,900	274,100	**311,500**
EXPRESSWAY					
Number of Through Lanes	Level of Service				
	A	B	C	D	E
4	25,900	41,900	60,500	78,300	**88,900**
6	38,700	62,700	90,700	117,500	**133,500**
PRINCIPAL ARTERIAL					
Number of Through Lanes	Level of Service				
	A	B	C	D	E
4	**	5,200	32,900	41,500	**43,600**
6	**	8,300	51,100	62,400	**65,600**
MINOR ARTERIAL					
Number of Through Lanes	Level of Service				
	A	B	C	D	E
4	**	5,200	32,900	41,500	**43,600**
COLLECTOR					
Number of Through Lanes	Level of Service				
	A	B	C	D	E
2	**	**	6,000	12,700	**16,000**

Bold Type *indicates the planning level threshold standard for maximum acceptable daily volume by facility type.*

* *Excludes auxiliary lanes.*

** *Cannot be achieved using table input value defaults.*

Note: This table does not constitute a standard and should be used for general planning applications, only. *The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor design, where more refined techniques exist. Values are shown for two-way annual average daily volumes (based on K_{100} factors) for levels of service and are for automobile/truck modes. Calculations are based upon planning applications of the Highway Capacity Manual, Transportation Research Board, Washington DC, 2000.*

Source: *Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.*

Table C-2
Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis
CutLine 1 - Interstate17 (Black Canyon Freeway) / SR 101L (Aqua Fria Freeway)
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
Northern Section						
New River Rd	West of Black Canyon Fwy	6	Principal Arterial	65,600	34,900	0.5
Anthem Way	West of Black Canyon Fwy	6	Principal Arterial	65,600	66,700	1.0
Daisy Mountain Dr	West of Black Canyon Fwy	6	Principal Arterial	65,600	70,100	1.1
Pioneer Rd	West of Black Canyon Fwy	6	Principal Arterial	65,600	50,400	0.8
Carefree Hwy	West of Black Canyon Fwy	6	Principal Arterial	65,600	99,100	1.5
Dove Valley Rd	West of Black Canyon Fwy	6	Principal Arterial	65,600	99,200	1.5
Estrella Freeway (SR 303L)	West of Black Canyon Fwy	6	Freeway	149,100	271,300	1.8
Dixeleta Dr	West of Black Canyon Fwy	6	Principal Arterial	65,600	79,200	1.2
Happy Valley Rd	West of Black Canyon Fwy	6	Principal Arterial	65,600	92,800	1.4
Pinnacle Peak Rd	West of Black Canyon Fwy	4	Minor Arterial	43,600	62,000	1.4
Deer Valley Rd	West of Black Canyon Fwy	4	Minor Arterial	43,600	53,400	1.2
Rose Garden Complex	West of Black Canyon Fwy	6	Principal Arterial	65,600	102,100	1.6
35th Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	65,100	1.5
51st Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	13,300	0.3
59th Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	88,700	2.0
67th Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	99,200	2.3
75th Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	77,800	1.8
Beardsley Rd	North of Agua Fria Fwy	4	Minor Arterial	43,600	106,200	2.4
Union Hills Dr	North of Agua Fria Fwy	6	Principal Arterial	65,600	137,600	2.1
83rd Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	82,700	1.9
Bell Rd	North of Agua Fria Fwy	6	Principal Arterial	65,600	145,700	2.2
Thunderbird Rd	North of Agua Fria Fwy	6	Principal Arterial	65,600	137,500	2.1
US-60 / Grand Ave	North of Agua Fria Fwy	4	Expressway	88,900	151,500	1.7
Peoria Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	101,400	2.3
Olive Ave	North of Agua Fria Fwy	6	Principal Arterial	65,600	135,700	2.1
99th Ave	North of Agua Fria Fwy	4	Minor Arterial	43,600	54,400	1.2
Northern Ave	West of 99th Ave	6	Expressway	133,500	214,100	1.6
			Northern Section Sub-Total	1,703,900	2,692,100	1.6
Southern Section						
Glendale Ave	West of 99th Ave	6	Principal Arterial	65,600	150,800	2.3
Camelback Rd	West of 99th Ave	4	Minor Arterial	43,600	111,000	2.5
Indian School Rd	West of 99th Ave	4	Minor Arterial	43,600	98,000	2.2
Thomas Rd	West of 99th Ave	4	Minor Arterial	43,600	91,700	2.1
McDowell Rd	West of 99th Ave	6	Principal Arterial	65,600	121,000	1.8
I-10 Fwy	West of 99th Ave	8	Freeway	203,200	679,500	3.3
Frontage Rd	West of 99th Ave	4	Minor Arterial	43,600	52,700	1.2
Van Buren St	West of 99th Ave	4	Minor Arterial	43,600	119,600	2.7
Buckeye Rd	West of 99th Ave	4	Minor Arterial	43,600	80,200	1.8
Lower Buckeye Rd	West of 99th Ave	4	Minor Arterial	43,600	79,900	1.8
Broadway Rd	West of 99th Ave	4	Minor Arterial	43,600	81,200	1.9
SR 801 Fwy	West of 99th Ave	6	Freeway	149,100	371,400	2.5
Southern Ave	West of 99th Ave	4	Minor Arterial	43,600	82,800	1.9
			Southern Section Sub-Total	875,900	2,119,800	2.4
			Cut-Line 1 Total	2,579,800	4,811,900	1.9

Source: Wilson & Company, December 13, 2006.

Notes:
(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.
(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-3
Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line 2 - SR 303L (Estrella Freeway)
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E [1]	Buildout Daily Volume [2]	V/C Ratio
Northern Section						
SR 74 Expwy	West of 163rd	6	Expressway	133,500	95,100	0.7
E-W Collector	West of 163rd	2	Collector	16,000	44,900	2.8
Dove Valley Rd	West of 163rd	4	Minor Arterial	43,600	181,300	4.2
Lone Mountain Rd	West of 163rd	6	Principal Arterial	65,600	288,000	4.4
Patton Rd	North of Estrella Freeway	6	Principal Arterial	65,600	260,200	4.0
Jomax Rd	North of Estrella Freeway	6	Principal Arterial	65,600	266,700	4.1
Happy Valley Rd	North of Estrella Freeway	4	Minor Arterial	43,600	176,500	4.0
US-60 / Grand Ave	North of Estrella Freeway	4	Expressway	88,900	419,200	4.7
Mountain View Blvd	West of Estrella Freeway	2	Collector	16,000	20,100	1.3
Desert Winds Dr	West of Estrella Freeway	2	Collector	16,000	22,600	1.4
Bell Rd	West of Estrella Freeway	6	Principal Arterial	65,600	122,200	1.9
Greenway Rd	West of Estrella Freeway	4	Minor Arterial	43,600	104,600	2.4
Waddell Rd	West of Estrella Freeway	6	Principal Arterial	65,600	104,500	1.6
Cactus Rd	West of Estrella Freeway	6	Principal Arterial	65,600	94,400	1.4
Peoria Ave	West of Estrella Freeway	6	Principal Arterial	65,600	91,700	1.4
Olive Ave	West of Estrella Freeway	6	Principal Arterial	65,600	117,500	1.8
Northern Ave	West of Estrella Freeway	4	Minor Arterial	43,600	79,300	1.8
			Northern Section Sub-Total	969,600	2,488,800	2.6
Southern Section						
Glendale Ave	West of Estrella Freeway	4	Minor Arterial	43,600	74,700	1.7
Bethany Home Rd	West of Estrella Freeway	4	Minor Arterial	43,600	83,300	1.9
Camelback Rd	West of Estrella Freeway	4	Minor Arterial	43,600	87,500	2.0
Indian School Rd	West of Estrella Freeway	4	Minor Arterial	43,600	93,700	2.1
Thomas Rd	West of Estrella Freeway	4	Minor Arterial	43,600	88,900	2.0
McDowell Rd	West of Estrella Freeway	4	Minor Arterial	43,600	96,300	2.2
I-10 Fwy	West of Estrella Freeway	8	Freeway	203,200	552,700	2.7
Van Buren St	West of Estrella Freeway	4	Minor Arterial	43,600	100,000	2.3
Yuma Rd	West of Estrella Freeway	6	Principal Arterial	65,600	122,100	1.9
Lower Buckeye Rd	West of Estrella Freeway	4	Minor Arterial	43,600	101,400	2.3
Dunlap Rd	West of Estrella Freeway	4	Minor Arterial	43,600	84,900	1.9
Broadway Rd	West of Estrella Freeway	4	Minor Arterial	43,600	103,100	2.4
MC 85 / Baseline Rd	West of Estrella Freeway	6	Principal Arterial	65,600	99,900	1.5
SR 801 Expwy	West of Estrella Freeway	4	Expressway	88,900	95,100	1.1
171st Ave	West of Estrella Freeway	4	Minor Arterial	43,600	128,800	3.0
Elliot Rd	West of Estrella Freeway	4	Minor Arterial	43,600	119,500	2.7
			Southern Section Sub-Total	946,500	2,031,900	2.1
			Cut-Line 2 Total	1,916,100	4,520,700	2.4

Source: Wilson & Company, December 13, 2006.

Notes:
(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.
(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-4
Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line 3 - Jackrabbit Trail
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E [1]	Buildout Daily Volume [2]	V/C Ratio
Northern Section						
SR 74 Fwy	East of 211th Ave	8	Freeway	203,200	98,400	0.5
Cloud Rd	East of 211th Ave	4	Minor Arterial	43,600	85,000	1.9
Black Mountain Rd	East of 211th Ave	6	Principal Arterial	65,600	67,200	1.0
Dove Valley Rd	East of 211th Ave	6	Principal Arterial	65,600	176,100	2.7
Tillman Pkwy	East of 211th Ave	6	Principal Arterial	65,600	146,900	2.2
US-60 / Grand Ave	East of 211th Ave	6	Expressway	133,500	176,200	1.3
Dixileta Dr	East of 211th Ave	6	Principal Arterial	65,600	201,800	3.1
Patton Rd	East of 211th Ave	4	Minor Arterial	43,600	151,600	3.5
Jomax Rd	East of 211th Ave	6	Principal Arterial	65,600	229,500	3.5
Deer Valley Rd	East of 211th Ave	8	Freeway	203,200	230,700	1.1
Sun Valley Pkwy	East of 211th Ave	6	Principal Arterial	65,600	205,000	3.1
Olive Ave	West of Jackrabbit Trail	6	Principal Arterial	65,600	32,100	0.5
			Northern Section Sub-Total	1,086,300	1,800,500	1.7
Southern Section						
Camelback Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	104,200	2.4
Indian School Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	81,500	1.9
Thomas Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	86,500	2.0
McDowell Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	82,900	1.9
I-10 Fwy	West of Jackrabbit Trail	8	Freeway	203,200	586,400	2.9
Van Buren St	West of Jackrabbit Trail	4	Minor Arterial	43,600	95,600	2.2
Yuma Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	103,600	2.4
Lower Buckeye Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	108,200	2.5
Broadway Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	97,600	2.2
Southern Ave	West of Jackrabbit Trail	2	Collector	16,000	72,500	4.5
SR 801 Expwy	West of Jackrabbit Trail	4	Expressway	88,900	103,200	1.2
MC 85 / Baseline Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	97,800	2.2
Beloat Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	62,700	1.4
Tuthill Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	82,000	1.9
Elliot Rd	East of Tuthill Rd	4	Minor Arterial	43,600	68,900	1.6
Ray Rd	East of Tuthill Rd	4	Minor Arterial	43,600	53,600	1.2
Queen Creek Rd	East of Tuthill Rd	4	Minor Arterial	43,600	47,500	1.1
Chandler Heights Rd	East of Tuthill Rd	4	Minor Arterial	43,600	33,600	0.8
Riggs Rd	East of Tuthill Rd	4	Minor Arterial	43,600	42,400	1
			Southern Section Sub-Total	1,005,700	2,010,700	2
			Cut-Line 3 Total	2,092,000	3,811,200	1.8

Source: Wilson & Company, December 13, 2006.

Notes:

(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.

(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-5
Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line 4 - Hassayampa River
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
Patton Rd	West of 307th Ave	6	Principal Arterial	65,600	100,800	1.5
Deer Valley Rd	West of 307th Ave	4	Minor Arterial	43,600	89,400	2.1
Bell Rd	West of 307th Ave	4	Minor Arterial	43,600	87,800	2
Greenway Rd	West of 307th Ave	4	Minor Arterial	43,600	78,800	1.8
Waddell Rd	West of 307th Ave	4	Minor Arterial	43,600	80,400	1.8
Northern Ave	West of 307th Ave	6	Principal Arterial	65,600	82,800	1.3
Camelback Rd	West of 307th Ave	4	Minor Arterial	43,600	76,500	1.8
Indian School Rd	West of 307th Ave	4	Minor Arterial	43,600	103,500	2.4
I-10 Fwy	West of 307th Ave	8	Freeway	203,200	502,900	2.5
MC 85 / Baseline Rd	West of 307th Ave	4	Minor Arterial	43,600	165,800	3.8
Elliott Rd	West of 307th Ave	6	Expressway	133,500	178,900	1.3
Riggs Rd	West of 307th Ave	8	Freeway	203,200	75,400	0.4
			Cut-Line 4 Total	976,300	1,623,000	1.7

Source: Wilson & Company, December 13, 2006.

Notes:

(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.

(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-6
Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line 5 - Future White Tanks Freeway / SR 303L
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
363rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	39,000	0.9
347th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	29,100	0.7
355th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	27,700	0.6
339th Ave	North of White Tanks Fwy (Future)	8	Freeway	203,200	32,300	0.2
331st Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	31,400	0.7
323rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	32,800	0.8
315th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	43,600	1
291st Ave	North of White Tanks Fwy (Future)	6	Principal Arterial	65,600	88,400	1.3
267th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	78,600	1.8
259th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	50,700	1.2
251st Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	53,200	1.2
235th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	93,700	2.1
219th Ave	North of White Tanks Fwy (Future)	6	Principal Arterial	65,600	82,900	1.3
211th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	101,500	2.3
203rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	96,200	2.2
163rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	153,900	3.5
US-60 / Grand Ave	North of White Tanks Fwy (Future)	4	Expressway	88,900	276,300	3.1
Bullard Ave	North of Estrella Fwy	6	Principal Arterial	65,600	224,800	3.4
Dysart Rd	North of Estrella Fwy	6	Principal Arterial	65,600	162,500	2.5
El Mirage Rd	North of Estrella Fwy	6	Principal Arterial	65,600	152,400	2.3
Happy Valley Rd	West of Estrella Fwy	6	Principal Arterial	65,600	243,200	3.7
Jomax Rd	West of Estrella Fwy	6	Principal Arterial	65,600	167,900	2.6
Lone Mountain Rd	West of Estrella Fwy	6	Principal Arterial	65,600	222,200	3.4
Dove Valley Rd	West of Estrella Fwy	6	Principal Arterial	65,600	188,800	2.9
SR 74 Expwy	West of Carefree Hwy	6	Expressway	133,500	94,500	0.7
			Cut-Line 5 Total	1,582,800	2,767,600	1.7

Source: Wilson & Company, December 13, 2006.

Notes:

(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.

(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-7
Sub-Regional Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line 6 - Interstate 10
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
411th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	82,400	1.9
395th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	71,100	1.6
379th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	95,300	2.2
371st Ave	North of I-10 Fwy	4	Minor Arterial	43,600	76,800	1.8
363rd Ave	North of I-10 Fwy	4	Minor Arterial	43,600	95,600	2.2
N-S Collector	North of I-10 Fwy	8	Freeway	203,200	78,700	0.4
347th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	80,100	1.8
339th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	107,500	2.5
307th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	167,800	3.8
299th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	149,200	3.4
291st Ave (Sun Valley Pkwy)	North of I-10 Fwy	6	Principal Arterial	65,600	165,800	2.5
283rd Ave	North of I-10 Fwy	4	Minor Arterial	43,600	127,000	2.9
275th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	104,200	2.4
Miller Rd	North of I-10 Fwy	4	Minor Arterial	43,600	136,200	3.1
Watson Rd	North of I-10 Fwy	4	Minor Arterial	43,600	74,600	1.7
Airport Rd	North of I-10 Fwy	4	Minor Arterial	43,600	131,600	3.0
Jackrabbit Trail	North of I-10 Fwy	6	Principal Arterial	65,600	130,500	2.0
Perryville Rd	North of I-10 Fwy	4	Minor Arterial	43,600	130,800	3.0
Citrus Rd	North of I-10 Fwy	4	Minor Arterial	43,600	86,600	2.0
Estrella Fwy (SR 303L)	North of I-10 Fwy	6	Freeway	149,100	308,100	2.1
Sarival Ave	North of I-10 Fwy	4	Minor Arterial	43,600	70,100	1.6
Estrella Pkwy	North of I-10 Fwy	6	Principal Arterial	65,600	109,500	1.7
Bullard Ave	North of I-10 Fwy	6	Principal Arterial	65,600	95,800	1.5
Litchfield Ave	North of I-10 Fwy	6	Principal Arterial	65,600	93,900	1.4
Dysart Rd	North of I-10 Fwy	6	Principal Arterial	65,600	85,800	1.3
El Mirage Rd	North of I-10 Fwy	4	Minor Arterial	43,600	50,800	1.2
115th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	73,800	1.7
107th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	91,300	2.1
99th Ave	North of I-10 Fwy	6	Principal Arterial	65,600	92,600	1.4
Aqua Fria Fwy (SR 101L)	North of I-10 Fwy	8	Freeway	203,200	268,900	1.3
			Cut-Line 6 Total	1,886,700	3,432,446	1.8

Source: Wilson & Company, December 13, 2006.

Notes:
(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.
(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-8
Focused Sub-Area Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line A - Jackrabbit Trail
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
Northern Section						
SR 74 Fwy	East of 211th Ave	8	Freeway	203,200	98,400	0.5
Cloud Rd	East of 211th Ave	4	Minor Arterial	43,600	85,000	1.9
Black Mountain Rd	East of 211th Ave	6	Principal Arterial	65,600	67,200	1.0
Dove Valley Rd	East of 211th Ave	6	Principal Arterial	65,600	176,100	2.7
Tillman Pkwy	East of 211th Ave	6	Principal Arterial	65,600	146,900	2.2
US-60 / Grand Ave	East of 211th Ave	6	Expressway	133,500	176,200	1.3
Dixileta Dr	East of 211th Ave	6	Principal Arterial	65,600	201,800	3.1
Patton Rd	East of 211th Ave	4	Minor Arterial	43,600	151,600	3.5
Jomax Rd	East of 211th Ave	6	Principal Arterial	65,600	229,500	3.5
Deer Valley Rd	East of 211th Ave	8	Freeway	203,200	230,700	1.1
Sun Valley Pkwy	East of 211th Ave	6	Principal Arterial	65,600	205,000	3.1
Olive Ave	West of Jackrabbit Trail	6	Principal Arterial	65,600	32,100	0.5
			Northern Section Sub-Total	1,086,300	1,800,500	1.7
Southern Section						
Camelback Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	104,200	2.4
Indian School Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	81,500	1.9
Thomas Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	86,500	2.0
McDowell Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	82,900	1.9
I-10 Fwy	West of Jackrabbit Trail	8	Freeway	203,200	586,400	2.9
Van Buren St	West of Jackrabbit Trail	4	Minor Arterial	43,600	95,600	2.2
Yuma Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	103,600	2.4
Lower Buckeye Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	108,200	2.5
Broadway Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	97,600	2.2
Southern Ave	West of Jackrabbit Trail	2	Collector	16,000	72,500	4.5
SR 801 Expwy	West of Jackrabbit Trail	4	Expressway	88,900	103,200	1.2
MC 85 / Baseline Rd	West of Jackrabbit Trail	4	Minor Arterial	43,600	97,800	2.2
			Southern Section Sub-Total	700,500	1,620,000	2.3
			Cut-Line A Total	1,786,800	3,420,500	1.9

Source: Wilson & Company, December 13, 2006.

Notes:
(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.
(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-9
Focused Sub-Area Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line B - Hassayampa River
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
Patton Rd	West of 307th Ave	6	Principal Arterial	65,600	100,800	1.5
Deer Valley Rd	West of 307th Ave	4	Minor Arterial	43,600	89,400	2.1
Bell Rd	West of 307th Ave	4	Minor Arterial	43,600	87,800	2.0
Greenway Rd	West of 307th Ave	4	Minor Arterial	43,600	78,800	1.8
Waddell Rd	West of 307th Ave	4	Minor Arterial	43,600	80,400	1.8
Northern Ave	West of 307th Ave	6	Principal Arterial	65,600	82,800	1.3
Camelback Rd	West of 307th Ave	4	Minor Arterial	43,600	76,500	1.8
Indian School Rd	West of 307th Ave	4	Minor Arterial	43,600	103,500	2.4
I-10 Fwy	West of 307th Ave	8	Freeway	203,200	502,900	2.5
MC 85 / Baseline Rd	West of 307th Ave	4	Minor Arterial	43,600	165,800	3.8
			Cut-Line B Total	639,600	1,368,700	2.1

Source: Wilson & Company, December 13, 2006.

Notes:

(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.

(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-10
Focused Sub-Area Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line C - Future White Tanks Freeway / SR 303L
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
363rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	39,000	0.9
347th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	29,100	0.7
355th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	27,700	0.6
339th Ave	North of White Tanks Fwy (Future)	8	Freeway	203,200	32,300	0.2
331st Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	31,400	0.7
323rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	32,800	0.8
315th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	43,600	1.0
291st Ave	North of White Tanks Fwy (Future)	6	Principal Arterial	65,600	88,400	1.3
267th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	78,600	1.8
259th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	50,700	1.2
251st Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	53,200	1.2
235th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	93,700	2.1
219th Ave	North of White Tanks Fwy (Future)	6	Principal Arterial	65,600	82,900	1.3
211th Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	101,500	2.3
203rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	96,200	2.2
163rd Ave	North of White Tanks Fwy (Future)	4	Minor Arterial	43,600	153,900	3.5
US_60 / Grand Ave	North of White Tanks Fwy (Future)	4	Expressway	88,900	276,300	3.1
			Cut-Line C Total	990,100	1,311,300	1.3

Source: Wilson & Company, December 13, 2006.

Notes:

(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.

(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

Table C-11
Focused Sub-Area Cut-Line and Volume to Capacity (V/C) Analysis
Cut-Line D - Interstate 10
Initial Unconstrained Travel Demand Assignment - Adopted Regional Transportation Plan (RTP) Network
I-10/Hassamyampa Valley Roadway Framework Study

Street Name	Location	Lanes	Functional Class	Planning Level Daily Volume Threshold Capacity at LOS E (1)	Buildout Daily Volume (2)	V/C Ratio
411th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	82,400	1.9
395thAve	North of I-10 Fwy	4	Minor Arterial	43,600	71,100	1.6
379th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	95,300	2.2
371st Ave	North of I-10 Fwy	4	Minor Arterial	43,600	76,800	1.8
363rd Ave	North of I-10 Fwy	4	Minor Arterial	43,600	95,600	2.2
N-S Collector	North of I-10 Fwy	8	Freeway	203,200	78,700	0.4
347th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	80,100	1.8
339th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	107,500	2.5
307th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	167,800	3.8
299th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	149,200	3.4
291st Ave (Sun Valley Pkwy)	North of I-10 Fwy	6	Principal Arterial	65,600	165,800	2.5
283rd Ave	North of I-10 Fwy	4	Minor Arterial	43,600	127,000	2.9
275th Ave	North of I-10 Fwy	4	Minor Arterial	43,600	104,200	2.4
Miller Rd	North of I-10 Fwy	4	Minor Arterial	43,600	136,200	3.1
Watson Rd	North of I-10 Fwy	4	Minor Arterial	43,600	74,600	1.7
Airport Rd	North of I-10 Fwy	4	Minor Arterial	43,600	131,600	3.0
Jackrabbit Trail	North of I-10 Fwy	6	Principal Arterial	65,600	130,500	2.0
			Cut-Line D Total	944,800	1,874,439	2.0

Source: Wilson & Company, December 13, 2006.

Notes:
(1). Source: Maricopa Association of Governments (MAG) and Wilson & Company (December 13, 2006). Modified version of Table 4-1 (Urbanized Areas), Quality/Level of Service Handbook, Florida Department of Transportation, 2002. Modifications were made to reflect a lower K factor (0.075 vs 0.095) that is predominant in the Phoenix area.
(2). MAG 2050 Buildout ADT Volume Forecast (Base Condition - Adopted RTP Network), dated: November 20, 2006.

APPENDIX D
Comparison of Conceptual Roadway Network to Other Metropolitan Areas

COMPARISON OF CONCEPTUAL ROADWAY NETWORK TO OTHER METROPOLITAN AREAS

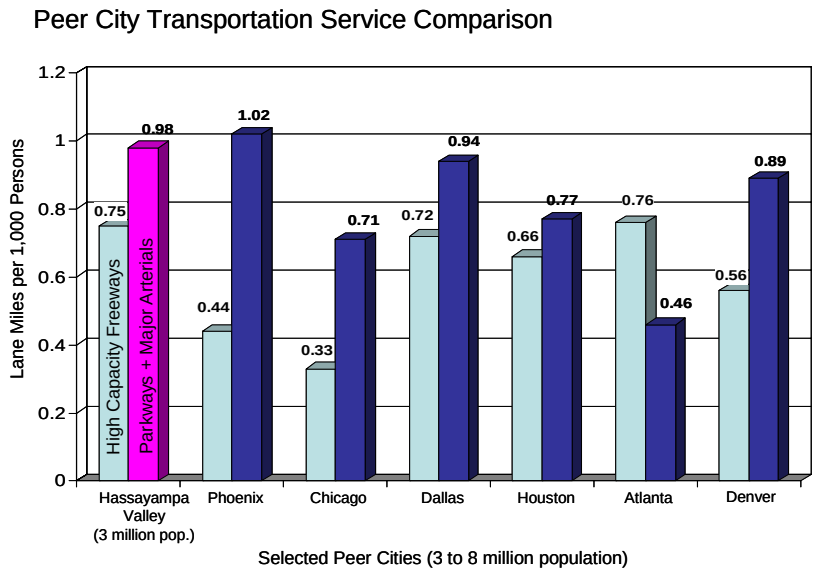
Information in this appendix focuses on comparing population data, roadway network information, and transit service characteristics associated with seven selected urbanized areas (UZAs) in the United States, including metropolitan Phoenix.

Population Density

The current populations of three UZAs – Atlanta, Phoenix, and Denver – are roughly comparable to that projected for the Hassayampa Valley study area. (The others are larger, especially Chicago and Los Angeles.) The population density of the supposedly "sprawling" Phoenix metropolitan area (2,636 persons per square mile) is greater than that of Atlanta, Dallas, Denver and Houston. The study area, at 1,430 square miles, is projected to have a density of 1,878 persons per square mile, exceeding the current density only of greater Atlanta.

Roadway Network

Despite all the recent freeway construction, the Phoenix UZA has the second lowest number of freeway lane miles per capita, but the highest number of "principal arterial" (parkway plus major arterial) lane miles per capita. This is reflected in the well-developed arterial street "grid" system. The Phoenix area's centerline miles of roadway per 1,000 persons (3.92) is relatively high by comparison with the other UZAs; only Dallas, Houston, and Atlanta exceed Phoenix (refer to the accompanying table). Data collected for the peer UZAs show an average of 0.51 lane miles of freeways and 0.83 lane miles of principal arterials per 1,000 persons. The following figure shows that the study area Conceptual Transportation Framework for the study area would exceed these averages.



Comparison of Study Area Lane Miles by Facility Type with Other Urban Areas

At Buildout, the study area would have 0.75 lane miles of high-capacity freeways per 1,000 persons and 0.98 lane miles of "principal arterials" per 1,000 persons, assuming construction of the entire proposed network. Freeway miles per 1,000 persons would be the same as in Dallas and greater than in the other peer UZAs. Principal arterial lane miles per 1,000 persons in the study area would be exceeded only by the Phoenix UZA. Thus, the roadway

network defined by the conceptual transportation framework would provide similar transportation capacity (per capita) to the peer UZAs.

Transportation Mobility Comparison – Urbanized Areas (UZAs)

Inventory Measures	Los Angeles	Chicago	Dallas	Houston	Atlanta	PHOENIX	Denver
Population Data							
Population (000)	12,500	8,125	4,300	3,750	3,005	**3,005**	2,050
Urban Area (Square Miles)	2,275	2,785	1,935	1,800	1,830	**1,140**	855
Population Density (persons/square mile)	5,495	2,917	2,222	2,083	1,642	**2,636**	2,398
Lane Miles by Facility Type							
Freeway	5,850	2,665	3,105	2,460	2,285	**1,325**	1,140
Freeway Lane Miles Per 1,000 Persons	0.47	0.33	0.72	0.66	0.76	**0.44**	0.56
Principal Arterial	11,500	5,730	4,050	2,900	1,390	**3,060**	1,820
Principal Arterial Lane Miles Per 1,000 Persons	0.92	0.71	0.94	0.77	0.46	**1.02**	0.89
Roadway System							
Total Centerline Miles	27,100	23,850	17,760	15,570	13,640	**11,765**	7,820
Miles of Roadway Per 1,000 Persons	2.17	2.94	4.13	4.15	4.54	**3.92**	3.81
Roadway System Performance							
Total Annual Delay Per Peak Traveler (person-hours)	93	58	60	63	67	**49**	51
Travel Time Index	1.75	1.57	1.36	1.42	1.46	**1.35**	1.40
National Rank (Relative to Travel Time Index)	1	2	19	6	5	**20**	9
Transit System							
Annual Vehicle Revenue Miles of Service Per 1,000 Persons							
Bus	13,221	10,770	8,502	11,771	9,195	**9,131**	18,741
Demand Responsive	3,183	2,260	2,737	3,309	1,056	**2,380**	2,931
Rail (1)	1,774	12,596	1,709	0	6,488	**0**	1,916
Other Transit Services (2)	4	806	974	920	501	**1,269**	654
Fixed Guideway Directional Route Miles	1,030	1,329	270	203	174	**109**	81

Source: Year 2003 data reported in *2005 Urban Mobility Study*, Texas Transportation Institute, May 2005. Transit System data from *2003 National Transit Database*.

Notes:
(1) Includes Light Rail, Heavy Rail, and Commuter Rail services
(2) Includes Vanpool and Jitney services.

Definitions:

Travel Delay – Travel time above that needed to complete a trip at free-flow speeds. Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the national comparison thresholds. Other speed values may be appropriate for specific urban areas.

Annual Delay per Peak Traveler – Extra travel time for peak period during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.).

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak.

National Rank – Refers to Travel Time Index.

Vehicle Revenue Miles – The miles traveled when the vehicle is in revenue service (i.e., the time when a vehicle is available to the general public and there is an expectation of carrying passengers).

Fixed Guideway (FG) – A separate right-of-way (R/W) or rail for the exclusive use of public transportation and other high-occupancy vehicles (HOV).

Directional Route Miles (DRM) – The mileage in each direction over which public transportation vehicles travel while in revenue service.

Interstate 10 – Hassayampa Valley Roadway Framework Study

Chapter 6

Alternative Transportation Network Description and Evaluation

September 2007

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

Prepared by

DMJM HARRIS | AECOM

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6.1 Alternatives Considered

6.1.1 Alternative A (Base)

During the extensive community involvement process that included more than 120 meetings with the Funding Partners, Study Review Team and individual (public and private) stakeholders—as well as three Development Forums and one public Open House—the MAG Study Team developed and continually refined a network of roadways to provide mobility to, from, and within the Hassayampa Valley study area under Buildout conditions. As discussed in Chapter 5, this network was also designed to address the deficiencies identified when the existing plus committed (MAG Regional Transportation Plan) year 2026 roadway system was used as the background network for an unconstrained traffic assignment. The socioeconomic (population, housing and employment) inputs to the MAG model were based on the latest Buildout projections supplied by jurisdictions within the study area, and on adopted year 2030 projections for the balance of Maricopa County outside the study area.

Alternative A, illustrated in Figure 6-1, is the "base" roadway network designed to serve the Hassayampa Valley study area under Buildout conditions. The map shows three types of roadway: freeways, arterial streets, and an intermediate facility called a parkway (or boulevard), designed to provide greater capacity than a standard arterial without the high cost and disruptive impacts of a freeway. Alternative A contains several freeways and numerous parkways that no previous plan has proposed. These include the (mainly north-south) Hassayampa Freeway, the east-west White Tanks Freeway, a westward extension of the future SR-74 freeway, and a westward extension of SR-801 beyond SR-85. Proposed local service and system traffic interchange (TI) locations, spaced at least two miles apart wherever possible, are also shown. This alternative is intended to provide the a high level of geographically balanced capacity to handle long-term travel demand.

The following bullet points enumerate key high-capacity elements (freeways and parkways) of Alternative A. The list does not include facilities already scheduled and funded for construction as part of the current Regional Transportation Plan (RTP).

Freeways (or similarly designed facilities with fully controlled access and four to five lanes per direction at Buildout):

- Lake Pleasant Freeway, extending along the approximate alignment of existing SR-74 from US-60 to the east study area boundary, or approximately 15.4 miles. (The RTP funds right-of-way preservation for a future freeway along SR-74.)

- Lake Pleasant Freeway (SR-74) Extension, generally east-west from US-60 at the north study area boundary to the Hassayampa Freeway (approximately 10.7 miles).

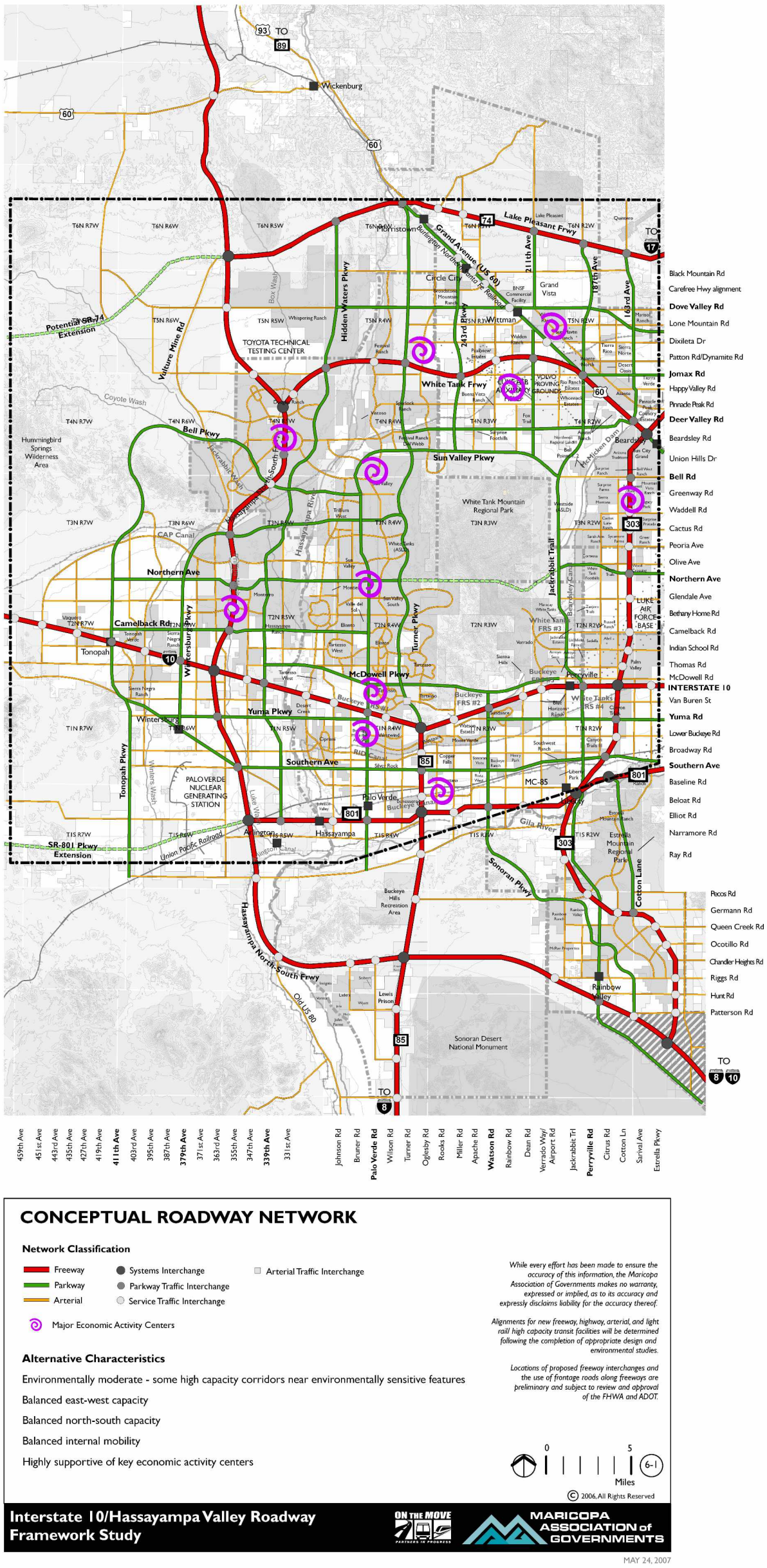
- Hassayampa Freeway, extending generally north-south from beyond the north study area boundary to the Gila River (approximately 41.2 miles in the study area). Figure 6-1 also shows this freeway continuing south outside the study area, turning east near the Riggs Road section line and extending toward the Hidden Valley area of Maricopa and Pinal counties. Regional planners envision this freeway as part of a potential future Interstate and international trade route ("I-11") that could begin at I-10 in Cochise County, bypass the Tucson and Phoenix metropolitan areas, and carry traffic north to a junction with I-15 in the Las Vegas metropolitan area. (ADOT is currently conducting an Interstate 10 Bypass Study to assess the feasibility of this concept.) This corridor could also serve a portion of the north-south CANAMEX International Trade Corridor function in Arizona, from its potential future junction with either I-8 or I-10 in the MAG Hidden Valley Roadway Framework Study area to its intersection with US 93 near Wickenburg.

- White Tanks Freeway (approximately 24.1 miles). The 19 miles from the Hassayampa Freeway to existing US-60 would be a primarily east-west facility on an alignment between Happy Valley Road and Dixileta Drive. The last 5 miles would follow the existing US-60 alignment from roughly Jomax Road to the junction with SR-303L.

Figure 6-1 Alternative A

ALTERNATIVE A

Maximum Balanced Capacity



- SR-85, improved to a full freeway from I-10 south to I-8. (The RTP funds construction of a four-lane divided highway, with right-of-way preserved for future upgrade to a freeway.)

- Development of SR-801 into a full freeway from SR-303L west to the Hassayampa Freeway, or approximately 21.8 miles. (The RTP funds right-of-way preservation and construction of an interim roadway as far west as SR-85.)

- An extension of SR-303L from SR-801 beyond the study area boundary to a junction with the Hassayampa Freeway.

- Existing I-10 would eventually be widened west of SR-303L to approximately five lanes per direction. Interchanges are proposed for the following locations, generally preserving the minimum two-mile spacing between TIs prescribed by ADOT and FHWA policy for Interstate highways:

    - 459th Avenue (near milepost (MP) 88.2)
    - 443rd Avenue (near MP 90.2)
    - 427th Avenue (near MP 92.2)
    - 411th Avenue/Tonopah Parkway (existing TI at MP 94.2)
    - 395th Avenue (MP 96.3)
    - Wintersburg Parkway (existing TI at MP 98.3)
    - Hassayampa Freeway (system TI at MP 100.5, with potential CANAMEX Corridor route)
    - 347th Avenue (previously approved near MP 102.5)
    - 339th Avenue/Hidden Waters Parkway (existing TI at MP 103.5, and one of two exceptions to two-mile spacing)
    - Desert Creek Parkway (MP 105.5)
    - Johnson Road (MP 107.6)
    - Sun Valley Parkway/Palo Verde Road (existing TI at MP 109.7)
    - SR-85 (existing TI at MP 112.8; to be completely rebuilt as a system TI including Turner Parkway as north leg)
    - Miller Road (existing TI at MP 114.9)
    - Watson Road (existing TI at MP 117.0)
    - Dean Road (near MP 119.0)
    - Verrado Way (existing TI near MP 120.0; the second exception to two-mile spacing)
    - Jackrabbit Trail (existing TI at MP 121.7)
    - Perryville Road (near MP 122.7; included in current RTP)
    - SR-303L (existing TI near MP 124.7; to be completely rebuilt as a system TI)

Parkways (intermediate-capacity, six- to eight-lane divided highways with partial access control and no direct left turns permitted at major intersections), generally spaced every three to five miles:

- 163rd Avenue (north of US-60)
- Cotton Lane (SR-801 to SR-303L extension)
- Jackrabbit Trail, as a continuous north-south route across the study area east of the White Tank Mountains
- 211th Avenue, Sun Valley Parkway to US-60 and Dove Valley Road to SR-74
- Sonoran Parkway (I-10 at Watson Road to SR-303L/Hassayampa Freeway outside study area limits)
- 243rd Avenue (Sun Valley Parkway to US-60)
- Turner Parkway (I-10 at SR-85 to US-60/Lake Pleasant Freeway)
- Sun Valley Parkway (existing Maricopa County route to be improved to full parkway standard; to be extended south to Gila River via Palo Verde Road alignment)
- Hidden Waters Parkway (SR-801 to Lake Pleasant Freeway extension)
- Wintersburg Parkway (Tonopah-Salome Parkway to Hassayampa Freeway)
- Tonopah Parkway/Vulture Mine Road (future SR-801 extension to future SR-74 extension near Hassayampa Freeway)
- Lone Mountain/Dove Valley Parkway (east study area boundary to Hidden Waters Parkway)

- Jomax Parkway (east study area boundary to US-60)
- Deer Valley Parkway (US-60 to Turner Parkway)
- Bell Parkway (Sun Valley Parkway to Tonopah Parkway/Vulture Mine Road)
- Waddell/Cactus Parkway (Turner Parkway to Hassayampa Freeway)
- Northern Parkway (continuous east-west parkway from Phoenix and Glendale to Tonopah Parkway, using a tunnel to be constructed through the White Tank Mountains)
- Camelback Parkway (Sun Valley Parkway to Tonopah Parkway)
- McDowell Parkway (Jackrabbit Trail to Wintersburg Parkway)
- Yuma Parkway (east study area boundary to Sonoran Parkway; and Sun Valley Parkway to Tonopah-Salome Parkway)
- Southern Parkway (east study area boundary to Hassayampa Freeway)
- Tonopah-Salome Parkway (Hassayampa Freeway to Tonopah Parkway)
- Potential long-term extension of SR-74 as a parkway west of Hassayampa Freeway
- Potential long-term extension of SR-801 as a parkway west of Hassayampa Freeway

A fully directional system TI would be provided at each junction between freeways. In addition, smaller-scale system TIs are envisioned for freeway-parkway junctions, and grade-separated intersections may be provided at junctions between two parkways. Figure 6-1 also shows a proposed background network of arterial streets that would accommodate shorter trips within and between Hassayampa Valley communities. The arterial network would most likely be funded by developers in cooperation with local governments.

It is important to recognize that the roadway locations shown in Figure 6-1 are intended to show generalized corridors, not specific alignments. All of the routes are subject to modification and refinement as detailed corridor studies are conducted and local circulation plans are further developed.

Table 6.1 summarizes key characteristics of the base network presented as Alternative A. Figures 6-2 and 6-3 illustrate typical parkway design features, including sample cross-sections and the indirect or "Michigan" left turn concept that MAG and several of its member jurisdictions are considering.

Table 6.1 Summary of Base Network Alternative A

Network Characteristic	Description
Anticipated Completion	Buildout
Types of Roadways Included	Freeways, Parkways, Arterials
Parkway Design Features	Minimum 200-foot right-of-way
	60-foot landscaped median
	Strong access management with right-in, right-out access predominant
	Minimum six-lane divided with limited median breaks
	No direct left turns at major intersections (replaced by indirect methods: U-turn or multiple rights)
	Small-scale system TIs at junctions with freeways
	Grade separations at major intersections, especially with other parkways
High-Capacity Roads	Includes many freeways and parkways not proposed in previous plans
Network Operation	Network based on analysis of deficiencies of MAG RTP network under Buildout conditions
East-West Capacity	Enhanced with parkway tunnel through White Tank Mountains
North-South Capacity	Balanced, with reasonably frequent and consistent freeway and parkway spacing
Internal Mobility	Balanced overall
Support of Economic Activity Centers	High, with generally good freeway and parkway access
Special Facilities	East-west tunnel (parkway) through White Tank Mountains

Source: MAG Study Team, April 2007

Figure 6-2 Generalized Parkway Cross-Section

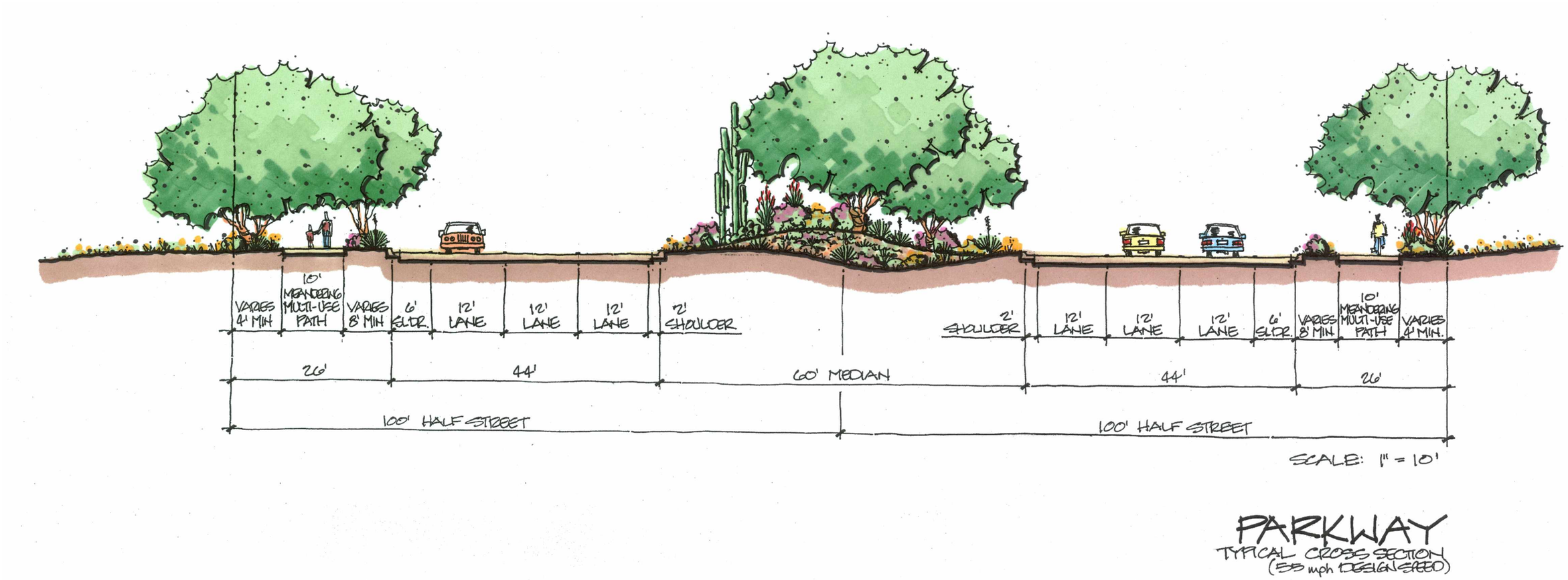
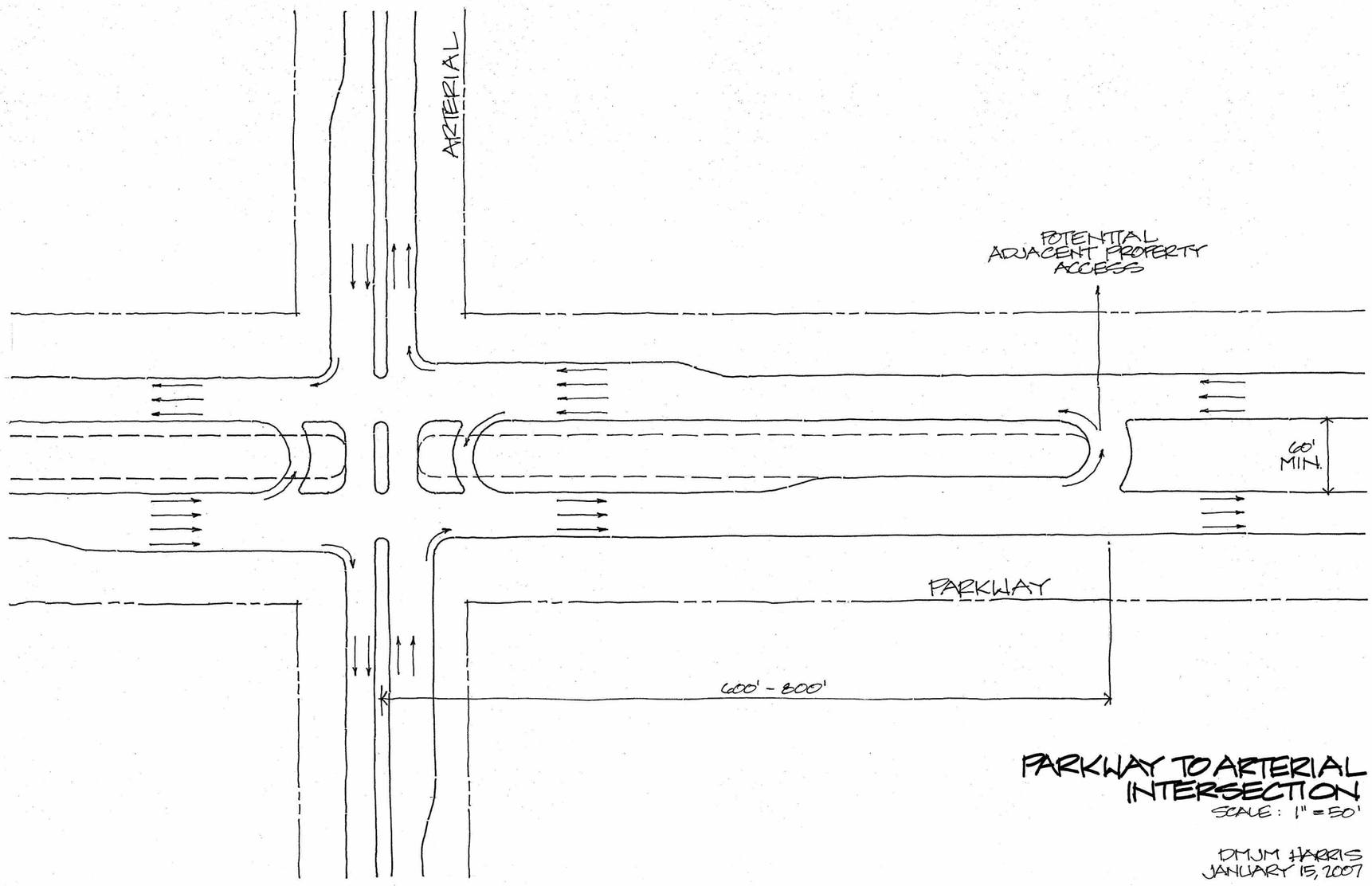


Figure 6-3 Parkway/Arterial Intersection with Indirect Left Turn



6.1.2 Additional Roadway Network Alternatives

Suggestions from the Funding Partners, SRT members and other stakeholders were incorporated in the conceptual formulation and mapping of eight additional network alternatives, which were then modeled alongside Alternative A. Figures 6-4 through 6-11 depict these alternatives (A3, A4, A5, B, C, D, E and F), while Table 6.2 enumerates the differences between them and the base alternative. In various alternatives facilities were reclassified, where necessary, to respond to identified deficiencies as revealed by the initial unconstrained model run. Reclassification provided the appropriate capacity to eliminate deficiencies in a facility or facilities. The remainder of this section discusses principal features of the eight additional roadway network alternatives.

Alternatives A3, A4 and A5 contain only simple variations of Alternative A. Alternatives A3 and A4 omit the White Tank Mountain tunnel, A4 also omits the Turner Parkway just west of the White Tanks, and A5 adds a frontage road or collector-distributor (C-D) road system to enhance access on both sides of I-10 between Miller Road and Johnson Road—a distance of approximately seven miles. A5 was included at the request of the Town of Buckeye and private stakeholders, who are concerned about providing adequate access to large-scale, mixed-use development proposed for this segment of the I-10 corridor. *A preliminary feasibility study of design options for a supplemental access road system has been added to this study as a change order funded by the Town of Buckeye.*

As Table 6.2 shows, the remaining five alternatives contain more significant departures from the base roadway network. Alternative B provides the strongest east-west capacity in the central portion of the study area, by upgrading the tunnel through the White Tank Mountains to a full freeway. On the other hand, it downgrades several parkways to arterials, both north-south and parallel to I-10. Alternative B is one of several—along with D, E and F—that reduce the Hassayampa Freeway to a parkway south of SR-801 and southeast toward the Hidden Valley.

The most noteworthy change in Alternative C is its provision of full freeways along both the north and west edges of the White Tank Mountains. This makes C among the most disruptive of the alternatives environmentally, in addition to its incompatibility with Maricopa County plans for improvement of Sun Valley Parkway. Technical challenges and environmental concerns may also be encountered in constructing a freeway along the Turner Parkway alignment. Farther from the mountains, however, this alternative downgrades the White Tank and SR-801 freeways, as well as two north-south parkways.

Like A3 and A4, Alternative D eliminates the tunnel through the White Tank Mountains. To counterbalance this omission, it upgrades several parkways to freeways, including both the north-south and east-west segments of Sun Valley Parkway. The enhanced north-south capacity on Sun Valley Parkway is added at the expense of Turner Parkway, which is reduced to an arterial.

Alternative E resembles D in removing the White Tank tunnel. Even more than D, however, it is intended to maximize environmental compatibility, although this requires sacrificing needed roadway capacity. Several parkways in the western portion of the study area are downgraded to arterials, and the SR 74 extension is reduced from a freeway to a parkway. This alternative might be the most consistent with possible future attempts to moderate growth or limit density in the western portion of the study area.

Finally, Alternative F brings together several mutually supportive changes that were not tested in the preceding scenarios. Three of the principal north-south parkways—Wintersburg, Turner and Jackrabbit—are reduced to arterials, while the westerly Vulture Mine Road route from Tonopah to the SR-74 extension is improved to a full freeway. This alternative somewhat resembles B and C in reducing the role of parkways in the central portion of the study area.

Table 6.3 indicates that Alternative A contains approximately 1,600 lane miles of freeways, 2,700 of parkways and 4,900 of arterials. At this early stage of long-range planning, these numbers should be considered no more than "ballpark" figures. The development of arterials, in particular, will be under the control of the cities, towns, and to some extent private developers of master-planned communities. The arterial network presented in Figure 6-1 is expected to be refined and expanded as the study area builds out. Therefore, the arterial lane miles listed in Table 6.3 represent the minimum desirable number.

Figure 6-4 Alternative A3

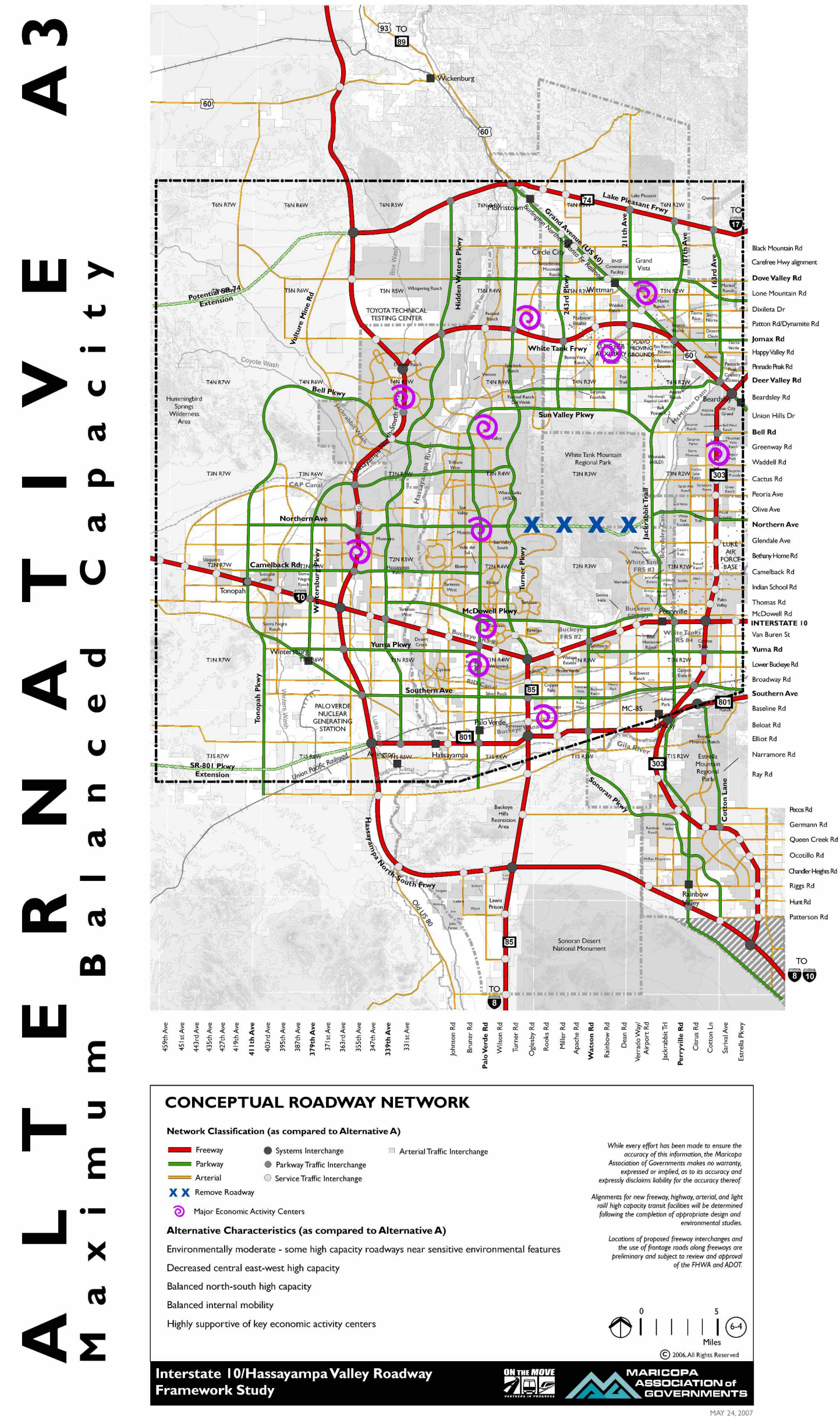


Figure 6-5 Alternative A4

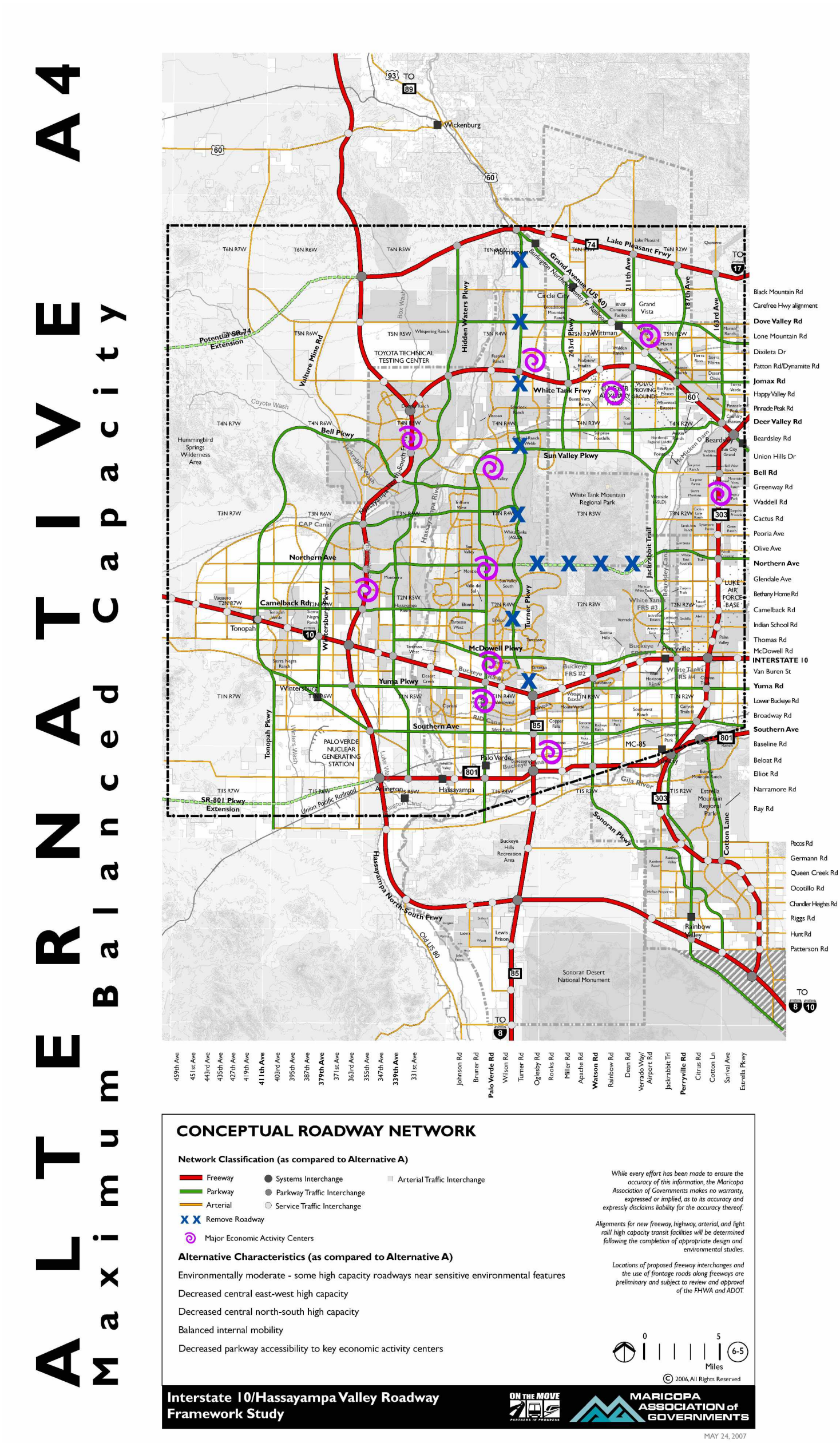


Figure 6-6 Alternative A5

ALTERNATIVE A5
Maximum Balanced Capacity

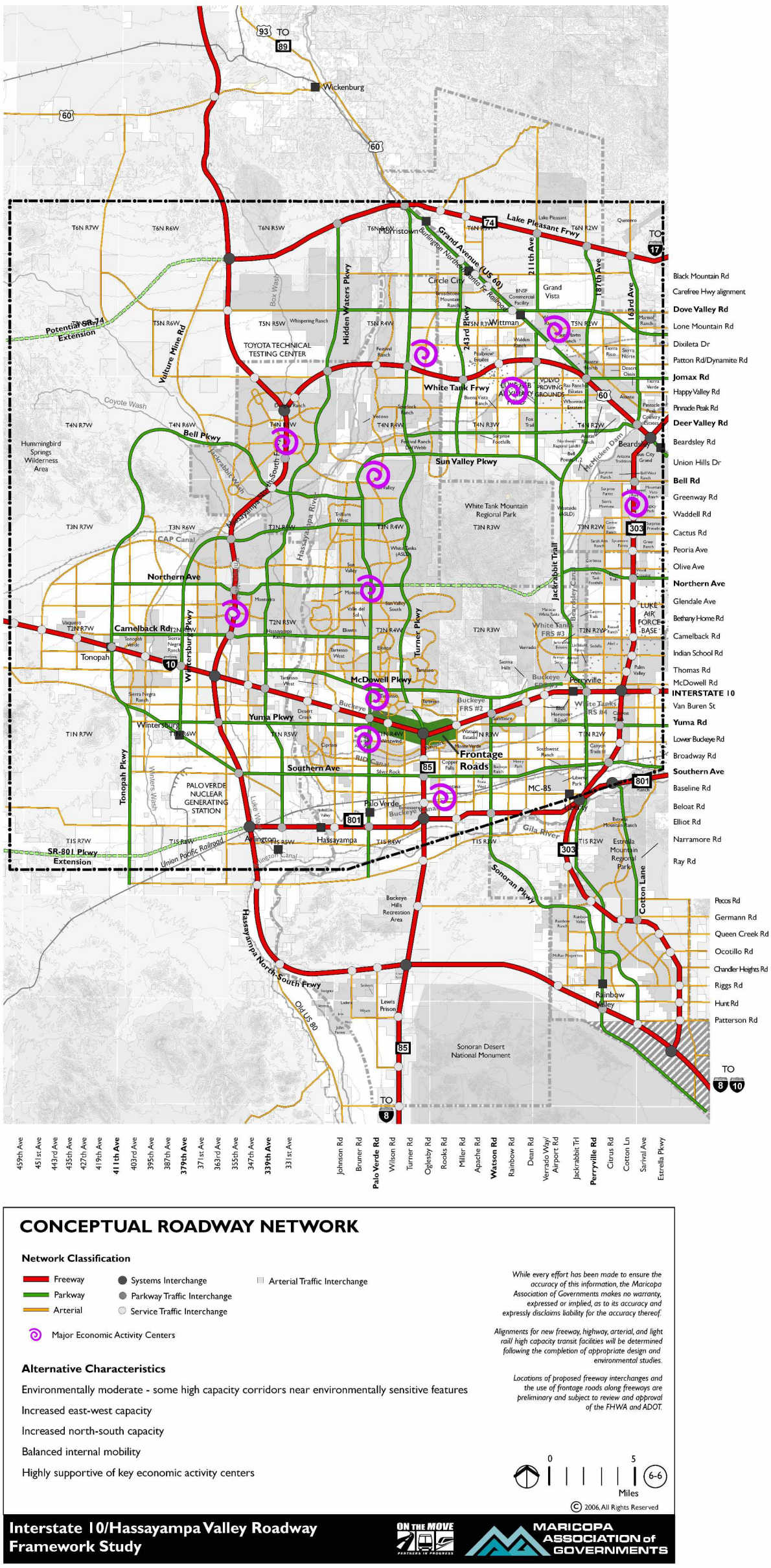


Figure 6-7 Alternative B

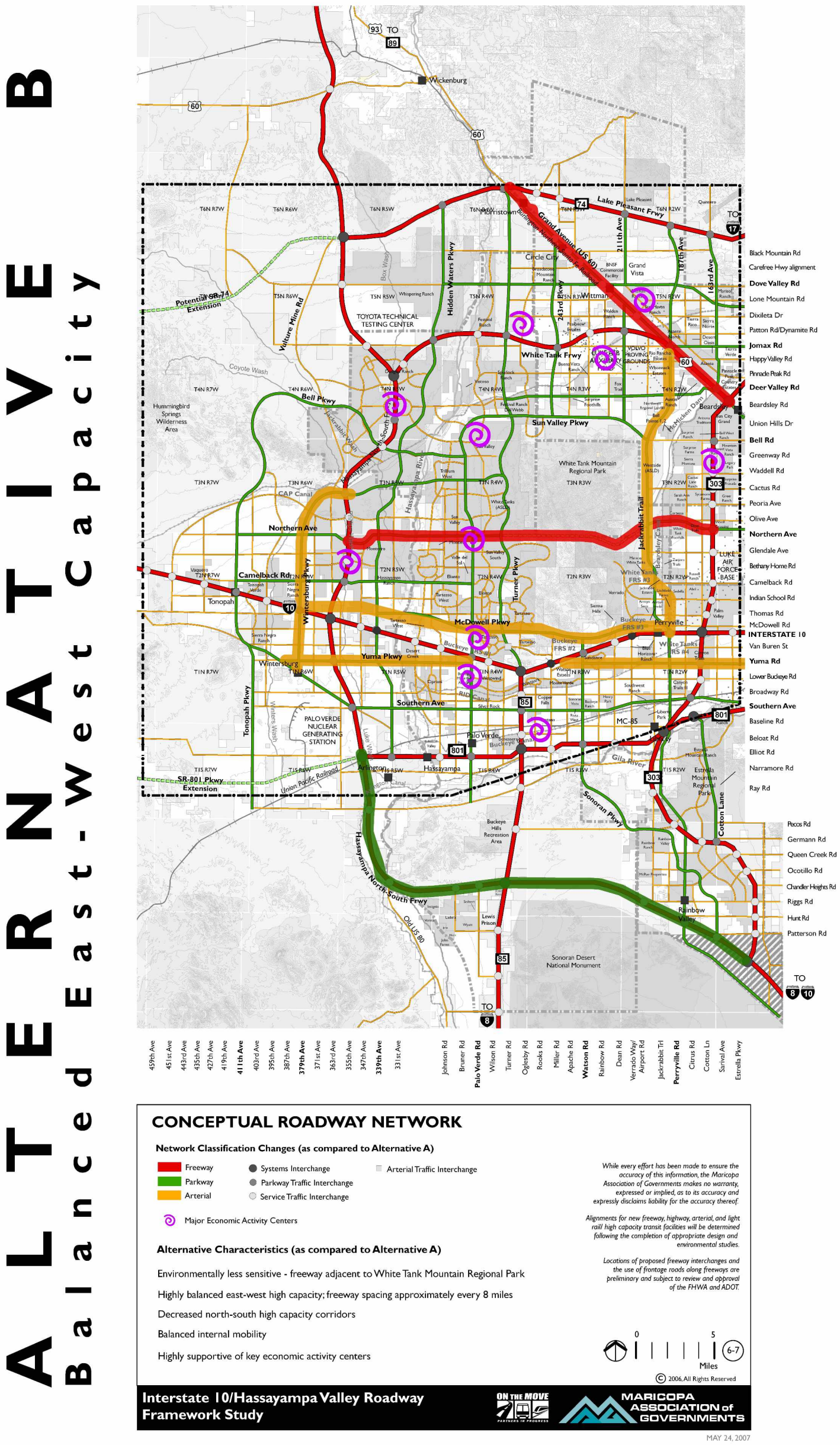


Figure 6-8 Alternative C

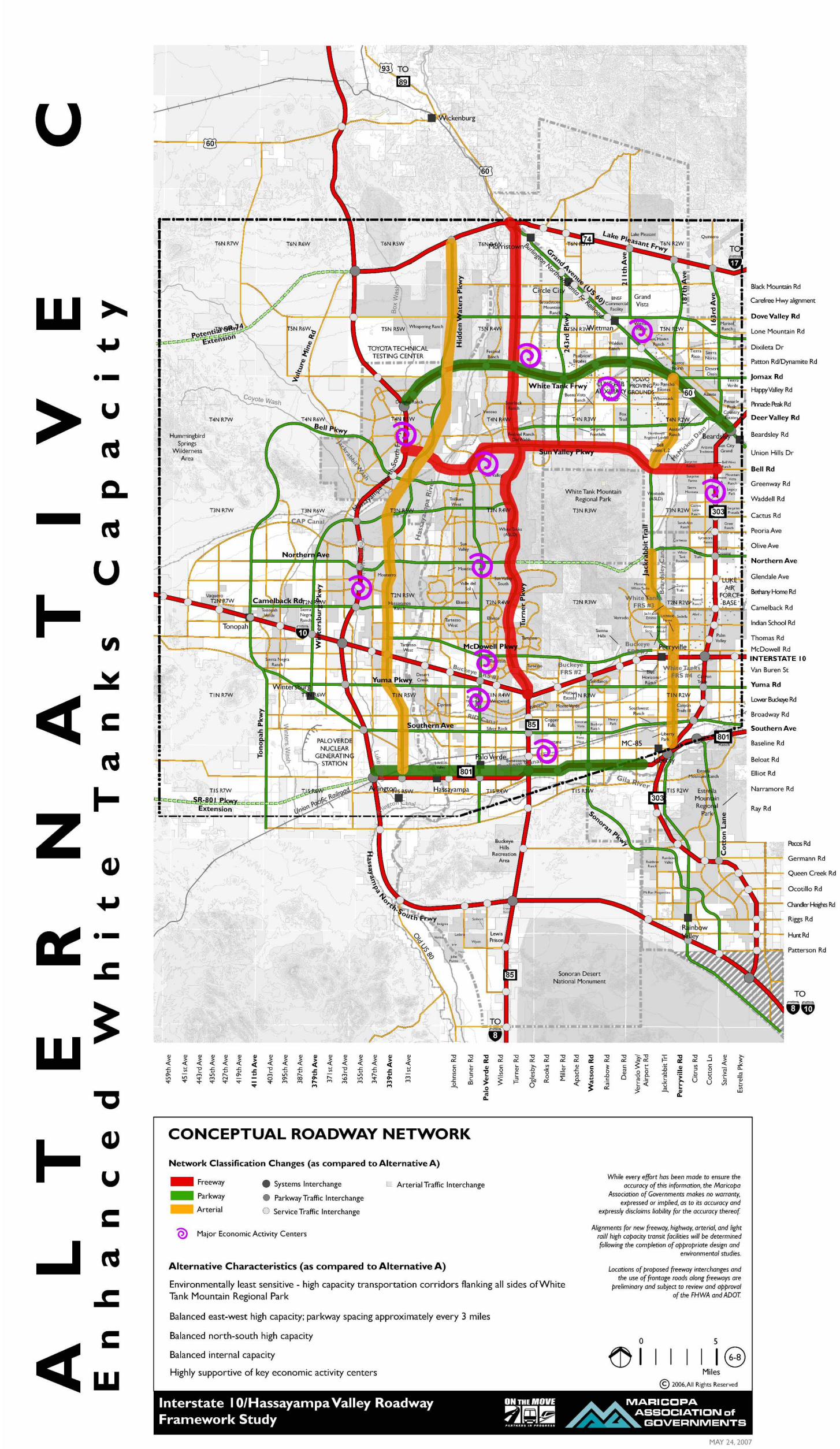


Figure 6-9 Alternative D

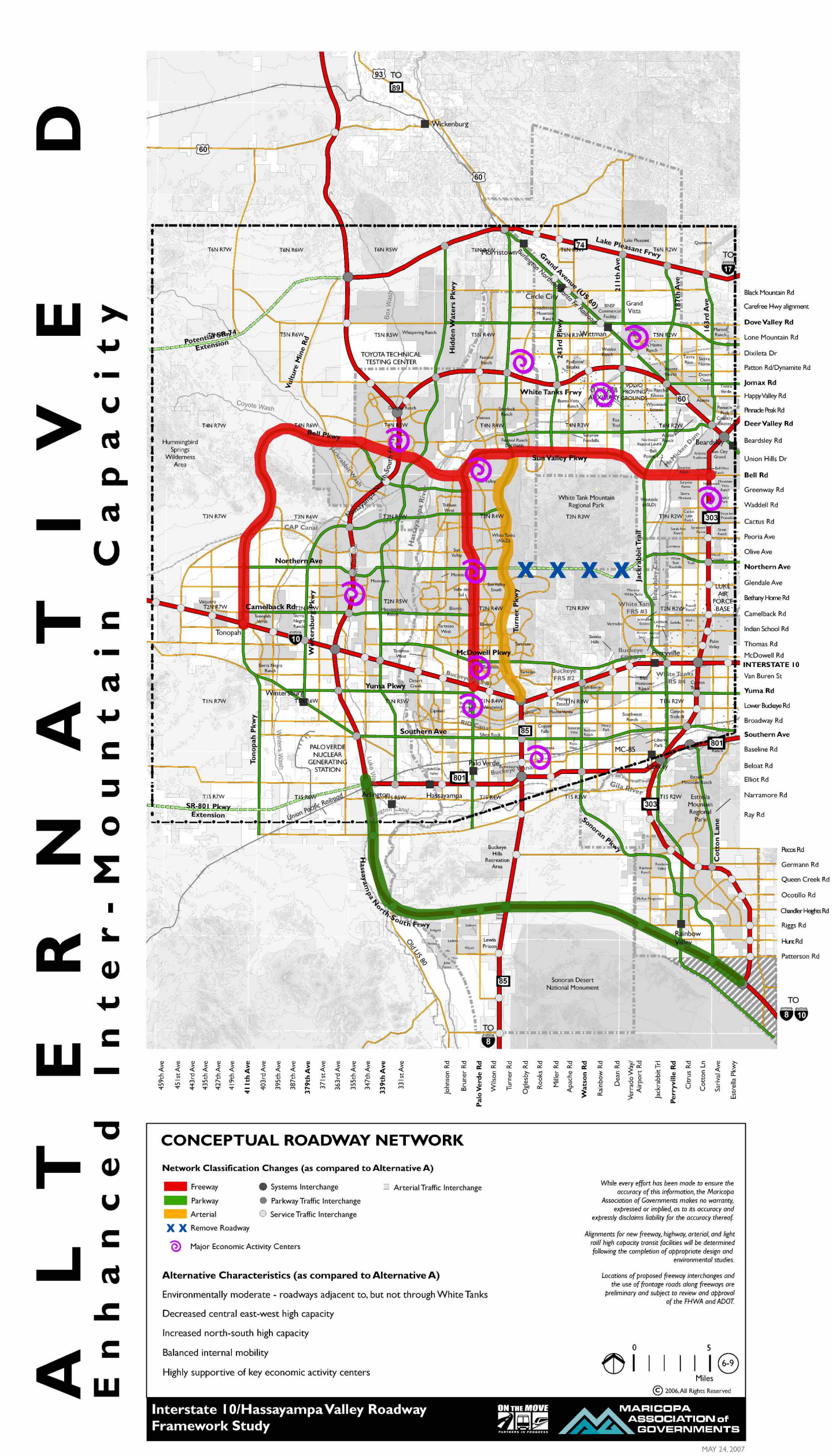
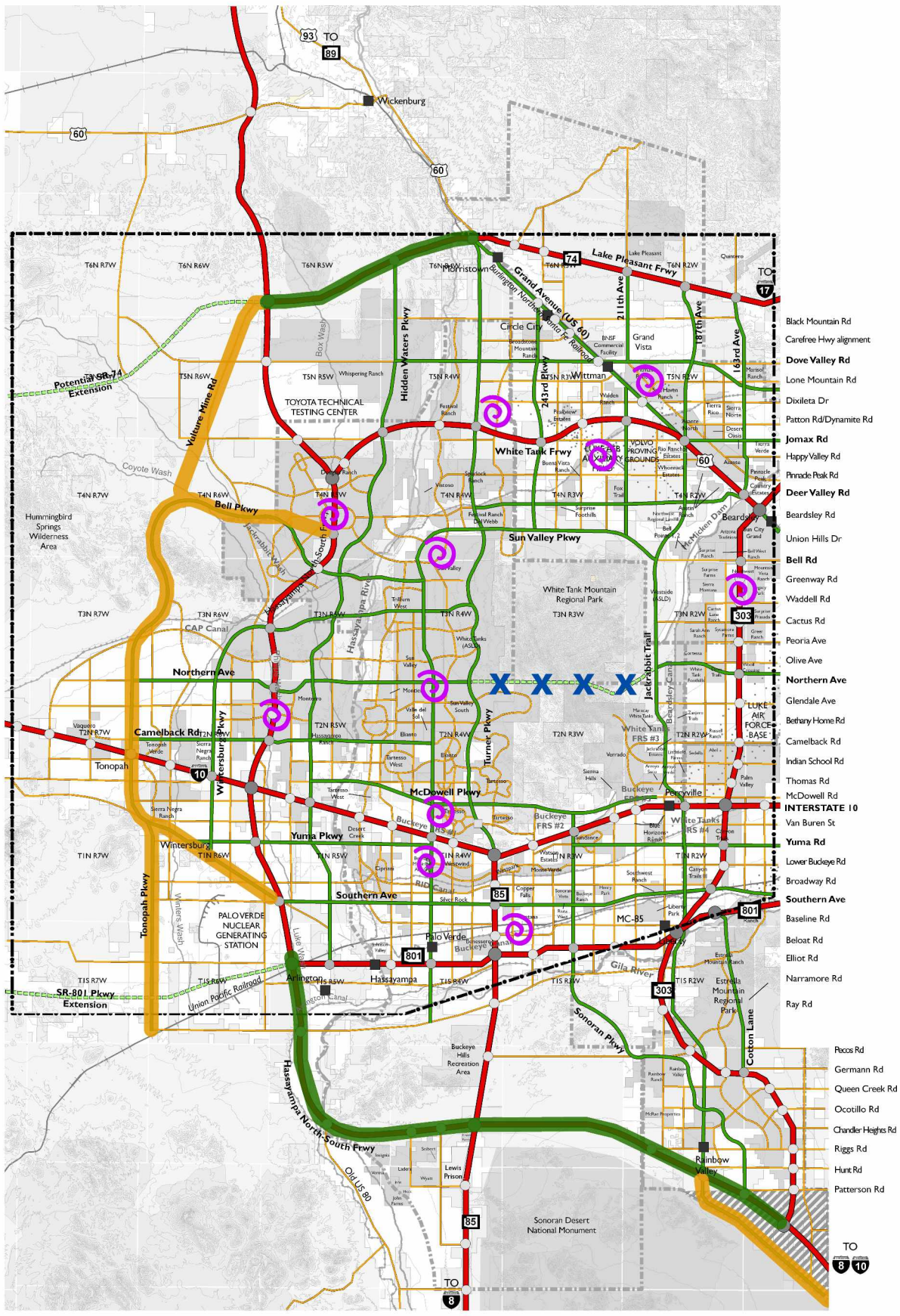


Figure 6-10 Alternative E

ALTERNATIVE E

Environmentally Sensitive, Minimum Capacity



CONCEPTUAL ROADWAY NETWORK

Network Classification Changes (as compared to Alternative A)

- Freeway
- Parkway
- Arterial
- Systems Interchange
- Parkway Traffic Interchange
- Service Traffic Interchange
- Arterial Traffic Interchange
- X X Remove Roadway
- Major Economic Activity Centers

While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

Alignments for new freeway, highway, arterial, and light rail/ high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

Locations of proposed freeway interchanges and the use of frontage roads along freeways are preliminary and subject to review and approval of the FHWA and ADOT.

Alternative Characteristics (as compared to Alternative A)

Environmentally sensitive - lower capacity roadways near sensitive environmental features

Decreased east-west high capacity corridors

Slightly decreased north-south high capacity corridors

Balanced internal mobility

Decreased western and southern access to key economic activity centers

0 5 Miles

6-10

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Figure 6-11 Alternative F

ALTERNATIVE F
Testing Miscellaneous Segments

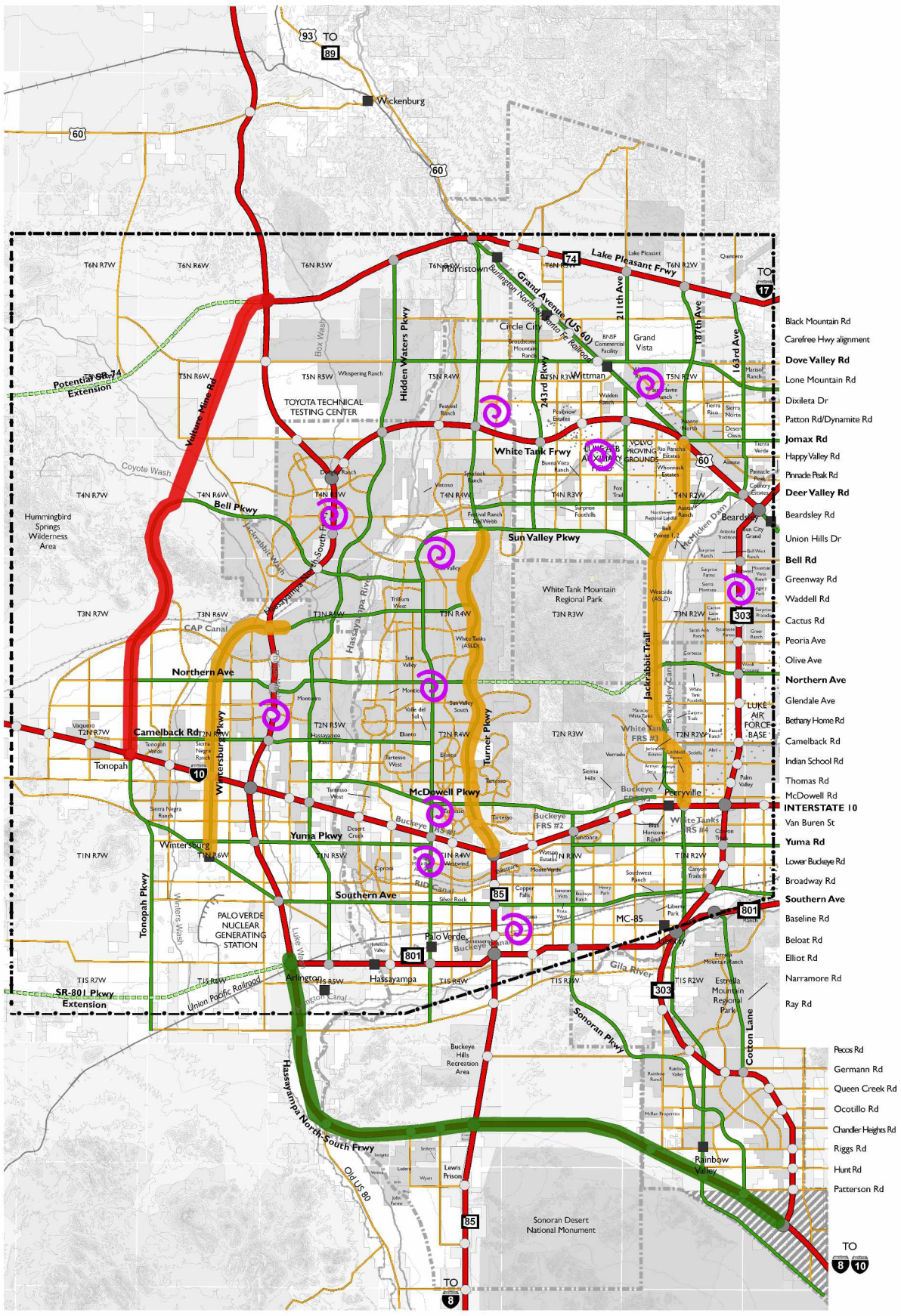

Table 6.2 Differences Between Base Alternative A and Other Alternatives

Network Characteristics	Alternatives							
	A3	A4	A5	B	C	D	E	F
Degree of Difference	Minor, except tunnel omitted	Minor, except tunnel omitted	Minor	Substantial	Substantial	Substantial	Substantial	Substantial
Roadway Upgrades	None	None	None	-Northern Parkway now freeway (Hassayampa Freeway to SR-303) -US-60 now freeway (White Tanks Freeway to SR-74)	-Turner, Sun Valley Parkway (east-west), Bell Parkway (e. of Hassayampa Freeway) now freeways	-To freeway: Sun Valley Parkway, Bell Parkway, Vulture Mine Rd (s. of Bell Parkway)	None	Vulture Mine Freeway
Roadway Downgrades	None	None	None	-Hassayampa Freeway now parkway (s. of SR-801) -Parkways become arterials: Wintersburg, McDowell, Yuma, Jackrabbit (I-10 to US-60)	-White Tanks Freeway, most of SR-801, all of US-60 now parkways -Parkways become arterials: Hidden Waters, Jackrabbit (SR-801 to Northern & Sun Valley Parkway to US-60)	-Hassayampa Freeway now parkway (s. of SR-801) -Turner Parkway now arterial (s. of Sun Valley Parkway)	-Hassayampa Freeway now parkway (s. of SR-801) -SR-74 extension also parkway, not freeway -Parkways become arterials w. of Hassayampa Freeway: Vulture Mine Rd, Tonopah & Tonopah-Salome Parkways, Bell Parkway	-Hassayampa Freeway now parkway (s. of SR-801) -Parkways become arterials: Wintersburg, Turner (s. of Sun Valley Parkway), Jackrabbit (I-10 to US-60)
Other Differences	No tunnel	-No tunnel -No Turner Parkway	Frontage or C-D road system along I-10 between Johnson, Miller rds	Tunnel upgraded from parkway to freeway	None	No tunnel	No tunnel	None
Environmental	Similar to Alt A	Similar to Alt A	Similar to Alt A	Greater potential impact to White Tank Regional Park	Greatest potential impact to White Tank Regional Park	Generally moderate, similar to Alt A	Most sensitive to environment	Generally moderate, similar to Alt A
East-West Capacity	Decreased in central area	Decreased in central area	Similar to Alt A	Highly balanced	Similar to Alt A	Decreased in central area	Significantly decreased	Similar to Alt A
North-South Capacity	Similar to Alt A	Decreased (no Turner Parkway)	Similar to Alt A	Decreased (road downgrades)	Similar to Alt A	Similar to Alt A	Slightly decreased	Reduced parkway density
Internal Mobility	Similar to Alt A	Similar to Alt A	Similar to Alt A	Similar to Alt A	Similar to Alt A	Similar to Alt A	Similar to Alt A	Enhanced in central study area
Support of Economic Activity Centers	Similar to Alt A	Decreased parkway accessibility	May be higher along portion of I-10 corridor	Similar to Alt A	Similar to Alt A	Similar to Alt A	Decreased western & southern access	Decreased parkway accessibility

Source: MAG Study Team, April 2007

Table 6.3 Total Lane Miles in Study Area by Alternative and Facility Class

Class	Lane Miles by Alternative*								
	A	A3	A4	A5	B	C	D	E	F
Freeway	1,628	1,628	1,628	1,628	1,735	1,747	1,891	1,518	1,603
Parkway	2,662	2,608	2,379	2,662	2,033	2,224	2,178	2,329	2,226
Arterial	4,949	4,949	4,919	5,025	5,362	5,315	5,047	5,281	5,257
Total	*9,239*	*9,185*	*8,926*	*9,315*	*9,130*	*9,286*	*9,116*	*9,128*	*9,086*

*Includes existing facilities
Source: MAG Study Team, April 2007

6.2 Tiered Evaluation of Alternatives

The I-10/Hassayampa Valley roadway network alternatives were evaluated in a two-tiered process by applying the criteria and performance measures developed in Chapter 3. In Tier 1, the nine original alternatives were screened down to five, using only the safety and mobility criteria. The more detailed Tier 2 evaluation used all of the criteria and performance measures to evaluate the remaining alternatives in more depth, and to select a preferred alternative.

The (quantitative) safety and mobility portion of the evaluation was conducted by applying constrained travel times, based on roadway link capacities identified within the network and the effects of congestion. Travel time constraints recognized the differing functional characteristics of the alternative networks, permitting planners to equilibrate the magnitude of traffic flows and patterns. In effect, imposing travel time constraints recognized specific limitations of network links and enabled the Study Team to identify deficiencies and define potential opportunities for improvements.

6.2.1 Tier 1 Screening

Table 6.4 shows how Alternatives A, A3, A4, A5, B, C, D, E and F were first evaluated using the ten safety and mobility criteria introduced in Chapter 3. The left column of the table lists the performance measures associated with the pertinent evaluation criteria from that document. As in Chapter 3, each performance measure is phrased in the form of an objective involving measurement of a specific characteristic. The remaining columns report the numerical performance of the alternatives and compare their scores with each other. For some measures of effectiveness (e.g., travel speed) a higher number means superior performance. In other cases, such as vehicle hours of travel (an indicator of congestion), a lower number is better.

The MAG Study Team then translated each numerical score into either a full circle (●), a half circle (◐), or an empty circle (○). The alternatives with the best performance were assigned a full circle, while those that fared worst were given an empty circle. In each case, the intermediate group received a half circle. The distribution of circles among alternatives followed logical breaks between groupings whenever possible. In two cases, for example, only one alternative (that clearly stood out from the rest) was assigned to the highest-performing group (●).

The next step in this portion of the evaluation consisted of computing streamlined point scores for each alternative. A value of two points was assigned to each full circle (●) and one point to each half circle (◐). Alternatives in the poorest-performing group (○) received no points. Finally, the team calculated the total score for each alternative by adding the partial scores across rows.

The last row of Table 6.4 shows a clear division into a higher-performing group of alternatives and a lower-performing group. Four of the alternatives (A, A5, B and C) have scores of 12 to 16, while the remaining five have scores of 3 to 8. The most obvious common element of the four highest-scoring alternatives is the White Tank Mountain tunnel. Although Alternative F also includes the tunnel, this scenario has fewer total roadway and freeway lane miles than the other four. This alternative upgrades only one lower-level facility to a freeway: Vulture Mine Road corridor, which is located in a peripheral area.

Table 6.4 Tier 1 Safety and Mobility Evaluation Matrix for Alternatives A, A3, A4, A5, B, C, D, E and F

Performance Measures	Alternative								
	A	A3	A4	A5	B	C	D	E	F
Minimize PM peak period VMT per lane mile in study area	1,303 ●	1,312 ◐	1368 ○	1,276 ●	1,296 ●	1,287 ●	1,322 ◐	1,320 ◐	1,329 ◐
Maximize the percent of study area PM peak period VMT on freeways*	35.6 ◐	34.3 ○	35.2 ◐	34.0 ○	38.8 ●	32.6 ○	33.1 ○	36.2 ◐	34.8 ○
Minimize the percent of freeway lane miles operating at Level of Service E or worse in the PM peak period*	48.9 ◐	50.2 ◐	52.2 ○	47.3 ◐	52.2 ○	41.8 ●	36.8 ●	57.7 ○	48.8 ◐
Maximize average PM peak travel speed on freeways in study area	49.7 ○	52.2 ●	50.3 ◐	52.6 ●	53.4 ●	53.2 ●	49.3 ○	52.0 ●	50.3 ◐
Maximize average PM peak travel speed on arterials and parkways in study area	38.1 ●	37.5 ◐	37.1 ○	38.0 ●	37.5 ◐	37.1 ○	37.5 ◐	37.5 ◐	37.3 ○
Minimize PM peak period VHT in study area (in millions)	257.4 ●	286.2 ◐	324.4 ○	257.2 ●	257.0 ●	266.4 ●	286.2 ◐	286.2 ◐	287.4 ◐
Minimize the percent of congested (LOS E or worse) PM peak period VMT	66.2 ●	69.0 ◐	70.8 ○	64.4 ●	68.0 ◐	67.8 ◐	69.8 ○	69.8 ○	70.7 ○
Minimize the number of facilities crossing selected cut-lines at LOS E or worse in the PM peak period	25 ●	28 ◐	28 ◐	26 ●	26 ●	26 ●	27 ◐	28 ◐	30 ○
Minimize the overall PM peak period volume/capacity ratio across east-west cut-lines	1.34 ◐	1.42 ○	1.42 ○	1.34 ◐	1.27 ●	1.45 ○	1.36 ◐	1.41 ○	1.34 ◐
Maximize the number of continuous freeway and parkway lanes crossing a north-south cut-line drawn through the White Tank Mountains	88 ●	82 ○	82 ○	88 ●	84 ◐	84 ◐	86 ◐	82 ○	88 ●
Total Score	15	8	3	16	15	12	8	7	7

● = highest rating; ◐ = intermediate; ○ = lowest
*Weighted by the relative number of freeway lane miles in each alternative (compared with the average for all alternatives).
**Numerical scoring scheme:

2 points for each ●

1 point for each ◐

No points for ○

Source: MAG Study Team, April 2007

As a result, Alternatives A, A5, B and C were all carried forward into the Tier 2 evaluation. Knowing that any tunnel through the White Tanks would be not only very costly but extremely controversial, the MAG Study Team deemed it necessary to include one "no tunnel" scenario in the Tier 2 evaluation. Alternative A3 was selected because (i) it performs at least as well as Alternatives A4, D, E and F, and (ii) it is the most similar to the base Alternative A, which has been discussed, reviewed and accepted by most stakeholders involved in the study. Thus, five alternatives survived the Tier 1 screening.

6.2.2 Tier 2 Evaluation

The Tier 2 evaluation (Table 6.5) used all of the criteria and performance measures from Chapter 3 to evaluate Alternatives A, A3, A5, B and C, and to compare them with each other. The safety and mobility performance measures are identical to those used in Table 6.4, and so are the numbers in the corresponding cells. However, the "Consumer Reports" icons (full, half and empty circles), do not necessarily match those in the corresponding cells from Tier 1, because the comparison group is different. In Table 6.4, for instance, four of the five Tier 2 alternatives received the highest possible rating of a full circle for the first performance measure, "Minimize PM peak period VMT per lane mile." With the narrower and stronger field in Table 6.5, only two of the five received a full circle.

The criteria and performance measures in the remaining categories (access, plan consistency, environmental, cost, ease of implementation and cost/benefit) are used only in Tier 2. Because many of the measures are subjective, an explanation of each full, half or empty circle is provided where appropriate. Table 6.5 reports not only an individual rating for each performance measure, but also a composite rating for each category. The basic scoring system is the same as the one in the Tier 1 screening: two points for a full circle, one point for a half circle and nothing for an empty circle.

The process of adding partial scores across rows to yield a total numerical score for each alternative resembles the simple addition used in the Tier 1 evaluation, with one change. Each composite score for a category is added to the grand total, and receives double weight. For example, the Alternative A scores for all individual performance measures add to (14 + 0 + 7 + 8 + 3 + 4 + 0) or 36. The composite scores by category are 2, 0, 2, 2, 1, 1 and 0, all doubled for a total of 16. The grand total for this alternative is therefore 36 + 16, or 52.

Table 6.6 shows how planning-level capital costs, in constant 2006 dollars, were calculated for use in the cost and cost/benefit evaluations. Most of the unit costs are based on cost data for projects in the current editions of the MAG RTP and Transportation Improvement Program (TIP). RTP projects were used primarily for large projects such as freeways and system TIs, while the TIP was consulted for information on new and reconstructed arterials. All of these unit costs are likely to change substantially during subsequent planning and design concept work. They will also vary by location according to the terrain, drainage, soil conditions and various other characteristics.

Table 6.7 provides a capital cost breakdown for each of the five Tier 2 alternatives. Alternatives A3, B and C spend the greatest proportion on freeway lane miles, while Alternatives A, A3 and A5 spend the highest percentages on parkways. The numbers for A3 are skewed by the absence of a tunnel in this alternative. In every case, system TIs, freeway-parkway TIs and parkway grade separations account for 8 to 11 percent of the total cost, and (Hassayampa River) bridges for 2 percent.

Table 6.5 Detailed Tier 2 Evaluation Matrix for Alternatives A, A3, A5, B and C

Performance Measures	Alternative*				
	A	A3	A5	B	C
Safety & Mobility					
Minimize PM peak period VMT per lane mile in study area	◐ 1,303	○ 1,312	● 1,276	◐ 1,296	● 1,287
Maximize the percent of study area PM peak period VMT on freeways**	◐ 35.6	◐ 34.3	◐ 34.0	● 38.8	○ 32.6
Minimize the percent of freeway lane miles operating at Level of Service E or worse in the PM peak period**	◐ 48.9	○ 50.2	◐ 47.3	○ 52.2	● 41.8
Maximize average PM peak travel speed on freeways in study area	○ 49.7	◐ 52.2	◐ 52.6	● 53.4	● 53.2
Maximize average PM peak travel speed on arterials and parkways in study area	● 38.1	◐ 37.5	● 38.0	◐ 37.5	○ 37.1
Minimize PM peak period VHT in study area	● 257.4 million	○ 286.2 million	● 257.2 million	● 257.0 million	◐ 266.4 million
Minimize the percent of congested (LOS E or worse) PM peak period VMT	● 66.2	○ 69.0	● 64.4	◐ 68.0	◐ 67.8
Minimize the number of facilities crossing selected cut-lines at LOS E or worse in the PM peak period	● 25	○ 28	◐ 26	◐ 26	◐ 26
Minimize the overall PM peak period volume/capacity ratio across east-west cut-lines	◐ 1.34	○ 1.42	◐ 1.34	● 1.27	○ 1.45
Maximize the number of continuous freeway and parkway lanes crossing a north-south cut-line drawn through the White Tank Mountains	● 88	○ 82	● 88	◐ 84	◐ 84
Composite (counts double)	●	○	●	●	◐
Safety & Mobility Total	18	3	19	17	12

Table 6.5 – Continued

Performance Measures	Alternative*				
	A	A3	A5	B	C
Access					
Maximize the percent of study area residents within two miles of a (local service) freeway TI	○ 41%	○ 41%	○ 41%	● 49%	● 48%
Maximize the percent of study area employment within two miles of a (local service) freeway TI	○ 54%	○ 54%	○ 54%	● 64%	○ 53%
Composite (counts double)	○	○	○	●	◐
Access Total	0	0	0	8	4
Plan Consistency					
Maximize land use planning consistency[1]	● Overall Component I = ● Component II = ● Component III = ●	● Overall (same as A)	● Overall (Similar to A, but I even better due to frontage roads)	◐ Overall Component I = ◐ Component II = ● Component III = ◐	○ Overall Component I = ○ Component II = ● Component III = ○
Maximize circulation planning consistency[2]	●	●	●	◐	○
Maximize consistency with jurisdictional economic development plans[3]	◐ 34 points 5 primary centers on freeways (20 points); 1 on parkway (3 points); 4 secondary centers on freeways (8); 3 on parkways (3)	◐ 34 points (same as A)	● 36 points Same as A, but extra points due to frontage roads along I-10 in Buckeye area	● 37 points 6 primary centers on freeways (24 points); 6 secondary centers on freeways (12); 1 secondary on parkway (1)	◐ 35 points 5 primary centers on freeways (20 points); 1 on parkway (3); 5 secondary centers on freeways (10); 2 on parkways (2)
Maximize consistency with development master plans	● Base alternative designed for consistency & consensus	● Similar to A, but no tunnel	● Similar to A, but I-10 frontage roads further improve access	◐ Additional freeways create conflicts along Grand & Northern Ave corridors	○ Sun Valley & Turner freeways totally inconsistent w/ ASLD & other plans
Composite (counts double)	●	●	●	◐	○
Plan Consistency Total	11	11	12	7	1

Table 6.5 - Continued

Performance Measures	Alternative*				
	A	A3	A5	B	C
Environmental					
Minimize impacts to existing canals and flood control structures	◐ Parkway across McMicken Dam; Jackrabbit is parkway; McDowell & Yuma Rds are parkways	◐ Similar to A	◐ Similar to A	● Parkway across McMicken Dam; Jackrabbit is arterial; McDowell & Yuma are arterials	○ Freeway across McMicken Dam; part of Jackrabbit is parkway; McDowell & Yuma are parkways;
Minimize impacts associated with crossing of floodplains or disturbance of drainage features, including Waters of the U.S. under jurisdiction of the U.S. Army Corps of Engineers	◐ Hidden Waters Parkway; 4 new freeway river crossings; White Tanks Freeway crossing difficult	◐ Similar to A	◐ Similar to A	◐ Similar to A (still 4 new freeway river crossings Safety & Mobility ; Northern instead of Hassayampa Freeway)	● Hidden Waters becomes arterial; only 3 new freeway river crossings
Minimize impacts to resources protected under Section 4(f) or 6(f)[4]	◐ Tunnel (parkway)	● No tunnel; least intrusive to regional park	◐ Similar to A	○ Tunnel (freeway); highly intrusive to park	○ Parkway tunnel, plus freeways near north & west sides of park
Minimize impacts to areas containing known or likely habitat for Threatened, Endangered and other sensitive species	◐ Tunnel (parkway)	● No tunnel; least intrusive to regional park	◐ Similar to A	◐ Tunnel (freeway), but arterials only on McDowell Rd & Wintersburg alignment; parkway only on Hass. Freeway alignment south of Gila	○ Parkway tunnel, plus freeways near north & west sides of park
Minimize impacts to wildlife corridors[5]	● 50 parkway crossing equivalents	● 50 parkway crossing equivalents	● 50 parkway crossing equivalents	○ 56 parkway crossing equivalents	◐ 53 parkway crossing equivalents
Air quality: Minimize PM peak VHT in the study area (used also as a mobility criterion)	● 257.4 million	○ 286.2 million	● 257.2 million	● 257.0 million	◐ 266.4 million
Composite (counts double)	●	●	●	◐	○
Environmental Total	12	12	12	8	4

Table 6.5 - Continued

Performance Measures	Alternative*				
	A	A3	A5	B	C
Cost					
Minimize capital cost[6]	○ $21.44 billion	● $19.16 billion	○ $21.53 billion[7]	○ $21.45 billion	○ $21.54 billion
Minimize operating and maintenance cost	◐ 1,444 new freeway lane miles 5,375 new parkway/art lane miles 7 system TIs Tunnel—parkway	● 1,444 new freeway lane miles 5,321 new parkway/art lane miles 7 system TIs No tunnel	◐ 1,444 new freeway lane miles 5,451 new parkway/art lane miles 7 system TIs Tunnel--parkway	○ 1,551 new freeway lane miles 5,159 new parkway/art lane miles 10 system TIs Tunnel—freeway	◐ 1,563 new freeway lane miles 5,303 new parkway/art lane miles 7 system TIs Tunnel—parkway
Minimize right-of-way cost	● 1,444 new freeway lane miles	● 1,444 new freeway lane miles	● 1,444 new freeway lane miles	◐ 1,551 new freeway lane miles	◐ 1,563 new freeway lane miles
Composite[8] (counts double)	◐	●	◐	○	○
Cost Total	5	10	5	1	2
Ease of Implementation					
Obtain strong support from the Study Review Team & Funding Partners	● Base developed with Funding Partners & SRT	● Same as A without tunnel	◐ I-10 frontage roads not unanimously supported	○ Grand Ave freeway; freeway tunnel; removal of needed freeway segments	○ Turner freeway; no freeway along 801; no White Tanks Freeway
Maximize the likelihood of acceptance by outside agencies, stakeholders & the community	◐ Tunnel	● No tunnel	◐ Tunnel & frontage roads	○ Freeway tunnel through White Tanks	○ Tunnel plus Sun Valley & Turner freeways
Minimize any legal or institutional barriers that may make one alternative harder to implement than others	◐ Tunnel; Proximity to Palo Verde nuclear plant common to all alts	● No tunnel	◐ Similar to A	◐ Similar to A	○ Tunnel; Bell Rd as freeway over McMicken Dam
Composite (counts double)	◐	●	◐	○	○
Ease of Implementation Total	6	10	5	1	0
Cost/Benefit					
Minimize "planning-level" capital cost per PM peak VMT accommodated (counts double)	○ $1,781	● $1,590	○ $1,812	○ $1,813	○ $1,803
Cost/Benefit Total	0	4	0	0	0
Grand Total Score	52	50	53	42	23

Table 6.5 - Continued

● = highest rating; ◐ = intermediate; ○ = lowest

*Numerical scoring scheme:
2 points for each ●
1 point for each ◐
No points for ○
Scores in "composite" rows (including /cost/benefit) are doubled

**Weighted by the relative number of freeway lane miles in each alternative (compared with the average for all alternatives).

[1]I = Roadway network compatibility with (existing and proposed) adjacent land uses
II = Balanced facility spacing (approximately 8-10 miles for freeways; 3-4 miles for arterials)
III = Consistency with jurisdictional land use and circulation plan elements

[2]Based on consistency with jurisdictional land use and circulation plan elements (component #III above).

[3]Primary activity center on freeway = 4 points; primary center on parkway = 3 points; secondary activity center on freeway = 2 points; secondary center on parkway = 1 point

[4]Section 4(f) of the U.S Department of Transportation Act and Section 6(f) of the Land and Water Conservation Fund Act (LWCFA) provide certain protections for land acquired and developed for public recreational purposes. Section 4(f) applies to federally funded transportation projects, and projects on federal land, with a potential impact on recreational resources. Section 6(f) applies to all projects, whether federally funded or not, that may affect land acquired under the LWCFA.

[5]Based on the number of freeway and parkway intersections with wildlife linkage zones, according to ADOT Wildlife Linkages Assessment mapping. A freeway crossing is considered the equivalent of three parkway crossings.

[6]Based on planning-level unit costs for new freeway lane miles, parkway lane miles, arterial lane miles, bridges (river crossings), new system TIs, and parkway grade separations; and on estimated tunnel cost of $140,000 per linear foot for two four-lane bores using New Austrian Tunneling Method. Costs are in constant 2006 dollars and based primarily on projects in the MAG Transportation Improvement Program and Regional Transportation Plan. See Table 6.6 for details.

[7]Does not include additional allowance for frontage roads or C-D road system along a portion of I-10.

[8]Capital cost is the predominant element in determining the composite rating.

Source: MAG Study Team, April 2007

Table 6.6 Derivation of Planning-Level Capital Cost*

Cost Element	Estimated Cost Per Unit	Source of Estimate
Lane Mile—Freeway**	$7 million	MAG RTP: SR-303L and SR-801
Lane Mile—Parkway***	$1.5 million	150% of arterial cost
Lane Mile—Arterial	$1.0 million	10 projects in MAG TIP and RTP
System TI (Freeway-Freeway)	$50 million	2 projects in RTP: SR-303L at I-17 and I-10
Freeway-Parkway TI	$30 million	Scaled down from freeway-freeway (system) TI
Parkway Grade Separation	$15 million	Scaled down from freeway-freeway (system) TI
Hassayampa River Bridge	$20 million	Based on 2 projects in MAG TIP
Tunnel (White Tank Mountains)	$2.218 billion	3-mile tunnel, based on MAG estimate of $140,000 per linear foot for twin four-lane bores, using New Austrian Tunneling Method

*2006 dollars
**Includes local service TIs
***Includes all capital costs except for freeway-parkway TIs and parkway grade separations

6.2.3 Results and Recommendation

The last line of Table 6.5 gives the total score of each Tier 2 alternative based on all the evaluation criteria and performance measures. Alternative C performs poorly in most evaluation categories and lags far behind the others, with only 23 points. Alternative B performs much better than C, with 42 points—partly because the freeway tunnel improves its mobility score—but not as well as A, A3 or A5. Of these three, only Alternative A3 lacks the White Tank Mountain tunnel. The resulting cost saving partially counterbalances the low mobility offered by this scenario.

Alternatives A, A3 and A5 all have total scores from 50 to 53 points. Because of the expected controversy over the White Tank tunnel, two options are recommended for further planning:

- Alternative A3 (no tunnel), but with the frontage road or C-D road element of Alternative A5 added to meet the needs of the Town of Buckeye.
- Alternative A5, in case a tunnel turns out to be acceptable and affordable at a future date, based on the preparation of a detailed feasibility study and more extensive discussion with potentially affected stakeholders.

Table 6.7 Planning-Level Capital Cost Breakdown by Alternative

Element	Cost ($Million) and Percent of Total by Alternative									
	A		A3		A5		B		C	
	Cost	Percent	Cost	Percent	Cost	Percent	Cost	Percent	Cost	Percent
Freeways[1]	$10,108	47	$10,108	53	$10,108[2]	47	$10,857	51	$10,941	51
Parkways	3,993	19	3,912	20	3,993	19	3,050	14	3,336	15
Arterials	2,713	13	2,713	14	2,789	13	3,126	15	3,079	14
TIs (except local service)	2,045	9	2,045	11	2,045	9	1,820	8	1,610	8
System	350	2	350	2	350	2	500	2	350	2
Freeway-Parkway	960	4	960	5	960	4	900	4	870	4
Parkway Grade Separations	735	3	735	4	735	3	420	2	390	2
Bridges	360	2	380	2	380	2	380	2	360	2
White Tank Tunnel	2,218	10	0	0	2,218	10	2,218	10	2,218	10
Total	$21,437	100	$19,158	100	$21,533	100	$21,451	100	$21,544	100

[1]Freeway capital cost per lane mile is based on programmed cost (from the MAG RTP) for portions of the SR-303L and SR-801 freeways. TIs along these freeways will typically be one mile apart, whereas the spacing on freeways in the Hassayampa Valley study area will generally be two miles. However, this apparent cost saving will be offset by the construction of additional grade-separated crossings (approximately two per mile) on study area freeways.

[2]Does not include additional allowance for frontage roads or C-D road system along a portion of I-10. Municipalities and benefiting property owners will bear this cost through cost-sharing arrangements to be established after detailed planning and design.

Source: MAG Study Team, April 2007

Interstate 10 – Hassayampa Valley Roadway Framework Study

Chapter 7

Implementation

September 2007

Prepared for

MARICOPA ASSOCIATION of GOVERNMENTS

Prepared by

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7.1 Recommended Conceptual Roadway Framework

Following development of the preferred roadway framework alternative as described in Chapter 6, the MAG study team brought this conceptual network to the Funding Partners for review and comment. The team met individually with each local funding partner (Buckeye, Goodyear, Surprise and Maricopa County) to discuss potential revisions and priorities for implementation. At the final project forum on July 12, 2007 in Buckeye, MAG unveiled a Draft Executive Summary, including the long-range conceptual framework, in poster format. The final map and other elements of the Executive Summary reflect comments from the Funding Partners, members of the Study Review Team and others. Figure 7-1 illustrates the final Hassayampa Valley roadway network.

Table 7.1 lists major modifications to the recommended network shown in Chapter 6, Figure 6-4 (or Figure 6-6 with a future tunnel through the White Tank Mountains). Many of these changes reflect late input from individual funding partners, especially the Town of Buckeye and the City of Surprise. Some of the less significant or minor changes are not included in this table.

Table 7.1 Summary of Major Changes to Conceptual High-Capacity Roadway Framework

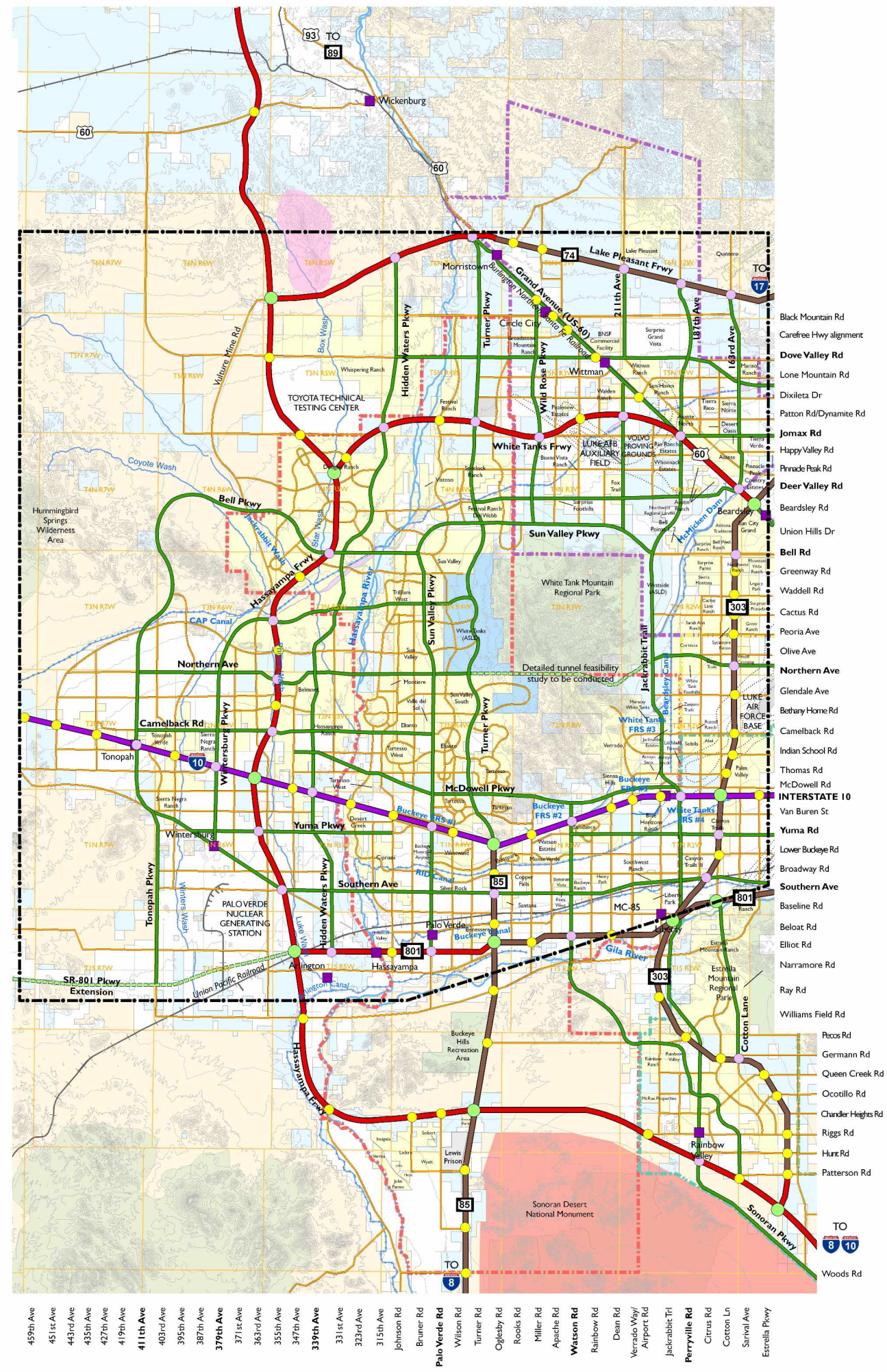
Roadway Name	Location	Description of Change	Reason for Change
		Freeways	
SR-303L	East edge of study area	No longer shares a segment with SR-801 in Goodyear	Continuing studies
SR-801	Just west of SR-85	Alignment jogs southwest	To show the alignment following Old Highway 80
Hassayampa Fwy	Cactus Rd Pkwy to White Tanks Fwy	(1) Curvilinear alignment is smoothed out; (2) No. of TIs is reduced from 3 to 2	Response to network changes in Douglas Ranch area, reflecting revised location of background arterials
I-10	Wilson Rd	Map shows local service TI	Requested by Town of Buckeye to show access pending completion of I-10 geometric study, Miller Rd-Johnson Rd
		Parkways	
Bell Rd	Jackrabbit Trail to east study area boundary	Parkway reduced to arterial	Intense development along R/W precludes parkway
Bell Pkwy	Vulture Mine Rd to Sun Valley Pkwy	Corridor jogs south (west of Hassayampa Fwy)	R/W and topography considerations in Douglas Ranch area
Hidden Waters Pkwy	Northern Pkwy to White Tanks Fwy	Corridor as illustrated is much curvier	Response to network changes in Douglas Ranch area
Jackrabbit Trail	Glendale Ave to Yuma Rd	Alignment veers southeast to Perryville Rd alignment just south of I-10, instead of near Camelback Rd	Request from Town of Buckeye; reflects planned addition of I-10 TI at Perryville Rd
Sun Valley Pkwy	Turner Pkwy to 211th Ave	Corridor follows a curvier path	Request from City of Surprise
Wild Rose Pkwy (formerly 243rd Ave)	US-60 to Sun Valley Pkwy	Now meanders slightly instead of following a straight line	Request from City of Surprise
McDowell Pkwy	Desert Creek Pkwy to 347th Ave	Jogs north to reach Indian School Rd alignment	Request from Town of Buckeye
	347th Ave to Wintersburg Pkwy	Deleted	
Vulture Mine Pkwy	Entire route	Reduced to arterial; realigned and extended southeast to Wintersburg Pkwy near Hassayampa Fwy	Request from Town of Buckeye

Table 7.1 Continued

Roadway Name	Location	Description of Change	Reason for Change
Yuma Rd	Approx Johnson Rd to Sun Valley Pkwy	Reduced to arterial	Development plans near Buckeye Municipal Airport
		Arterials	
Jomax Rd	At Hassayampa River	Bridge crossing removed	Based on local land development plans and nearby White Tanks Fwy river crossing
395th Ave	Entire route	South end straightened; north end realigned to meet Tonopah Pkwy	Request from Town of Buckeye
Waddell Rd	Tonopah Pkwy to Jackrabbit Wash area	Deleted	Request from Town of Buckeye
Broadway Rd	Johnson Rd to Hidden Waters Pkwy	Arterial realigned and extended to cross Hassayampa River	Request from Town of Buckeye
MC-85 (existing alignment)	Turner Rd to Johnson Rd	Extend as arterial	Request from Town of Buckeye
		Other Changes	
N/A	Goodyear	Sonoran Valley Planning Area no longer shaded	Outside study area

Source: MAG Project Team, July 2007

Figure 7-1 Conceptual Roadway Framework



7.2 Potential Development Timeframes for High-Capacity Roadway Network

Freeways (or Other Fully Access-Controlled Facilities)

Table 7.2 lists potential timeframes for development (corridor preservation, planning, design and construction) of the proposed freeways—or more generally, access-controlled highways, in the Hassayampa Valley. Because this is an extremely long-range plan that would be fully implemented only at Buildout, several decades in the future, the timeframes typically represent periods of five to ten years, and in some cases longer. The priorities in the table are based primarily on interviews with the Funding Partners and on planning judgment, rather than on formal modeling. *Table 7.2 is intended as one reasonable scenario for phased implementation of the high-capacity roadway system, rather than as a directive, blueprint or program for future action.* This scenario is meant to stimulate thought and serve as a starting point for further planning efforts. In any case, all timeframes are subject to change based on the results of subsequent studies, such as the MAG Hidden Valley Roadway Framework Study currently underway in the area immediately south of the Hassayampa Valley study area.

The table is divided into two sections. The first covers "existing and previously planned freeways," meaning those that are included in the adopted MAG RTP. There are one existing freeway (I-10), two highways to be upgraded to freeways, and two completely new facilities. As indicated, however, not all of the proposed improvements to these routes are listed or funded in the RTP. The second section consists of four freeways proposed for the first time in this study: the Hassayampa Freeway, White Tank Freeway, SR-74 extension west of US-60, and SR-801 extension west of SR-85. Except for the few RTP projects on the list, none of the improvements in Table 7.2 currently has a committed or identified source of funding.

Parkways

This section provides a preliminary division of proposed future parkways into high, medium and low priorities. As Table 7.3 shows, parkways designated as high priorities for (relatively) early implementation generally belong to one of these categories:

- Existing state route, MAG Road of Regional Significance, or MCDOT priority corridor
- Continuation of a key regional facility
- Existing parkway (in need of improvement to meet full parkway standards)
- Strategic location in relation to topographic features
- Designated parkway in a municipal general plan or transportation plan

The following parkways are located west of the proposed Hassayampa Freeway, in an area expected to develop later than the rest of the Hassayampa Valley, and may therefore have a relatively low priority:

- Tonopah Parkway
- Vulture Mine Road
- Northern Avenue west of Hassayampa Freeway
- Tonopah-Salome Parkway
- Bell Parkway west of Hassayampa Freeway
- Camelback Road west of Hassayampa Freeway
- McDowell Road west of Hassayampa Freeway
- Wintersburg Parkway west of Hassayampa Freeway
- Yuma Road west of Hassayampa Freeway

Table 7.2 Potential I-10/Hassayampa Valley Freeway Development Timeframes

Freeway^	Segment	Estimated Timeframe				Notes
		Corridor/Prelim. Alignment Study	Right-of-Way Preservation	Facility Design/ Construction		
				Interim	Full	
Existing and Previously Planned Freeways						
I-10	SR-303L to SR-85 (with 2 new TIs)	N/A	2007-2015 (for new TIs)	Perryville Rd TI: 2011-2015	2016-2020	Will require 8 lanes plus 2 HOV (only 6 lanes in MAG RTP)
	SR-85 to Hassayampa Fwy (4 new TIs)	N/A	2007-2015 (for new TIs)	Staged widening with some TIs may begin before 2021	2021-2030	Will require 8 lanes plus 2 HOV—*not in RTP*
	Hassayampa Fwy to 459th Avenue (4 new TIs)	N/A	2016-2020 (for new TIs)	New TIs may be built before 2030	Post 2030	Will require up to 8 lanes plus 2 HOV—*not in RTP*
SR-74	East of US-60	Complete	2007-2015	Staged widening may begin before 2021	2021-2030	*Only R/W preservation in RTP*, with phase unspecified
SR-85	I-10 to SR-801 (upgrade to full freeway)	Complete	Complete	Widen to 4-lane divided highway in RTP Phase I (complete by 2010)	2021-2030	Some TIs may be built before 2021
	SR-801 to Hassayampa Fwy*	Complete	Complete		Post 2020	To be refined in Hidden Valley Roadway Framework Study
SR-303L	US-60 to I-10	Complete	Complete	Interim facility exists	2007-2015	Funded for 6-lane freeway in Phases I and II of RTP
	I-10 to SR-801	Complete	Complete	N/A	2011-2020	Funded for 6-lane freeway in Phases II and III of RTP
	SR-801 to Hassayampa Fwy*	2007-2010	2007-2015	To be determined	2016-2025	*Not in RTP*; to be refined in Hidden Valley Study
SR-801	SR-303L to SR-85	Underway	2007-2010	2-lane interim road, 2021-2026 (RTP)	2026-2035	Construction to be staged; only 2-lane interim road in RTP
Newly Proposed Freeways						
Hassayampa Fwy	I-10 to White Tank Fwy	2007-2010	2011-2015	Possibly 2016-2025	2026-2035	High priority segment—Town of Buckeye
	White Tank Fwy to SR-74 Extension	2011-2015	2016-2020	Possibly 2021-2030	2031-2050	Potential future CANAMEX corridor segment
	I-10 to SR-801	2011-2015	2016-2020	N/A	2031-2050	Second priority segment—Buckeye
	SR-801 to SR-85*	2011-2015	2016-2020	N/A	2031-2050 or later	Dependent on Hidden Valley, I-10 Bypass and other studies
	SR-85 to SR-303L**	To be determined	TBD	TBD	TBD	Dependent on other studies, especially Hidden Valley
White Tank Fwy	Hassayampa Fwy to US-60/SR-303L	2007-2010	2011-2015	Possibly 2016-2025	2026-2035	High priority segment—City of Surprise
SR-74 Extension	US-60 to Hassayampa Fwy	2011-2020	2021-2030	Possibly 2031-2040	Post 2040	Dependent on development trends and emerging regional travel patterns
SR-801 Extension	SR-85 to Hassayampa Fwy	2007-2010	2011-2020	N/A	Post 2040	Not a high priority for Buckeye, but need to preserve R/W fairly soon

^The word "freeway" in this table, and throughout this chapter, is not intended to rule out the future use of tolls on fully access-controlled facilities.
*Partially outside study area
**Outside study area

Source: MAG Project Team, July 2007

Table 7.3 Potential High-Priority Parkways

Proposed Parkway	Justification for High Priority
Grand Ave (US-60)	Major state route
Northern Ave east of Hassayampa Fwy	Continuation of planned Northern Ave Parkway (to east) and possible White Tank tunnel
Sun Valley Pkwy, I-10 to Jackrabbit Trail	Existing parkway, development corridor, named by MCDOT as highest priority
Turner Pkwy, I-10 to Sun Valley Pkwy	Sensitive corridor requiring advance R/W preservation; intense stakeholder interest; first opportunity west of White Tanks
Jackrabbit Trail, I-10 to Bell Rd	Current MCDOT corridor study, first opportunity east of White Tanks, MAG Road of Regional Significance, City of Surprise parkway north of Peoria Ave
Dove Valley Rd	City of Surprise parkway*
Jomax Rd (east of US-60)	City of Surprise parkway*
Deer Valley Rd	City of Surprise parkway*
243rd Ave	City of Surprise parkway*
211th Ave north of US-60	City of Surprise parkway*
187th Ave north of US-60	City of Surprise parkway*
163rd Ave north of US-60	City of Surprise parkway*

*Development timing to be determined by City of Surprise in consultation with neighboring jurisdictions.

Source: MAG Project Team, July 2007

All parkways belonging to neither the high-priority nor the low-priority category would have a medium priority for implementation, including::

- Hidden Waters Parkway
- Sun Valley Parkway south of I-10
- Turner Parkway, Sun Valley Parkway to US-60
- Sonoran Parkway (to be revisited in Hidden Valley study)
- Cotton Lane (to be revisited in Hidden Valley study)
- Jackrabbit Trail, I-10 to Hassayampa Freeway (to be revisited in Hidden Valley study)
- Jackrabbit Trail, Bell Road to US-60
- 211th Ave, Sun Valley Parkway to US-60
- Wild Rose Parkway
- Bell Parkway east of Hassayampa Freeway
- Wintersburg/Cactus Parkway, Hassayampa Freeway to Turner Parkway
- Camelback Road, Hassayampa Freeway to SunValley Pkwy
- McDowell Road, Hassayampa Freeway To Jackrabbit Trail
- Yuma Parkway, Hassayampa Freeway to Sun Valley Pkwy/I-10
- Southern Avenue

Summary

Table 7.4 summarizes this section by providing one possible scenario of chronological milestones for implementation of the Hassayampa Valley high-capacity roadway system, consisting of freeways (or their equivalent) and parkways. Near-term activities, during the years 2008 to 2015, would consist mostly of right-of-way preservation, corridor studies and preliminary alignment studies. Construction (preceded by design) of most facilities would occur later. Given the expected pace of development to Buildout and the likely funding

limitations, completion of the network would occur well after 2040, and perhaps not until the second half of the 21st century.

Table 7.4 Chronological Scenario of Possible Freeway and Parkway Development Milestones

Dates	Potential Activities
2008-2010 (freeways)	*-Preserve R/W for SR-801, SR-303L to SR-85* *-Widen SR-85 to interim four-lane divided highway* -Preliminary alignment studies for SR-303L, SR-801 to Hassayampa Fwy -Preliminary alignment studies for Hassayampa Fwy, I-10 to White Tank Fwy -Preliminary alignment studies for White Tank Fwy, Hassayampa Fwy to US-60/SR-303L -Preliminary alignment studies for SR-801, SR-85 to Hassayampa Fwy
2008-2010 (parkways)	-Complete preliminary alignment studies and R/W preservation for Sun Valley Pkwy -Complete preliminary alignment studies and R/W preservation for Jackrabbit Pkwy, I-10 to Bell Rd -Complete preliminary alignment studies and R/W preservation for Northern Ave Pkwy east of Jackrabbit -Complete corridor studies and begin R/W preservation for Turner Pkwy
2008-2015 (freeways)	*-Preserve R/W along SR-74* *-Construct SR-303L freeway, US-60 to I-10* -Preserve R/W for SR-303L, SR-801 to Hassayampa Fwy
2011-2015 (freeways)	-Preliminary alignment studies for Hassayampa Fwy, White Tank Fwy to SR-74 Extension -Preliminary alignment studies for Hassayampa Fwy, I-10 to SR-85 -Preserve R/W for Hassayampa Fwy, I-10 to White Tank Fwy -Preserve R/W for White Tank Fwy, Hassayampa Fwy to US-60/SR-303L *-Construct TI at I-10/Perryville Rd*
2011-2015 (parkways)	-Preserve R/W for parkway portion of Grand Ave (US-60) in study area -Preliminary alignment studies and R/W preservation for Northern Pkwy west of White –Tanks to Hassayampa Fwy alignment -Complete initial feasibility, cost and environmental studies of potential Northern Pkwy connector via White Tank tunnel
2011-2020 (freeways)	-Preliminary alignment studies for SR-74 Extension, US-60 to Hassayampa Fwy -Preserve R/W for SR-801, SR-85 to Hassayampa Fwy *-Construct SR-303L freeway, I-10 to SR-801*
2011-2020 (parkways)	-Corridor studies, R/W preservation and possible interim facility construction for City of Surprise parkways -Begin alignment studies and R/W preservation for selected medium-priority parkways
2016-2020 (freeways)	-Construct I-10 improvements, SR-303L to SR-85 -Preserve R/W for Hassayampa Fwy, White Tank Fwy to SR-74 Extension -Preserve R/W for Hassayampa Fwy, I-10 to SR-85
2016-2025 (freeways)	-Construct SR-303L, SR-801 to Hassayampa Fwy -Possibly construct interim Hassayampa Fwy facility, I-10 to White Tank Fwy -Possibly construct interim White Tank Fwy facility, Hassayampa Fwy to US-60/SR-303L
2016-2025 (parkways)	-Begin constructing high-priority parkways to interim or ultimate configuration, depending on development trends and demonstrated demand
2021-2026 (freeways)	*-Construct two-lane interim facility on SR-801 alignment, SR-303L to SR-85*
2021-2030 (freeways)	-Construct I-10 improvements, SR-85 to Hassayampa Fwy -Preserve R/W for SR-74 Extension, US-60 to Hassayampa Fwy -Possibly construct interim Hassayampa Fwy facility, White Tank Fwy to SR-74 Extension -Improve SR-74 to full freeway -Improve SR-85 to full freeway

Table 7.4 Continued

Dates	Potential Activities
2026-2035 (freeways)	-Complete SR-801, SR-303L to SR-85 -Complete Hassayampa Fwy, I-10 to White Tank Fwy -Complete White Tank Fwy, Hassayampa Fwy to US-60/SR-303L
2026-2035 (parkways)	-Begin constructing medium-priority parkways to interim or ultimate configuration, depending on development trends and demonstrated demand
Post 2030 (freeways)	-Construct I-10 improvements, Hassayampa Fwy to 459th Ave
2031-2040 (freeways)	-Possibly construct interim SR-74 Extension, US-60 to Hassayampa Fwy
2031-2050 (freeways)	-Complete Hassayampa Fwy, White Tank Fwy to SR-74 Extension -Complete Hassayampa Fwy, I-10 to SR-801
2031-2050 or later (freeways)	-Complete Hassayampa Fwy, SR-801 to SR-85
Post 2035 (parkways)	-Complete all high- and medium-priority parkways, and begin work on low-priority parkways as demand dictates
Post 2040 (freeways)	-Complete SR-74 Extension, US-60 to Hassayampa Fwy -Construct SR-801, SR-85 to Hassayampa Fwy

Listings in *italics* are entirely or partially RTP projects.
The word "freeway" in this table, and throughout this chapter, is not intended to rule out the future use of tolls on fully access-controlled facilities.

Source: MAG Project Team, July 2007

7.3 Potential Responsibilities for Implementation

This section briefly describes potential responsibilities for implementation of the conceptual roadway framework in the Hassayampa Valley. Implementation includes right-of-way preservation for future alignments, construction, and operations and maintenance of the completed facilities. Because transportation funding is a complex topic and a prerequisite for implementation, Chapter 8 addresses this topic in detail..

Freeways

Construction, operations and maintenance of both urban and rural freeways in Arizona has traditionally been the responsibility of ADOT, although the funding may come from local sources like the half-cent sales tax in Maricopa County that funds the MAG RTP. Since freeways are facilities for uninterrupted travel that typically cross multiple jurisdictional boundaries, the obvious candidate for construction, operation and maintenance of Hassayampa Valley freeways would be either ADOT or some form of a regional transportation authority. Future controlled-access highways, whether "free" or tolled, could also be constructed and operated under some type of public-private partnership involving either ADOT or a new regional authority. Preservation of right-of-way in future freeway corridor will require a cooperative effort among all of the jurisdictions that the freeway would traverse, including cities, towns and Maricopa County.

Parkways

The parkway, as envisioned in this study and described in Chapter 6, is a new type of facility for Arizona. Hence there is no local precedent for implementation, and any of a variety of agencies could assume responsibility for part or all the process. These include Maricopa County, the Hassayampa Valley municipalities, and a possible regional authority. If ADOT remains responsible for constructing and maintaining freeways throughout Maricopa County, a new regional parkway authority could be established by the state legislature. Major ADOT involvement in parkway implementation appears unlikely without legislative expansion of that agency's mission, accompanied by additional funding.

Cities and towns will play an important role in working to preserve right-of-way for future parkways within their corporate boundaries, and the may also operate and maintain parkways if adequate funding is available. It is desirable, however, to charge a single agency with planning, designing and constructing the parkways as a uniform system with consistent design standards—in a manner analogous to ADOT's responsibility for the regional freeway system. This centralized authority could be vested in an existing agency such as MCDOT, or in a new regional highway (or parkway) authority. *It is important to emphasize that none of this is feasible without an adequate and reliable source of funding that can be tapped by the appropriate agency or agencies.*

Arterials

With the rapid expansion of development into outlying portions of the Phoenix metropolitan area, private developers are increasingly asked to pay for new arterials. This pattern will most likely intensify in the Hassayampa Valley, where much of the development will take the form of master-planned communities with their own street networks that will need to connect seamlessly with external arterials. The private financial contributions may be in kind (e.g., dedication of right-of-way) as well as in cash. Actual construction, operation and maintenance of arterials is typically the responsibility of MCDOT (in unincorporated areas) or the appropriate municipality—with or without financial infusions from developers. In some cases, developers have constructed roadways to county or municipal standards in order to provide access to their communities, and then turned them over to the city or county for operation and maintenance.

As the demand for new roadways in the Hassayampa Valley continues to grow, MCDOT will be increasingly hard-pressed to construct new roadways in unincorporated areas that will eventually be annexed by cities or towns. In effect, MCDOT is expected to pay for roads that will primarily benefit the residents of incorporated communities in the future. This concern is not new or unique to the Hassayampa Valley, but it will become more critical as the gap between needs and resources widens.

Hassayampa River Bridges

As the Hassayampa Valley develops and ultimately builds out, numerous new bridges over the Hassayampa River will be required, either to replace low-water crossings or at locations where no crossing at all exists today. As stated in Chapter 4, the study area now has only two bridged crossings of the Hassayampa. Much of the river corridor is currently unincorporated territory, but the adjoining land on either side lies within Buckeye or Surprise, or at least belongs to the Buckeye or Surprise MPA. In view of its limited resources and the fact that future Hassayampa River bridges will meet the needs of these municipalities, MCDOT's policy is not to assume responsibility for providing new river crossings in this area, regardless of past projects in other parts of Maricopa County.

Summary

Table 7.5 summarizes the types of entities (both public and private) and levels of government that might take responsibility for implementation of the recommended roadway framework illustrated in Figure 7-1. The table is not intended to be exhaustive, but only to list some of the more obvious candidates. Implementation responsibilities may vary by time, place and phase; e.g., three different entities could be responsible for parkway right-of-way preservation, construction, and operations and maintenance of the completed facilities.

No regional transportation agency with the authority and funding to do any of the things listed in Table 7.5 currently exists in Maricopa County. Only the state legislature could establish such an agency and specify its powers. For example, a regional authority might or might not have the power of eminent domain or the ability to levy taxes and fees. A future transportation authority for Maricopa County (or a portion thereof) might be a completely new agency, or its functions might be grafted onto an existing agency such as MAG or MCDOT. Whether or not a regional authority would be the best mechanism to develop a long-range, subregional transportation system lies beyond the scope of this study.

Table 7.5 Potential Roadway Responsibilities by Functional Class

Classification	Potentially Responsible Source, Agency or Other Agency		
	Funding (Sources)	Implementation	
		Right-of-Way Preservation	Construction, Operations & Maintenance
Freeways	-Statewide -Countywide	-Maricopa County -Cities/Towns -Regional Transp. Authority	-ADOT -Regional Transp. Authority
Parkways	-Countywide -Cities/Towns -Landowners & Developers*	-Maricopa County -Cities/Towns -Regional Transp. Authority	-Regional Transp. Authority -Maricopa County -Cities/Towns**
Arterials	-Cities/Towns -Landowners & Developers*	-Maricopa County -Cities/Towns	-Maricopa County -Cities/Towns

*Includes land and other in-kind contributions
**Operations and maintenance

Source: MAG Project Team, July 2007

7.4 Preliminary Transit System Concept

While this study focused on developing a long-range conceptual roadway framework for the Hassayampa Valley, public transportation is expected to play a vital role in the study area, as it will throughout urbanized Maricopa County. As the analysis in Chapter 5 demonstrated, the roadway system alone will be unable to meet all of the forecast travel demand at Buildout, even if the entire proposed network of freeways and parkways is constructed. More generally, both high-capacity and local transit are already playing an ever-greater role in moving people throughout metropolitan Phoenix. A large percentage of the revenue raised through the Proposition 400 sales tax is earmarked for local bus, bus rapid transit (BRT) and light rail transit, albeit not within the Hassayampa Valley study area. The cities of Glendale, Phoenix and Tempe have dedicated sales taxes funding a mix of transit services.

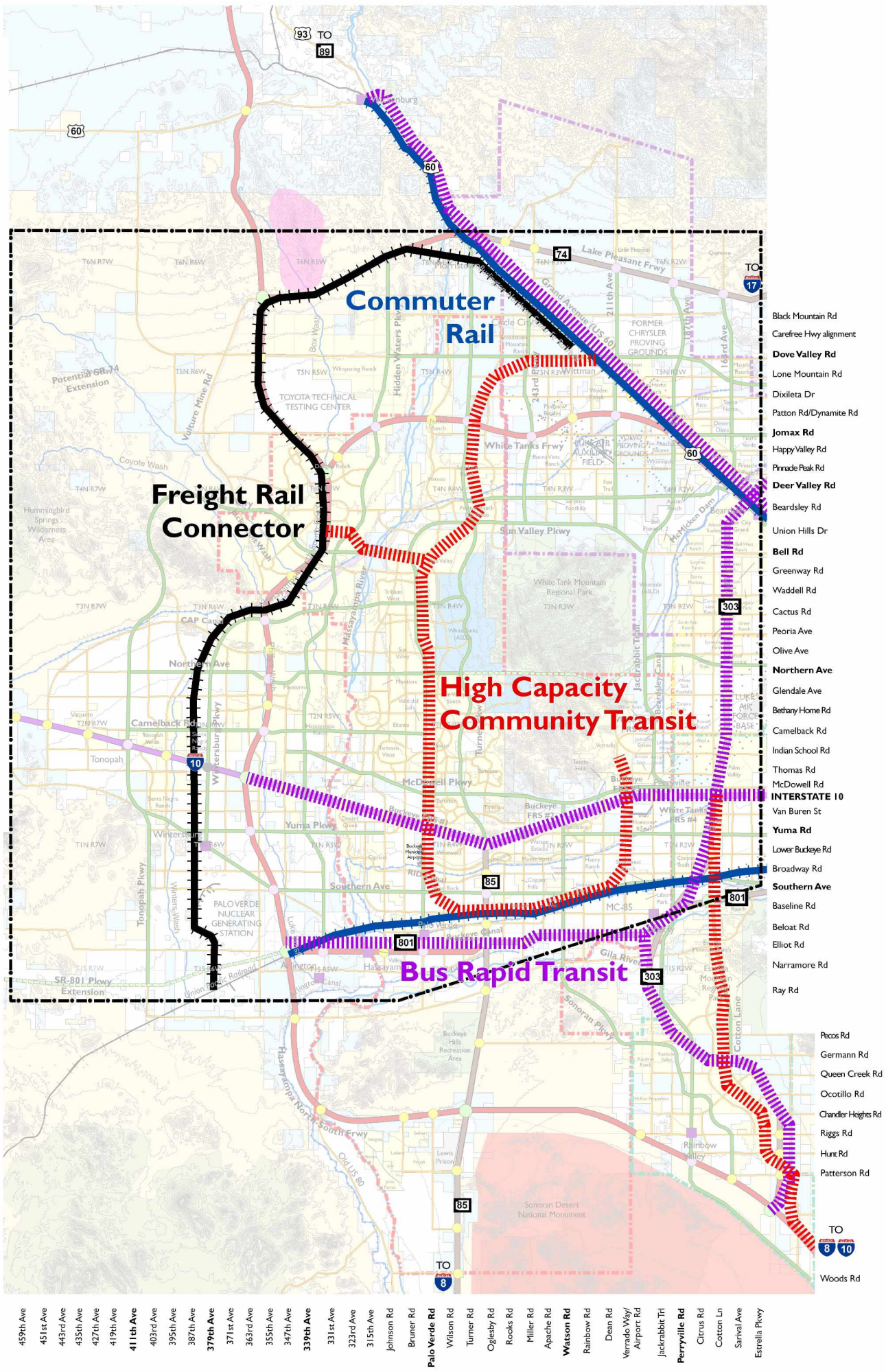
It is anticipated that the Hassayampa Valley at Buildout will have a level of transit service similar to that planned in the current RTP for the existing urbanized area of the county. Figure 7-2 illustrates one possible scenario for future high-capacity transit corridors in the study area. Several potential routes are shown along several existing and planned freeway corridors. These routes are envisioned as BRT services operating on freeway HOV lanes, although they might utilize rail technologies in some corridors. The primary purpose of these routes would be efficient connection of the Hassayampa Valley with the central portion of the region.

Several other possible high-capacity corridors are also shown, most notably a route from US-60 to I-10 west of the White Tank Mountains, largely following the general alignment of the Sun Valley Parkway and Turner Parkway. These services would be designed to enhance mobility within the study area. A variety of modes might be considered, including arterial BRT, limited-stop bus, modern streetcar, or full-fledged light rail.

Any high-capacity transit serving the Hassayampa Valley would supplement a background network of local bus routes, generally following the arterial streets and parkways, and making relatively frequent stops. It is anticipated that service frequencies and hours of operation at Buildout would match those in the older urbanized areas of Maricopa County. Door-to-door demand responsive service would be provided for residents who qualify under the Americans with Disabilities Act.

Finally, Figure 7-2 shows a possible heavy rail (freight and possibly passenger) line connecting the BNSF near Morristown with the UPRR near the Palo Verde Nuclear Generating Station. This would directly link new classification and intermodal yards proposed by the two railroads. Such a route would enable the BNSF and UPRR to interchange freight while bypassing the congested central Phoenix area. In addition, MAG is currently studying the feasibility of commuter rail service throughout Maricopa County and part of Pinal County. Figure 7-2 depicts potential commuter rail service in the existing BNSF corridor adjoining US-60, and along the UPRR line several miles south of and roughly parallel to I-10.

Figure 7-2 Long-Range High Capacity Transit and Rail Scenario



Chapter 8

Roadway Funding and Revenue Sources

September 2007

Prepared for

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8.1 Existing Roadway Revenue Sources

8.1.1 Introduction

Section 8.1 is a primer on transportation revenue sources available to the jurisdictions within the Interstate 10-Hassayampa Valley Framework Study area. Transportation planning and capital improvement programming is a complex blend of technical analysis and public policy. It is important to consider current and future revenues because infrastructure planning requires insight into how much money will be available for different types of projects, and when. While this document focuses on roadway system funding, some of the revenue sources may be used for public transit and other modes.

Revenues come from direct user fees and gasoline taxes, and from indirect taxes and fees, all of which are paid by the motoring public, commercial interests, property owners and taxpayers. Most transportation taxes and fees are public revenues, but private sources and public/private partnerships are becoming more popular across the country. The discussion of available revenue sources is not exhaustive; some minor and infrequent sources are not presented.

Existing public revenues are provided by federal, state, and local taxes and user fees. Most federal and state revenues are apportioned by formula among local jurisdictions. Revenues generated by local agencies typically are used exclusively within their jurisdictional limits. All public revenue sources have some use restrictions. For example, state gasoline taxes can be used only for streets and highways, while impact fees cannot be used for road maintenance. In Arizona, general fund revenues are rarely used for roadways because other municipal services (such as fire and police) are perceived as more important or lack other funding options. Private funding (in cash or in kind) includes developer exactions, right-of-way dedications, privatized projects such as toll roads, fees in-lieu of construction, and private sector construction of public roadways.

Section 8.1 includes a portion that describes existing transportation revenues used by the jurisdictions and transportation agencies involved in the I-10/Hassayampa Valley study. These entities include the Maricopa Association of Governments (MAG), the Arizona Department of Transportation (ADOT), Maricopa County, Town of Buckeye, and the cities of Glendale, Goodyear, and Surprise. Unlike the other entities, MAG is not a local government or jurisdiction, but a (quasi-governmental) metropolitan planning organization charged by law with certain transportation planning responsibilities throughout Maricopa County. In some cases it also acts as a conduit for funding. The Maricopa County Department of Transportation (MCDOT) is responsible for constructing, operating and maintaining roads in unincorporated areas of the county.

Only significant, recurrent or annually available sources, such as the Highway User Revenue Fund (HURF) and impact fee revenue have been addressed. Hassayampa Valley jurisdictions do receive non-recurrent transportation revenues, such as developer exactions or contributions and non-formula-based federal or state grants. Because these revenues are not consistently available from year to year, they contribute only marginally to transportation project funding. Accordingly, they are not included in this review.

Each entity controls or uses different mixes of transportation revenue. For example, ADOT and MAG have primary responsibility for federal revenues and for Regional Area Road Fund (RARF) freeway projects. Maricopa County is heavily dependent upon its annual HURF allocation, derived mainly from gasoline tax and vehicle license tax (VLT) collections. Cities and towns use a number of sources, including HURF, development impact fees, local transportation sales taxes and construction taxes.

The revenue sources currently used will not suffice to meet all of the roadway system demands forecast for the study area. A short discussion is included that addresses other revenue sources currently authorized by state statute, but not being used by any jurisdictions in the area. This list of "other" available and authorized sources is small, however. For example, Maricopa County is empowered to levy development impact fees for transportation and a countywide property tax for roadways, but does not.

This discussion emphasizes revenues only, not financial mechanisms (borrowing) that commit and spend future revenue for today's projects. For example, HURF allocations can be used, with voter approval, to finance revenue bonds; Glendale already does this. Secondary property taxes, however, are a specific revenue source, used for debt service on voter-authorized general obligation bonds (as in Glendale and Goodyear); therefore, these bonds are included in the discussion.

Unless otherwise noted, all revenues are in year 2007 dollars.

8.1.2 Roadway Revenue Overview

This section provides a brief overview of revenue sources for roadways, how they are paid, who pays them, who collects them, and how they are used. Section 8.1.2.1 provides brief descriptions of the most generally used revenue sources. Many of these sources, but not all, are currently used in Arizona. Section 8.1.2.2 provides additional detail on federal and state highway revenues and Arizona's HURF allocations because they are the most complicated sources with regard to origin and distribution.

8.1.2.1 Basic Sources of Roadway System Revenue

There are many sources and types of roadway system revenue, each with a unique set of advantages and limitations. No single source meets all of the needs, so jurisdictions must rely on multiple revenue streams. Most major sources are public revenues levied and collected by federal, state and local governments. Public-private partnerships, and direct private ownership, operation and maintenance of roadway facilities do occur and could become more prominent in the future, however.

Some existing and potential roadway revenues are direct user taxes and fees, such as the tax on gasoline purchases, the vehicle license tax, and tolls. These taxes and fees are assessed on the users of roadway systems, to offset the demands that users make for new capital investments and for operations and maintenance of existing systems. The user fees and fuel taxes for a mid-size car amount to about 2¢ per mile of the 57¢-per-mile cost to own and operate the vehicle.

Other revenues are indirect taxes and fees, levied by governments that allocate the generated revenues to transportation purposes. Property taxes and sales taxes are the primary sources of indirect revenue. They are considered indirect because they are imposed on the taxpaying public at large, rather than being targeted to roadway system users.

Table 8.1 presents a simplified profile of revenue sources, distinguishing between direct user taxes and fees on the one hand, and indirect taxes and fees on the other.

Sale of Motor Vehicle Fuel

These taxes, the primary component of direct user taxes and fees, are typically levied as cents-per-gallon. Some states impose a sales tax on fuel sales instead of, or in addition to, the cents-per-gallon tax. The federal government and the state of Arizona collect taxes on the sales of gasoline at the rate of 18.3¢ per gallon[1] and 18¢ per gallon, respectively. The federal government and Arizona collect taxes on diesel fuels and the federal government collects taxes on the sales of alternative fuels, but at lower rates. Motor fuel taxes are paid by the general motoring public (passenger cars) and owners of commercial vehicles. A few states index the tax rate to inflation, but Arizona does not. Arizona's tax rate has not increased since 1991. If adjusted for inflation since the last increase, the rate would be 27¢ today. Rates in other states range from a low of 8¢ in Alaska to a high of 32.9¢ in Wisconsin. Revenues from fuel sales are relatively predictable and reliable because there is little change in the volume of sales despite price fluctuations (i.e., consumer demand for gasoline is inelastic with respect to price.) At current fuel prices, a typical motorist driving 15,000 miles per year pays about $108 in Arizona gasoline tax and $110 in federal gasoline tax.

Vehicle License Tax (VLT)

A second significant source of direct user taxes and fees, the VLT is imposed by the state of Arizona and collected annually. It is a personal property tax on motor vehicles, based on statutorily defined formulas rather than direct market values. These fees are paid by all vehicle owners, at the time of initial licensing and annual license renewal. In Arizona, the amount decreases as the vehicle depreciates. The VLT is based on an assessed value of 60% of the manufacturer's base retail price (MSRP). For new vehicles, the tax is calculated at $2.80 per $100 of the assessed value. For used vehicles, the tax is calculated at $2.89 per $100 of the assessed value. Each year the assessed value is reduced by 16.25% since the first year the vehicle was registered in Arizona. The VLT on a typical $25,000 new car is about $420 and drops 16.25% per year. As discussed later, only a portion of the VLT (roughly half) is dedicated to transportation purposes.

Table 8.1 Roadway Revenue Overview Chart

REVENUE SOURCES	HOW PAID	WHO COLLECTS	WHO PAYS
Direct User Taxes and Fees			
Fuel Sales			
Gasoline Sales	Typically charged as cents-per-gallon and charged at the pump	Federal/state	Passenger/commercial vehicles
Diesel Fuel Sales	Typically charged as cents-per-gallon and charged at the pump	Federal/state	Commercial vehicles
Alternate Fuels	Typically charged as cents-per-gallon and charged at the pump	Federal	Alternate fuel users
Vehicle License/Registration Fees			
Vehicle License Tax	Property tax based upon the value of the vehicle ("ad valorem"), assessed annually	State	All vehicle owners
Vehicle Registration/Title Fees	Fees paid at the time of the initial vehicle registration and with annual renewal of registration	State	All vehicle owners
Vehicle Weight Taxes and Fees			
Truck and Trailer Sales	Sales taxes on trucks and trailers above specified weight	Federal	Commercial vehicles
Tire Sales	Cents per each 10 pounds over rated loads in excess of 3,5000 pounds	Federal	Commercial vehicles
Heavy-Vehicle Use	Annual taxes on trucks over a specified gross vehicle weight	Federal/state	Commercial vehicles
Toll Roads and Bridges	Tolls paid for use of roadways and bridges	State or interstate agencies/private entities	All vehicles using roadway not otherwise exempt
Other Miscellaneous Fees	Various fees charged for operators licenses, specialized license plates, requests for special services, licenses and permits	State/local	
Indirect Taxes and Fees			
Property Taxes/Assessments			
Primary Property Taxes	Taxes on assessed property valuations, collected annually, with some general fund revenues allocated to transportation	Local	Property owners
Secondary Property Taxes	Taxes on assessed property valuations, collected annually, for debt service on general obligation bond debt allocated to transportation capital improvements	Local	Property owners
Improvement & Community Facilities Districts	Assessments and/or property taxes against properties in specified geographic areas to pay for improvements benefiting the area	Local	All property owners in district
Development Impact Fees	One-time fees against new residential and non-residential property development, to offset the costs of transportation demand generated by the new development	Local	All new development
Private Contributions	Exactions/conditions of rezoning/dedications (of right-of-way), construction and other "in lieu" payments	Local	Private developers

Table 8.1 Continued

REVENUE SOURCES	HOW PAID	WHO COLLECTS	WHO PAYS
Sales Taxes			
General Sales Taxes	Taxes levied on sales of taxable items, with all or a portion of proceeds dedicated to transportation purposes	Local	All purchasers of taxable goods and services
Transportation Sales Taxes	Taxes levied on sales of taxable items, with all proceeds dedicated to transportation purposes	Local	All purchasers of taxable goods and services
Construction Sales Taxes	A tax levied on all construction activity, in addition to general sales taxes, with all or a portion of the proceeds dedicated to transportation purposes	Local	All purchasers of taxable goods and services

Source: Curtis Lueck & Associates, 2007

Vehicle Registration/Title Fees

Vehicle registration fees and certificate of title fees typically are minor charges. Both fees are collected at the time of the initial registration of the vehicle. Certificate of title is a one-time charge, while registration fees are collected annually, with the renewal of registration. They are collected by the state and are paid by all vehicle owners.

Vehicle Weight Charges

The federal government and states, including Arizona, also assess fees based upon vehicle weight. These charges are typically levied against large trucks and trailers, to recoup some of the extra wear and tear that heavy vehicles impose upon roadways. The federal government assesses sales taxes on trucks and trailers above a specified weight, and on large tires with rated loads in excess of 3,500 pounds. Both the federal government and states impose charges against "heavy-vehicle use" as well. For designated vehicles, Arizona imposes a commercial registration fee and a "gross weight fee" that increases with the vehicle weight.[2] These charges are paid by owners/operators of large commercial vehicles.

Toll Roads

Toll roads in this country are operated by statewide or interstate toll road agencies, or by private entities. Tolls are usually based upon mileage traveled and are paid by all users of the road. Toll charges typically range from 5 cents to 15 cents per mile for passenger cars and twice that for commercial vehicles, and can vary by time of day and congestion level.[3] Interest has grown in either selling existing public toll road systems to private investors, or having private investors build, own and operate new toll road facilities. Arizona considered toll roads in the 1990s for the Phoenix metropolitan area, but the initiative was short-lived and none were constructed. Most toll roads have fully controlled access. In recent decades, vehicle transponder technology and automatic billing have enabled many users to bypass the traditional toll plazas.

Real Property Taxes

Direct user taxes and fees do not generate enough revenue to meet all capital, operation, and maintenance costs of the roadway system. Many local governments seek to enhance these revenues by levying indirect taxes and fees on the two principal sources of local revenue – real property and retail sales. Taxes or fees on property are of four varieties.

Primary Property Taxes

Primary property taxes are collected by local governments, based on assessed valuations ("ad valorem"), and collected annually. Primary property taxes are deposited in the local government's general fund, and some governments allocate a portion of this revenue to transportation.

Secondary Property Taxes

Secondary property taxes are also "ad valorem" taxes, but they are levied to pay debt service on general obligation bonds approved by voters. General obligation bond debt has been used to fund transportation capital investments.

Improvement Districts or Community Facilities Districts

Many local governments form improvement districts or community facilities districts, which are special taxing districts developed to fund infrastructure capital improvements and operations, including transportation. These districts can be formed to fund capital improvements, operations and maintenance, or both. The districts are funded through assessments placed on all benefiting properties within the district. The Arizona enabling legislation is slightly different for counties than for municipalities.

Development Impact Fees, Exactions, and "In-Lieu" Fees

Development impact fees have become a common source of revenue for local governments, notably for capital improvements to roadway systems. Impact fees are charged against new development, usually both residential

and non-residential, to offset the costs of new capacity demands generated by the development. These fees are paid by developers at the time of building permit issuance, and are typically passed along to the owners and tenants. The fees cannot be used to mitigate pre-existing deficiencies or for non-capital expenditures. In Arizona, jurisdictions that impose impact fees must prepare annual reports that simplify tracking these revenues. Impact fees for roads range from a few hundred dollars to $10,000 per new house. The fees for non-residential uses also vary widely. Impact fees must be demonstrably proportionate to the actual cost of accommodating travel demand due to the development.

Property development may also generate transportation revenues in the form of private contributions, such as exactions and other conditions of rezoning, developer contributions (typically of right-of-way for public improvements), and direct developer construction of improvements or payments "in lieu" of construction.

Local Sales Taxes

Sales taxes are a second major source of local transportation revenue. They are paid by all purchasers of taxable goods and (in some states) services, unless exempt from payment. Local sales taxes in Arizona are levied in addition to the state rate of 5.6%, of which 0.6% is earmarked for public education and 5% goes to the state's general fund.

Local General Sales Taxes (Cities and Towns)

Local general sales taxes are levied against all taxable sales, typically as a percent of the purchase price, and are deposited in the general fund. Some local governments allocate a portion of their general fund revenues to transportation purposes. The total local sales tax rate is not prescribed by state law, but may be limited by municipal charter. Most cities charge a 1.5% to 2.0% sales tax. In communities with balanced land uses, sales taxes are large and reliable revenue producers, typically generating at least $150 per capita per year for each percent of the tax rate.[4] Counties cannot charge a general sales tax.

Transportation Sales Taxes

Some local governments levy transportation sales taxes on all taxable sales, with all of the proceeds dedicated to transportation. These revenues are typically deposited in special accounts and tracked separately from other government accounts. In Arizona, governments have used both regional transportation sales taxes, levied countywide, and local transportation sales taxes, levied by individual jurisdictions. In many cases, voters are asked to approve a sales tax for specific projects.

Construction Sales Taxes

In addition to general sales tax, some municipalities levy incremental sales taxes on certain construction-related activities.[5] These revenues, which are statutorily based on 65% of the sales or contract price, are then earmarked for transportation purposes. The tax is collected on new homes and other activities that involve a construction contract, such as installing a swimming pool, re-roofing, or on recurring structural maintenance. Activities subject to the tax are defined by local policy or adopted ordinance. A 2% construction sales tax on a typical $300,000 new home generates about $3900 in revenue.[6]

8.1.2.2 Some Basics on Federal and State Highway Revenues

This section provides basic information on federal and state of Arizona transportation revenues. Both federal and state revenues are somewhat complex in their sources and allocation procedures.

Federal Transportation Revenue

Federal transportation revenues and spending are governed by authorization bills approved by Congress. The current authorizing legislation is "The *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA–LU), signed into law by President Bush on August 10, 2005. Federal transportation revenue is collected from motor fuel taxes and vehicle weight-related taxes, as shown in Table 8.2. Federal funding is deposited into either the Highway Account or the Mass Transit Account of the Highway Trust Fund.[7]

The federal government collects taxes on gasoline, diesel fuel, and five forms of alternative fuels. With the exception of compressed natural gas, these taxes are imposed on a cents-per-gallon basis, with the rate for gasoline being $0.183/gallon and for diesel $0.243/gallon. These tax rates have been in effect since the early 1990s. Gasohol is taxed at $0.183/gallon, but the tax rates on other alternative fuels are lower.

The federal government also collects taxes on the sale of tires used for vehicles with a gross vehicle weight in excess of 3,500 pounds; on the sale of trucks and trailers in excess of 55,000 pounds and 26,000 pounds respectively; and (annually) on trucks over 55,000 pounds.

Table 8.2 Federal Highway User Taxes and Allocations

Motor Fuel Taxes		Distribution of Tax	
Type of Tax	Tax Rates (cents/gallon)	Highway Account	Mass Transit Account
Gasoline	18.3	84%	16%
Diesel	24.3	88%	12%
Gasohol	18.3	84%	16%
Liquefied petroleum gas	13.6	84%	16%
Liquefied natural gas	11.9	84%	16%
M85 (from natural gas)	9.15	84%	16%
Compressed natural gas	48.54/1,000 cu. ft.	80%	20%
Tires	9.45 cents/10 lbs	100%	0%
Truck and trailer sales	12% of sale price	100%	0%
Heavy-vehicle use	Weight-based max $550	100%	0%

Source: U.S. Government Accountability Office: "Highway Trust Fund: Overview of Highway Trust Fund Estimates," Table 1, Page 4, April 4, 2006

Depending on the type of fuel, 80% to 88% of the motor fuel tax revenues are deposited into the Highway Account. All of the truck-related taxes are deposited into this account. Revenues in the Highway Account are allocated among a number of programs, as shown in Table 8.3. Four programs account for 55% of federal highway authorizations: Interstate Maintenance, National Highway System, Bridge, and Surface Transportation. These four plus the Equity Bonus program account for 76% of the authorizations.[8] The following section will discuss the federal highway funding allocation to Arizona and Maricopa County.

Table 8.3 Federal Highway Account Program Categories

Authorization Category (Programs)	5-Year Authorizations	% of Total
Interstate Maintenance	$25,201,595,000	12.6%
National Highway System	$30,541,833,000	15.3%
Bridge	$21,607,442,000	10.8%
Surface Transportation Program	$32,549,757,000	16.3%
Equity Bonus	$40,895,552,000	20.5%
High Priority Projects	$14,832,000,000	7.4%
Congestion Mitigation/Air Quality Improvement	$8,609,100,000	4.3%
Highway Safety Improvement	$5,063,923,000	2.5%
Coordinated Border Infrastructure	$833,000,000	0.4%
Safe Routes to School	$612,000,000	0.3%
Other Programs	$18,744,276,000	9.4%
Total	$199,490,478,000	99.8%

(Percents do not add precisely to 100% due to rounding.)
Source: U.S. Federal Highway Administration, "Highway Authorizations: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (P.l. 109-59," April 6, 2006.)

State-shared Revenues

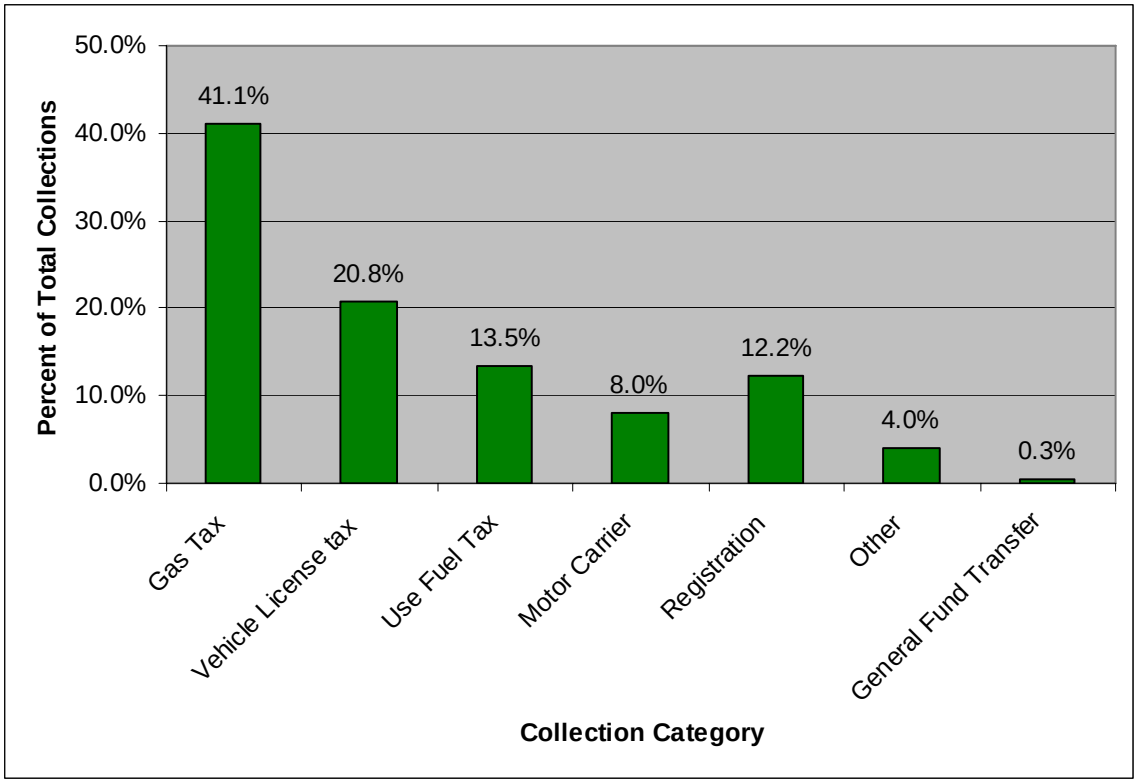
The state of Arizona shares transportation revenues with counties and cities/towns through allocations from HURF, and through a small allocation of VLT revenues to counties for transportation. The percentages of each allocation are fixed by statute.

HURF Revenues (other than VLT)

Arizona collects an array of user-related taxes and fees, which are then deposited in the HURF account. (See Attachment 1 for a chart that ADOT uses to report collections.[9]) HURF is the predominant source of transportation funds for ADOT, municipalities, and counties. In fiscal year (FY) 2006, HURF generated about $27 per capita for MCDOT and $83 per capita for municipalities in Maricopa County.[10]

The major transportation revenue sources collected by the state are gasoline taxes, use fuel (diesel fuel) taxes, vehicle license taxes, registration fees, and several other fees. Figure 8-1 shows that, between FY 1988 and 2005, gasoline taxes were the single largest source of HURF revenues at approximately 41% ($7.1 billion[11]). The next largest source of revenue is the transportation-dedicated portion of the Vehicle License Tax, which accounted for 21% ($3.6 billion) of collections. Use Fuel taxes accounted for 13.5% of collections, followed by vehicle registration fees at 12%. Motor Carrier Fees made up 8% of the total, with various other fees accounting for the remaining 4%.[12] All of these taxes and fees are assessed at a fixed rate (not indexed or responsive to inflation) except the VLT, which reflects the ever-increasing price of new motor vehicles.

Figure 8-1 HURF Revenue Collections, FY 1988 to 2006



Source, Arizona Department of Transportation, Annual Report for Fiscal Years 1998 to 2006

State statutes prescribe how HURF revenues are allocated to the State Highway Fund and to cities/towns and counties (see Table 8.4). Just over one-half of HURF (50.5%) is distributed to the State Highway Fund, but 7.7% of the grand total is sub-allocated to Maricopa and Pima Counties for controlled access highways, leaving a 42.8% allocation (50.5 – 7.7) to ADOT discretionary programs — i.e., state highway projects throughout Arizona. Cities and towns get 27.5% of HURF revenue and counties 19%. These funds are disbursed to

individual jurisdictions based upon population and origin of fuel sales. Phoenix, Tucson and Mesa, the three largest cities, share the last 3% of HURF revenues, allocated according to their populations.

Table 8.4 HURF Revenue Allocation Formulas

Distribution Breakdown	Distribution Formula
50.5% to State Highway Fund	7.67% to Maricopa and Pima Counties for controlled access (5.7525% to Maricopa and 1.9175% to Pima); 42.83% to ADOT discretionary
27.5% to cities and towns	One-half distributed on the basis of incorporated population and one half on the basis of county origin of gasoline sales and city or town population within each county
3% to cities with over 300,000 residents	Distributed to Phoenix, Tucson, and Mesa based on population
19% to counties	Distribution based partially on gasoline distribution and use fuel consumption (72%) and partially on unincorporated population (28%)

Source: Arizona Revised Statutes

Vehicle License Tax Revenues: HURF and Other

Attachment 2 presents the allocation of state VLT for FY 2006. In that year, approximately 45% of VLT collections were deposited into the HURF, which were then allocated as described above. Another 6% of VLT revenue - not part of the HURF - was distributed among the 15 Arizona counties for transportation purposes. (Two small allocations, together totaling $400,000, were also made to the State Highway Fund.) The remaining 49% of VLT revenues went to the general funds of the state, counties, cities and towns.[13]

Local Transportation Assistance Fund

There are two Local Transportation Assistance Fund (LTAF) accounts. The LTAF I Fund is funded from state lottery proceeds up to $23 million per year. The funds are distributed to cities and towns on the basis of population. The funds must be used for public transportation or general transportation purposes depending on the jurisdiction's population.

LTAF II was created by the 1998 legislature to provide additional statewide transit and transportation funding to cities, towns and counties. The LTAF II funding is in the form of the multistate Powerball lottery game and instant bingo game monies, along with a portion of the State Highway Fund's VLT monies. ADOT administers LTAF II and the state treasurer's office distributes the funds to the Regional Public Transportation Authority (RPTA) of Maricopa County, metropolitan planning organizations (MPOs), and cities, towns and counties not represented by an RPTA or MPO.[14]

8.1.3 Current Revenue Sources in the Hassayampa Valley Study Area

Following the previous overview of transportation revenues, this section reviews specific revenue sources that entities with transportation responsibilities in the study area use to construct, maintain and operate their roadway systems. Table 8.5 summarizes the transportation revenue sources available to the relevant jurisdictions and transportation agencies. These sources are:

- Federal revenue
- HURF revenue
- Non-HURF VLT revenue
- Regional Area Road Fund (RARF)
- Roadway impact fees
- Sales tax for transportation (other than RARF)
- Construction sales tax
- Secondary property taxes

Study area jurisdictions and transportation agencies have different mixes of current revenue sources.

Maricopa County DOT

HURF is the primary funding source for MCDOT and non-HURF VLT revenues are a secondary funding source.

Buckeye, Goodyear and Surprise

While each jurisdiction receives HURF revenues, their current receipts are relatively small, ranging in FY 2006 from only $754,000 for Buckeye to approximately $1.6 million and $2.7 million respectively for Goodyear and Surprise. Glendale received $16.9 million, but only a small portion of the city lies within the Hassayampa Valley study area. These jurisdictions all levy development impact fees for transportation, and also generate revenues from exactions and developer contributions. Goodyear and Surprise levy construction sales taxes; Glendale has a local transportation sales tax; Glendale and Goodyear use secondary property taxes to service general obligation bond debt.

ADOT

ADOT receives its revenues from HURF, RARF (through MAG), and several federal programs. It uses this funding primarily to construct, operate and maintain the state highway system, including the regional freeway system in Maricopa County.

MAG

MAG acts as a conduit for certain federal aid and local (Proposition 400/regional transportation sales tax) funding. Ultimate recipients of these funds include both ADOT and local jurisdictions. Federal aid is distributed according to SAFETEA-LU and related legislation.

Following Table 8.5 are brief analyses of the FY 2006 transportation revenues for each jurisdiction and transportation agency.

Table 8.5 Summary of Existing Transportation Revenue Sources

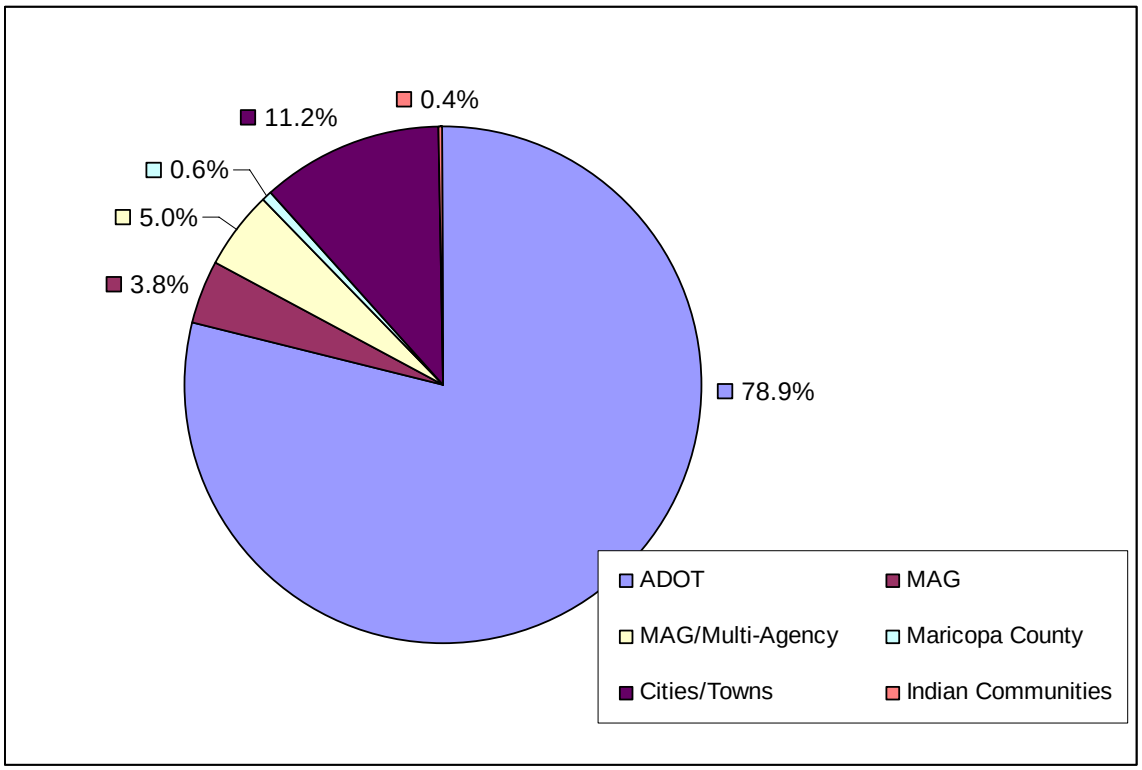
Jurisdiction	Federal Revenues	HURF/VLT	Non-HURF VLT	*RARF*	*Residential Roadway Impact Fees*	*Commercial Roadway Impact Fees*	Sales Tax for Transportation	Construction Sales Tax	Secondary Property Taxes
Maricopa County	No	Primary Source	Secondary Source	No	No	No	Not Authorized	Not Authorized	No
Buckeye	No	Secondary Source	No	No	Yes	Yes	No	No	No
Glendale	No	Primary Source	No	No	Yes	Yes	Yes	No	General Obligation Bonds
Goodyear	No	Secondary Source	No	No	Yes	Yes	No	Yes	General Obligation Bonds
Surprise	No	Secondary Source	No	No	Yes	Yes	No	Yes	No
ADOT	Primary Source	Primary Source	No	Primary Source	Not Authorized	Not Authorized	No	Not Authorized	Not Authorized
MAG	Secondary Source	Not Authorized	No	Secondary Source	Not Authorized	Not Authorized	No	Not Authorized	Not Authorized

Source: Curtis Lueck & Associates, 2007

8.1.3.1 Federal Funding

The primary sources of federal revenue in the region are allocated through the major federal highway funding categories. The MAG Transportation Improvement Program (TIP) reports $1,148 million in federal revenues in the FY 2008–2012 TIP. ADOT is the ultimate recipient of almost 80% of the federal revenue in the MAG TIP (Figure 8-2). ADOT spends these funds on the regional freeway system and other state highways. The municipalities receive approximately 11%. The remainder is divided among MAG, MCDOT and other agencies.

Figure 8-2 Agency Recipients of Federal Revenues



Source: Maricopa Association of Governments, "FY 2008-2012 Transportation Improvement Plan

8.1.3.2 HURF and Non-HURF (VLT) Revenues

State-shared revenues include HURF allocations, a recurrent funding source for all study area jurisdictions, and non-HURF VLT revenues, a secondary source of revenues for MCDOT. These revenues can be distinguished between 1) state-shared revenue (distributed to local governments by statutory formula) and 2) the State Highway Fund.

State-Shared Revenues

As noted previously, the state shares HURF revenue with local governments. Counties receive HURF revenue from the 19% county allocation. Buckeye, Glendale, Goodyear, and Surprise receive state-shared HURF revenue from the 27.5% cities and towns allocation. In addition, MCDOT shares in an allocation of non-HURF VLT revenues allocated to counties for transportation purposes.

Table 8.6 shows receipts of HURF/VLT for study area jurisdictions in FY 2006. Maricopa County DOT received approximately $105 million: $96 million in HURF and $9 million from the (non-HURF) county VLT fund. HURF/VLT accounts for approximately 90% of MCDOT's annual revenues.

Buckeye received only $754,000 in HURF in FY 2006. With the explosive growth expected in the Buckeye MPA, however, its share of HURF revenue is expected to increase markedly over time.

Table 8.6 FY 2006 HURF and VLT Receipts for Hassayampa Valley Jurisdictions

Jurisdiction	FY 2006 HURF Receipts	FY 2006 Non-HURF VLT Receipts	Total FY 2006 HURF/VLT Receipts
MCDOT	$95,865,000	$9,373,000	$105,238,000
Buckeye	$754,000	N/A	$754,000
Glendale	$16,888,000	N/A	$16,888,000
Goodyear	$1,614,000	N/A	$1,614,000
Surprise	$2,714,000	N/A	$2,714,000
Total	$117,835,000	$9,373,000	$127,208,000

Sources: Arizona Department of Transportation, "Highway User Revenue Fund: Fiscal Year 2006 Year End Report" and "Vehicle License Tax Distribution: FY 2006"

State Highway Fund

As described in the previous section, Arizona state statutes allocate 50.5% of HURF revenues to the State Highway Fund. Table 8.7 shows the FY 2006 State Highway Fund revenues available in Maricopa County. For that year, the MAG controlled access allocation was $72,576,000. Available ADOT discretionary revenues were just under $200 million.

Table 8.7 MAG Controlled Access and ADOT Discretionary Revenues

Revenue Source	Revenues
MAG Controlled Access	$72,576,000
ADOT Discretionary (MAG Area)	$199,751,000
Total	**$272,327,000**

Source: Arizona Department of Transportation, "Maricopa County Transportation Excise Tax: Fiscal Year 2006 Year-End Report," August 2006

8.1.3.3 Regional Area Road Fund

In 1985, Maricopa County voters approved a twenty-year, regional one-half cent transportation sales tax, which expired on December 31, 2005. On November 2, 2004, voters extended the tax for an additional twenty years, to expire on December 31, 2025.

This voter-approved measure, known as Proposition 400, provides funding to implement the MAG Regional Transportation Plan (RTP), including both roads and public transit. Revenues from the extended sales tax are distributed as shown in Table 8.8 and Attachment 3. The sales tax will generate an estimated $14.4 billion, with $8.2 billion (56.8%) going to freeways; $1.5 billion (10.4%) to arterial streets; and the remaining $4.7 billion (33.3%) to public transportation – both bus and light rail.

Table 8.8 Distribution of Extended Regional Half-Cent Sales Tax

Fund	Revenues ($ billion)	Percent of Total
Regional Area Road Fund	$9.670	67.2%
Regional Freeway System	*$8.178*	*56.8%*
Arterial Streets	*$1.492*	*10.4%*
Public Transportation Fund	$4.727	32.8%
Total	**$14.397**	**100.0%**

Source: Arizona Department of Transportation: Maricopa County Transportation Excise Tax: Forecasting Process & Results, FY 2006-2026 Italics indicate components of the RARF.

ADOT reports that the sales tax generated $367.6 million in FY 2006, with distributions as reported in Table 8.9. In this first year of the extended sales tax, expenditures on the regional freeway system, as a percentage of expenditures, are higher than established for the full twenty-year program, because freeway system improvements are farther along in the design process than the Arterial Streets and Public Transportation Fund components. These components will show higher expenditures as their projects are developed and brought to construction and operation in future years.

Table 8.9 FY 2006 Distributions of Half-Cent Sales Tax Revenues

Fund	Revenues ($ million)	Percent
Regional Freeway System	$292.5	79.6%
Arterial Streets	$16.1	4.4%
Public Transportation Fund	$51.1	13.9%
Regional Planning (from regional freeway account)	$7.9	2.1%
Total	**$367.6**	**100%**

Source: Arizona Department of Transportation, "Maricopa County Transportation Excise Tax: Fiscal year 2006 Year-End Report

ADOT will have the major responsibility for programming and expending the freeway funds, while local jurisdictions will be responsible for the arterial streets program.

8.1.3.4 Roadway Impact Fees

All of the jurisdictions in the study area, including Maricopa County, have statutory authority to levy development impact fees for transportation and other purposes. The four municipalities have impact fees for transportation, but Maricopa County does not. Buckeye recently began collecting a Streets Impact Fee. Glendale, Goodyear, and Surprise recently amended or proposed amendments to their development impact fee programs.

Buckeye

Buckeye has a comprehensive impact fee program, which includes fees for numerous municipal services. The fees are imposed on residential and non-residential construction. The residential fee is about $7,400 per new home, of which the roadway component is $319 per home. The town's FY 2006 budget estimated impact fee revenue at $957,000. The adopted FY 2007 budget reports a "prior year's carry-forward" of $789,000 and also estimates Street Impact Fees for the year of $708,000 (including $8,000 in interest income). The total estimated impact fee budget expenditures for FY 2007, therefore, are $1,497,000 ($708,000 plus the carryover of $789,000).

Glendale

Glendale imposes impact fees for transportation on both residential and non-residential development. The city council approved fee increases effective in September 2006. The new residential fee per housing unit ranges from $591 (for multi-family housing) to $1,160 (for single-family detached housing). Non-residential fees range from $694 to $4,858 per 1,000 square feet, depending on the type and intensity of use.

Goodyear

At its December 11, 2006 meeting, the Goodyear city council approved sweeping amendments to its transportation impact fee program. The amendments lowered the existing Transportation Development Fee for residential and office development, while raising the fee for retail and industrial development. They also supplemented this fee with the new Regional Transportation Fee and Arterial Street Fee. The Transportation Development Fee and Arterial Streets Fee are uniform across the city, while the Regional Transportation Fee differs between two zones. These amendments take effect on July 1, 2009. Table 8.10 presents the current and amended fee schedules.

Table 8.10 Goodyear Transportation Impact Fee Schedule

	Current Fees (through 6/30/09)		New Fees Effective 7/1/09		
	Transportation Development Fee		Regional Transportation Fee		Arterial Street Fee
Land Use	Current	New 7/1/09	Zonal North	Zonal South	
Single Family Residential (per DU)	$824.00	$566.00	$90.00	$980.00	$239.00
Multifamily Residential (per DU)	$571.00	$372.00	$59.00	$644.00	$157.00
Retail (per square foot)	$1.53	$2.71	$0.43	$4.69	$1.14
Office (per square foot)	$0.90	$0.83	$0.13	$1.44	$0.35
Industrial (per square foot)	$0.24	$0.60	$0.09	$1.04	$0.25

Sources: City of Goodyear, Ordinances No. 06-1046, 06-1047, and 06-1048, adopted on December 11, 2006

Surprise

In March 2007, the city council voted to adopt eleven amendments to the city's impact fee program, including a new Roads of Regional Significance Development Fee, effective July 1, 2007. The proposed Roads of Regional Significance Development Fee would be tailored to six Special Planning Areas (SPAs) within the city. No fee is proposed for SPA #1, because no roads of regional significance will be constructed there. Table 8.11 reports the fee schedules for the remaining five areas.

8.1.3.5 Local Sales Tax for Transportation

Glendale is the only study area jurisdiction with its own half-cent sales tax for transportation. On November 6, 2001, Glendale voters approved the tax to fund transportation improvements, including transit, streets, bicycle, pedestrian, and aviation modes, as described in the "Glendale Onboard" (GO!) transportation plan. There is no expiration date for this transportation sales tax.

The current Glendale Capital Improvement Plan (CIP) assumes annual revenues of almost $14.7 million from this transportation sales tax. The CIP shows transportation revenue bond sales funded by the sales tax revenues of $25 million in FY 2007 and $10 million for each of the next two fiscal years. According to the GO! 25-Year Program, most of the expenditures will be made for transit (51%) and streets (42%).[15] Bicycle and pedestrian facilities will account for 2% of expenditures and all other programs for the remaining 5%.

Sales tax receipts in the GO! 25-Year Plan account for 46% of all CIP revenue, which will be supplemented with federal, state and regional funds at 49%. The remaining 5% will come from transit fares, city general funds and other sources.

Table 8.11 Surprise's Proposed Roadway Development Impact Fee

Residential Fee per Housing Unit	SPA 2, 4, and 6	SPA 3 and 5
Single-family Detached	$5,715	$5,396
Single-family Attached; Multi-family 1-9 units	$4,013	$3,789
Multi-family 10 or more units	$4,013	$3,789
All other residential	$2,980	$2,814
Non-residential per 1,000 S.F. Commercial/Shopping Center		
< 25,000 S.F.	$16,322	$15,411
25,0000 - 50,000	$14,179	$13,388
50,0000 - 100,000	$11,842	$11,181
100,000 - 200,000	$10,135	$9,570
> 200,000 S.F.	$8,614	$8,133
Office/Institutional		
< 10,000 S.F.	$6,603	$6,234
10,000 - 25,000	$5,347	$5,049
25,000 - 50,000	$4,560	$4,306
50,000 - 100,000	$3,887	$3,670
> 100,000 S.F.	$3,313	$3,128
Business Park	$3,718	$3,511
Light Industrial	$2,031	$1,918
Manufacturing	$1,641	$1,051
Warehousing	$1,113	$1,365
Hotel (per room)	$1,445	$1,549

Source: See Public Notice of Intent to "accept the 11 written development impact fee reports prepared for the City of Surprise by TischlerBise," at http://www.surpriseaz.com/Index.asp NID=1157

8.1.3.6 Construction Sales Tax

Goodyear and Surprise both levy a construction sales tax with revenues allocated to transportation.

Goodyear

Goodyear has levied a construction sales tax of 3.5% since January 1, 2005. According to its FY 2007 budget, Goodyear collected $3.0 million in construction sales tax revenue in (partial) FY 2005 and $6.0 million in FY 2006. The city budgeted $1.2 million in FY 2007.

Surprise

Surprise collects a 1.5% construction sales tax, which is dedicated partially to "Transportation Enhancements" and deposited into a fund with the same name. According to the current budget, construction sales tax revenue for FY 2007 is estimated at $14.8 million, FY 2008 at $8.0 million, FY 2009 at $12.0 million, FY 2010 at $18.0 million, and FY 2011 at $20.0 million.

The CIP forecasts general obligation bond proceeds, repaid with secondary property taxes, of $9.3 million available in the Transportation Enhancement Fund for FY 2009.

8.1.3.7 Secondary Property Taxes

Voters in Glendale and Goodyear have approved general obligation bonds for transportation improvements, with the jurisdictions using secondary property taxes to repay this debt.

Glendale

On November 2, 1999, Glendale voters approved $411.5 million in general obligation authorizations, which included funding for streets, parking and transit. According to the city's current CIP, $6,919,000 in authorized funding remains for streets and parking, while $6,750,000 remains for transit. Further bond sales for streets and parking are not anticipated until FY 2009. The current CIP schedules no bond sales for transit until FY 2012 or later.

General obligation bonds are repaid with secondary property taxes. According to the current CIP, the secondary property tax rate for debt service is $1.4275 per $100 assessed valuation in FY 2007, scheduled to increase to $1.4715 per $100 in FY 2011. Total debt service in FY 2007 will be $20 million, increasing to $26.3 million in FY 2011.

Goodyear

The FY 2007 budget reports general obligation bond debt service for streets of $1,228,000 in that year, with a corresponding secondary property tax rate of $0.33/$100 of assessed valuation.

8.1.3.8 Conclusion

The sources of transportation revenue currently used in the study area are varied. Each entity with transportation responsibilities uses a different mix of funding sources. Use of each source is typically restricted, either by the state constitution or by federal and state statutes. Furthermore, only the *ad valorem* revenues increase with inflation, while the other (and generally larger) revenue sources are not indexed to inflation and have therefore lost purchasing power over time. It is becoming increasingly clear that reliance on fuel consumption taxes is not a sustainable long-term strategy.

The next section explores currently available alternatives for enhancing revenue sources.

8.1.4 Other Authorized Revenue Sources

This section introduces six revenue sources currently authorized by statute that could be expanded or initiated in the Hassayampa Valley. They are (1) broader use of development impact fees, (2) use of general funds for transportation purposes, (3) private contributions, (4) a countywide transportation property tax, (5) toll roads, and (6) continuation of the countywide one-half cent sales tax beyond its current 2025 expiration date. The primary advantage of considering these revenue alternatives is that new enabling legislation is not needed, although formal adoption by the local jurisdiction(s) would be required.

This section demonstrates that, under current state statutes, the options for increasing transportation funding in the Hassayampa Valley are limited. Section 8.2 addresses alternative revenue sources that are not currently authorized and would require new legislation.

8.1.4.1 Broader Use of Transportation Impact Fees

The four municipalities in the study area already have impact fees, but Maricopa County does not. The Board of Supervisors could adopt an impact fee ordinance by majority vote. Procedures and timelines are specified in A.R.S. 11-1102. MCDOT previously evaluated the potential for roadway impact fees and is currently addressing how impact fees might be used to co-fund improvements on the state highway system, especially portions of SR-60 and SR-74. A logical extension of this inter-agency concept is the creation of a Hassayampa Valley Benefit Area, with all five of the local jurisdictions participating in an impact fee program for projects identified in this study.

If Maricopa County would be willing to adopt an impact fee for roadways, the creation of such a multi-jurisdictional benefit area could be achieved through a formal intergovernmental agreement. A consistent

impact fee program for the area might help to resolve policy issues, such as different fees for similar developments on opposite sides of jurisdictional boundaries. Impact fees can be a reliable revenue source for capital improvements, but only in a growing community or area. If growth slows during economic downturns, or if a community is built out, impact fees lose their utility. Given the rapid growth expected in the study area for many years, however, impact fees are expected to remain viable and worthy of continued consideration.

8.1.4.2 Use of General Funds

General funds at all levels of government are a scarce resource used for myriad public purposes. Although general funds are seldom used for roadway projects, they are frequently used to support public transit (often because no other funds are available). General funds are sometimes used, through special allocations or earmarks, for sorely needed projects. For instance, under the Statewide Transportation Acceleration Needs (STAN) legislation, ADOT and regional authorities such as MAG will use more than $300 million in general fund transfers to accelerate urgent highway projects across the state. About $193 million will be used in the MAG region. Some state legislators have recently expressed interest in continuing this program, which may be consistent with Governor Napolitano's desire to enhance infrastructure investment throughout the state. However, the availability of general funds for transportation depends on the total revenue collected by the state or local government. This amount can increase or decrease substantially from one year to the next, making the general fund an unpredictable source.

8.1.4.3 Private Contributions and Exactions

These include dedication of rights-of-way, fulfillment of rezoning conditions and development agreements, and exactions imposed on land developers through the entitlement process. The financial importance of this source is potentially very significant, although not readily quantifiable because conditions differ among jurisdictions, and sometimes even within a jurisdiction. Contributions and exactions are best addressed as policies and strategies to obtain rights-of-way along prescribed corridors, which can be achieved during initial phases of the development process if corridor-level roadway plans are available.

8.1.4.4 Countywide Property Tax for Transportation

State law allows Arizona counties to impose a property tax up to 25¢ per $100 of assessed valuation for roadways[16], although none apparently have done so. For Maricopa County's $34 billion assessed valuation, the tax could yield about $85 million per year.[17] This is about the same amount that would be generated countywide by a sales tax of 0.12%, or roughly one-eighth cent per dollar.

8.1.4.5 Toll Roads

State laws specifically empower counties and ADOT to approve privately-built toll roads, but are silent on the power of municipalities to do so. The legislation for counties (A.R.S. 28-6801) is an archaic and humorous remnant[18] in contrast to the 1991 authorization for ADOT (see A.R.S. 28-7701 *et seq*), which established a privatization demonstration program. A pilot study initiative in the early 1990s using unsolicited proposals was short-lived, although it generated several technical studies and investment proposals. The original legislation was amended to allow only solicited proposals.[19] None have been solicited, however.

Substantial interest in toll roads exists at the federal, state, and local levels of government. The Federal Highway Administration (FHWA) is conducting extensive research on the topic. SAFETEA–LU has provisions for $15 billion in private activity bonds, and encourages states to examine toll roads. As national trends toward privatization and toll roads continue, it seems fitting to carefully consider toll facilities (either public, private or public-private partnerships) for the Hassayampa Valley study area.

An additional toll concept is so-called "shadow tolls," which are per-vehicle amounts paid to a facility operator by a third party such as a sponsoring governmental entity, rather than by facility users. Like traditional tolls, shadow toll payments may be based on the type of vehicle, distance traveled and time of day. Shadow tolls can be an element of a funding program wherein a public or private sector developer/operator accepts certain obligations and risks — such as construction, operations and maintenance, and most specifically traffic — and receives periodic shadow toll payments in place of, or in addition to, real or explicit tolls paid by users. Funds for shadow tolls can come from government or private sector sources, including state highway funds and

regional dedicated tax streams. The concept of shadow tolls is neither specifically allowed nor disallowed by existing state statutes.

8.1.4.6 Continuation of Half-Cent Countywide Sales Tax (Proposition 400)

The existing transportation sales tax could conceivably be extended by the voters for another twenty-year period to help fund more time-remote projects, such as those identified in this study. As discussed above, this tax is a very prominent revenue source, and another extension could be a financial foundation for long-range elements of the Hassayampa Valley roadway network. A public vote for a further extension would require authorization by the state legislature, and possibly action by the county Board of Supervisors depending on the terms of the legislation.

8.2 Additional Sources of Potential Transportation Revenue

8.2.1 Introduction

Overview

Transportation officials at every level of government lament inadequate funding, constantly search for new sources of funding, and make tough compromises to stretch existing revenue. Given the population projections and increasing travel demand in the study area, study area jurisdictions must succeed in finding additional revenue.

Section 8.1 reviewed existing transportation revenue available to the jurisdictions responsible for roadway systems in the study area.[20] Existing sources of transportation revenue are varied, including user fees such as gasoline taxes, vehicle registration fees, charges based on the weight of vehicles, regional and local sales taxes, impact fees and property taxes. Section 8.1 did not include precise estimates of existing revenue specifically available for use in the study area. It did, however, note that existing sources of transportation revenue will be inadequate to fully fund future transportation needs in the study area. For purposes of this study, existing revenue sources (including the regional half-cent countywide sales tax) are assumed to continue in the future.

Section 8.2 explores several potential new ways to augment transportation revenue. State statutes already authorize some of the identified sources. Most of the potential revenue sources, however, would become available only after the state legislature approves them, or gives local jurisdictions the option of approving them.

In some instances, the revenue option is intended to raise existing taxes (i.e., statewide gasoline and use fuel or diesel taxes)[21], while other options could be used as variants of existing taxes; for example, a new local option fuel tax. Still other options would create completely new taxes (a sales tax on gasoline) or introduce market-like mechanisms (such as congestion pricing or toll roads) to generate revenue. Some options (impact fees or higher fuel taxes) could supplement existing sources. Some alternatives are more "near-term" (for example, Maricopa County could implement a transportation impact fee program fairly quickly), while others would require more lead time to implement (e.g., toll roads).
This section discusses a variety of options, identifies examples of their existing use elsewhere, describes how they might be organized and administered, and, where possible, provides an indication of their revenue potential.

Identifying Potential Sources of Additional Revenue

It is important to frame policy decisions in the context of both needs and trends. To establish a current context for innovative finance, the study team researched the Internet for sites related to transportation funding and alternative transportation financing. This research revealed the "state of the discussion" on transportation financing, ensuring that the MAG study team reviewed a representative range of funding alternatives.

Some sites and documents were very specific in their analysis and concentrated on options like the federal fuel tax or toll facilities. Other sites focused on statewide transportation funding options, often focusing on alternative financing instruments, such as grant anticipation notes. A few sites reviewed transportation financing at the local government level, identifying a variety of alternatives such as sales taxes and impact fees.

Two sites are recognized for their comprehensive lists of transportation funding sources: the Victoria (British Columbia) Transport Policy Institute (VTPI) and the Santa Cruz County, California, Transportation Funding Task Force (TFTF).[22]

VTPI identifies nine categories of transportation funding:

- Parking pricing
- Road pricing
- Fuel tax increases and surcharges
- Dedicated local or regional sales taxes
- Transportation impact fees
- Special property taxes
- Vehicle impact mitigation charges
- Business and employee assessments
- Grants

Santa Cruz County TFTF identifies eleven additional sources of transportation funding (not just for roadways):

- Countywide sales tax
- City by city sales tax
- Gasoline tax (local option)
- Regional traffic impact/developer fees
- Parcel and property taxes
- Visitor taxes (tax on tourism; e.g., rental cars and lodging)
- Vehicle license or registration fee increases
- Increased transit fares
- Increased fines
- Tolls
- Payroll taxes

Potential Revenue Sources Included in this Analysis

The study team blended the VTPI and TFTF lists of sources to develop a menu of potential additional transportation revenues, with two clarifications:

- The FY 2008-2012 MAG TIP notes that 75% of TIP funding is state, regional or local and 25% federal. Beyond the familiar ideas of raising and indexing federal fuel taxes, ending diversion of taxes from the Highway Trust Fund, and reinstituting interest on the Trust Fund balance, strategies to increase available federal revenue are long-term and beyond the control of local jurisdictions.
- The study team did not investigate borrowing strategies in any detail. Transportation entities employ borrowing strategies (such as state infrastructure banks and grant anticipation notes) to accelerate the construction of facilities, using future revenue for debt service. This discussion identifies general obligation bonds as a potential source of project acceleration, but not as a revenue source *per se*.

The potential revenue estimates presented assume that additional taxes or fees would not exceed any "inelasticity" between prices and demands for fuel, purchases of vehicles, or residential and non-residential development (i.e., it assumes that higher taxes or fees would not reduce the activities that generate these revenues in the first place). To the extent that this assumption is incorrect, estimates of revenue potential for the options discussed below would be too high. This analysis is designed solely to provide comparative general information on funding options, and not to make precise, economic calculations of revenue potential.

Potential sources of additional revenue are categorized as either funding options or financing options.

Funding options include:

A. 1. User fees, such as
   a. Fuel taxes, including increases in existing taxes
   b. Statewide rate increases and/or indexing to inflation
   c. Local options to levy and index fuel taxes
   d. Levy a statewide sales tax on fuel sales
   e. Local options to levy sales taxes on fuel sales
   2. Local option for Vehicle Registration Fees

B. Sales taxes, including
   1. A statewide sales tax dedicated to transportation
   2. Legislative authorization for the Maricopa County Board of Supervisors (or voters) to add another half-cent transportation excise (sales) tax

C. Property-related fees and taxes, including
   1. Impact fees
      a. Maricopa County
      b. Regional or subarea benefit areas
      c. Statewide impact fees
   2. Primary property taxes and general fund expenditures

D. Road-use-based strategies, including
   1. Congestion pricing
   2. Mileage-based fees
   3. Toll facilities

Financing options considered in this analysis relate to general obligation bonding for transportation purposes, either by Maricopa County or by cities and towns.

8.2.2 Potential Sources of Additional Revenue

There are two general sources of additional revenue: funding options and financing options (i.e., general obligation bonding).

8.2.2.1 Funding Options

Funding options in this discussion refer to:

- User Fees, which include (a) taxes on fuel (gasoline and use fuel) and (b) vehicle registration and license fees. Fuel taxes include the current (per-gallon) taxes collected on gasoline and use fuel, as well as an additional sales tax on fuel sales. Both forms of taxation could be levied either statewide or by local option, or both. A fuel tax (in cents per gallon) is technically different from a sales tax (as a percentage of the value of fuel sales). Arizona does not currently have the latter type of tax on motor fuel.
- Transaction privilege taxes (sales taxes) imposed specifically for transportation purposes, either (a) statewide and distributed by statutory formula for state and local roads or (b) an additional transportation sales tax just for Maricopa County that could be imposed on the entire county or in areas of high transportation demand.
- Property-related fees and taxes, such as (a) impact fees and (b) a property tax levy for county roads.
- Road-use based charges, such as (a) distance-based charges, (b) toll roads, and (c) congestion pricing.

User Fees

Potential sources of additional transportation revenue generated from user fees could include (a) changes to how fuel taxes are imposed and (b) local options for collecting vehicle registration and license fees.

Fuel Taxes

States vary significantly in how they tax the sales of gasoline and use fuels. Attachment 4 presents a state-by-state analysis of gasoline and use fuel/diesel taxes.[23] The data first identifies base statewide gasoline and use fuel taxes, and then additional taxes imposed for transportation and related purposes.
Compared to some other states, Arizona has a simple fuel tax structure:

- 18 cents per gallon on "motor vehicle fuels" (A.R.S. §28-5606(A)) and on use fuel for "light class motor vehicles" (A.R.S. §28-5606(B)(1))[24];
- 26 cents per gallon for "use class motor vehicles"[25]; and,
- 1 cent per gallon as the underground storage tank tax (A.R.S. §28-6001 *et. seq*. and §49-1031 *et. seq*.)

When comparing Arizona's statewide fuel taxes to those in other states, some important differences emerge.

- First, 32 states levy higher base gasoline taxes, 33 states levy higher use fuel taxes on light class vehicles; and 10 states levy higher use fuel taxes on use class vehicles.
- Equally important, Attachment 5 contains a map that identifies 28 states with "variable fuel tax rates," such as (a) "percent" or sales taxes, (b) automatic rate adjustments, and (c) local option taxes.

Following are discussions analyzing several possible scenarios, based upon the information presented in Attachments 4 and 5:

- Raising and indexing statewide fuel taxes;
- Local options for levying and indexing fuel taxes;
- Levying a statewide sales tax on fuel sales; and
- Local options for levying and indexing sales taxes on fuel sales.

Raising and Indexing Statewide Fuel Taxes

Fuel taxes on gasoline and diesel fuels have long been the most important source of transportation revenue at the federal and state levels. The federal government also collects taxes on alternative fuels, but Arizona does not currently do so.

There are many reasons for raising gasoline taxes.[26] Among the reasons cited are: fuel taxes are lower now (when adjusted for inflation) than in the past; the costs of transportation projects are increasing faster than revenue; demand for gasoline is relatively inelastic with respect to price; and fuel taxes are user fees that, at certain thresholds, should send "price signals" to motorists to use the roadway system more efficiently.

While many reports and commentators argue for phasing out fuel taxes in favor of more market-driven charges (tolls, distance-based fees, etc.), they all agree that fuel taxes will continue in use for some time. They are a convenient mechanism as long as vehicles are refueled at some sort of traditional filling station.

The legislature has not increased Arizona gasoline and use fuel tax rates since the early 1990s. Since then, inflation has significantly eroded the purchasing power of the resulting revenues (Figure 8-3).[27] Arizona's gasoline tax rate was last raised in 1990, to 18 cents per gallon. By 2006, inflation had reduced the value of the gasoline tax to 6.9 cents per gallon (in 1990 dollars). The rate would need to be set at 27.6 cents per gallon today to have kept pace with inflation. Increasing vehicle fuel efficiency has also reduced the value of the tax by tending to reduce gasoline sales. The only "bright spot" for the motor fuel tax results from rapid growth in the Arizona population and number of vehicles, which tends to increase total vehicle miles of travel.

Options for addressing the impacts of inflation are:

Option 1 **Raise the Gasoline Tax Rate**

Option 1 would simply increase the gasoline tax rate from 18 cents to 24 cents per gallon. Attachment 4 shows that 32 states currently have gasoline taxes higher than Arizona's, ranging from 19 cents per gallon in Vermont to 33 cents in Wisconsin. The average gasoline tax rate for these thirty-two states is 24 cents per gallon.

This option would leave the use fuel tax at its current 26 cents per gallon, which already is among the 15 highest state tax rates for diesel fuel.

Option 2 **Index the Existing Rates for Gasoline and Use Fuel to Inflation**

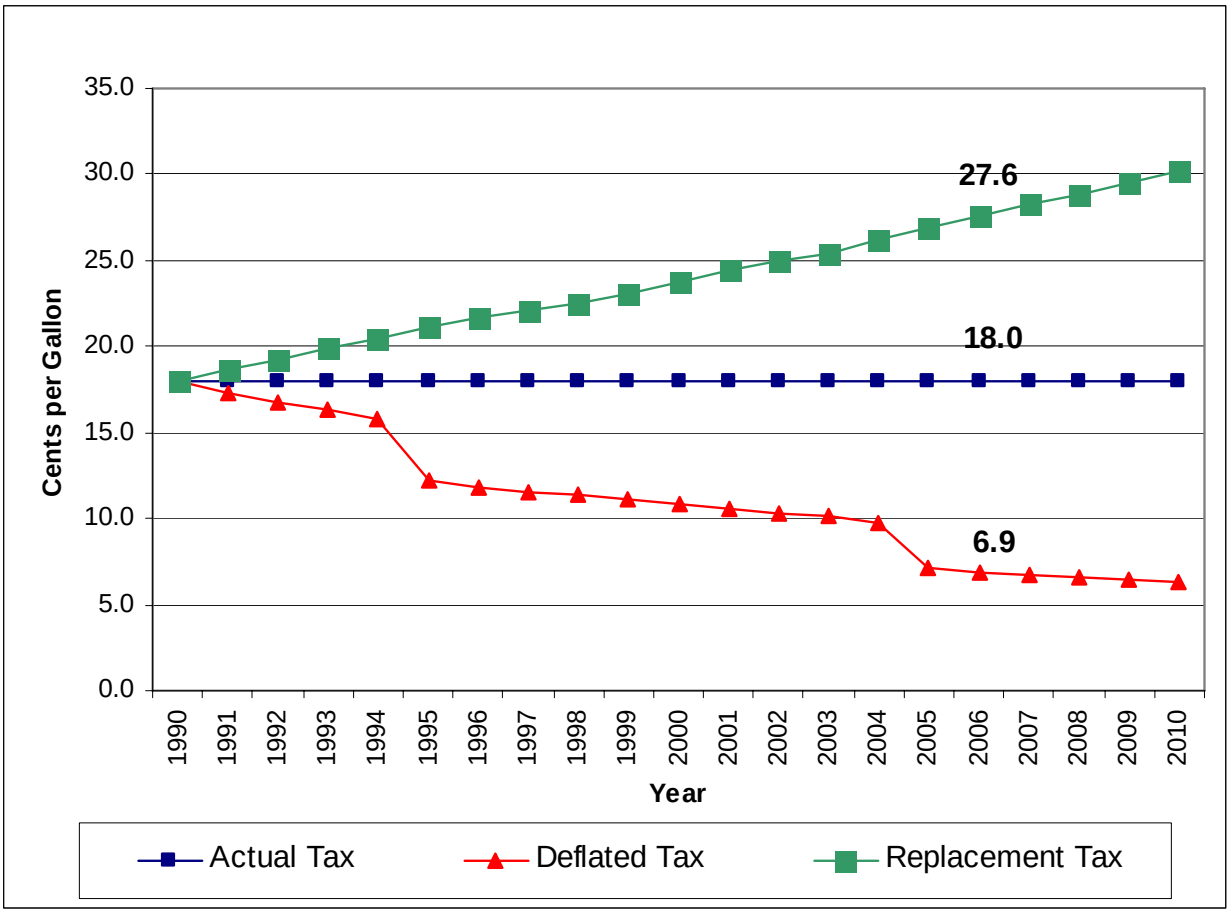
Option 2 would index the gasoline and use fuel tax rates to inflation, starting from the existing rates of 18 cents per gallon for gasoline and 26 cents per gallon for use fuel. The analysis assumes an annual inflation rate of 2.3%.[28]

Option 3 **Raise the Current Gasoline Tax Rate; Index From The New Rate; and Index Use Fuel from Existing Rate.**

Option 3 would index the gasoline and use fuel taxes to an assumed inflation rate of 2.3% per year, starting with an immediate gasoline tax increase to 24 cents per gallon and the use fuel tax at its existing rate of 26 cents per gallon.

Attachment 6 provides calculations for how each option would increase revenue from fuel taxes.[29]

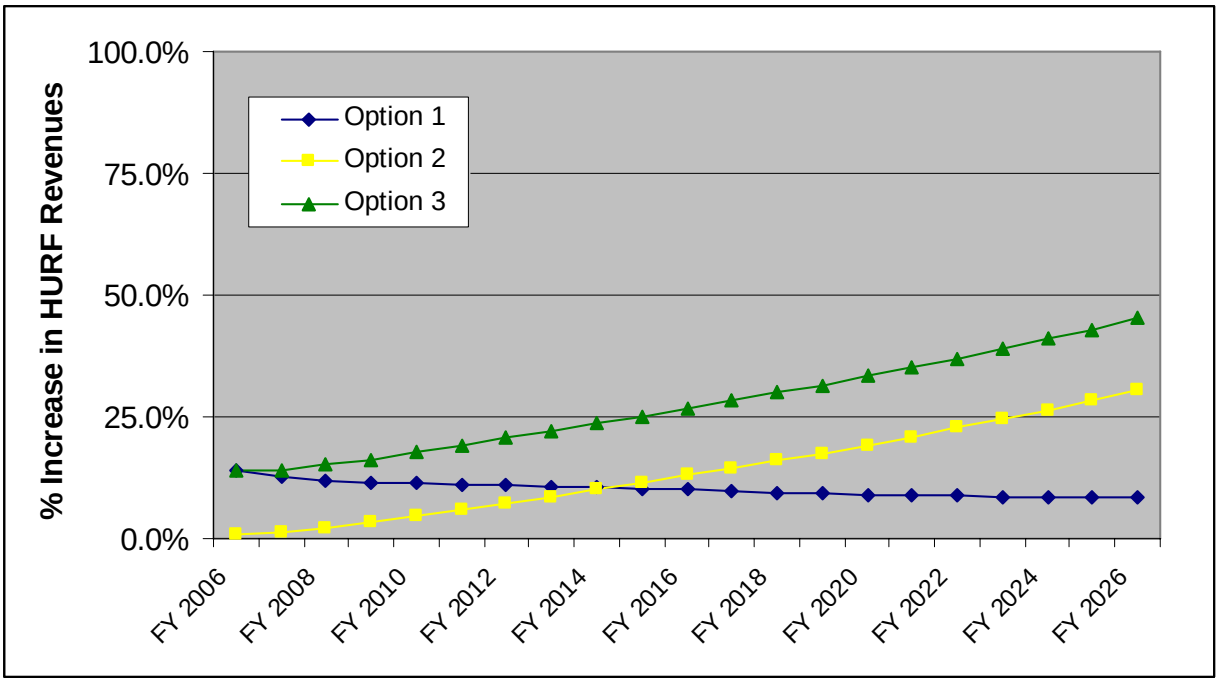
Figure 8-3 Gasoline Tax Rates, 1990 to 2010



Sources: Deflated and replacement taxes are derived from data on inflation from the Federal Reserve Bank of Minneapolis, at http://www.minneapolisfed.org/research/data/us/calc/hist1913.cfm

Figure 8-4 summarizes the data from Attachment 7, "Projected Increases in HURF Revenue from Three Options for Raising Fuel Taxes." Because Options 2 and 3 index the fuel tax rates, they would tend to produce larger increases in HURF revenue each year (due to compounding). Option 1, on the other hand, relies upon a one-time increase, but its impacts will decline over time. Over the 20 years between FY 2006 and 2026, the average HURF increases under Option 1 would be approximately 10%, under Option 2, 16%, and under Option 3, 30%. It is reasonable to assume that each jurisdiction in the study area would receive at least equivalent increases in its HURF receipts, assuming no changes in their status under statutory distribution formulas. The increases would be "at least" equivalent because the jurisdictions, with the possible exception of Glendale, are expected to experience population increases that exceed the statewide growth rate.

Figure 8-4 Increases in HURF Revenue, FY 2006–2026



Sources: ADOT, "Arizona Highway User Revenue Fund, Forecasting Process and Results 2007-2016" and CLA estimates

Local Options for Levying And Indexing Fuel Taxes

Another approach to raising additional revenue would be for state statutes to provide jurisdictions with a local option to charge fuel taxes, as well as to allow indexing of local option fuel taxes to inflation. There are examples from around the country of local option gasoline taxes (Alabama, California, New York and Oregon--see Attachment 5).

State statutes could structure a local option fuel tax with (a) a countywide gasoline tax with distributions between the county and incorporated jurisdictions, or (b) county and city-by-city options.

ADOT reported the sale of 1,592,469,000 gallons of gasoline and 160,777,000 gallons of diesel fuel in Maricopa County in FY 2006.[30] A 10-cents-per-gallon Maricopa County tax in that year would have generated $175,325,000 in additional transportation revenue. In FY 2006, Maricopa County and its 25 incorporated jurisdictions received $348.4 million in HURF revenue.[31] Revenues from a Maricopa County option fuel tax of $175.3 million would represent a 50% increase in transportation revenue over the FY 2006 total HURF receipts (Table 8.12).

Table 8.12 Potential Revenue - "Local Option" Fuel Tax, FY 2006

Fuel Type	Total Gallons Sold	Revenue at 10 Cents/Gallon
Gasoline	1,592,469,000	$159,247,000
Diesel	160,777,000	$16,078,000
Total	1,753,246,000	$175,325,000

Source: Curtis Lueck & Associates, 2007

Levying Statewide Sales Tax on Fuel Sales

A.R.S. §42-5061(A)(22) excludes motor fuel and use fuel sales from the state's transaction privilege (sales) tax.[32] Eleven states, however, do include motor fuel sales and use fuels sales in their transaction privilege taxes, in addition to collecting regular motor fuel and use fuel taxes. Those states are California, Connecticut, Georgia, Hawaii, Illinois, Indiana, Iowa, Michigan, New Jersey, New York and Virginia (see Attachment 5).

Table 8.13 presents a calculation of potential revenue that a sales tax on fuel sales could generate. The analysis makes the following assumptions:

- "Gallonage" sold for FY 2006 is derived from ADOT reports.
- Fuel prices are statewide averages for February 9, 2007, as reported by the American Automobile Association (AAA). This one-day average is assumed to be a yearly average for FY 2006. In fact, fuel prices are volatile. For example, AAA reported the February 10, 2007 cost for regular gasoline in "Phoenix Proper" at $2.237 per gallon, and diesel at $2.773 per gallon. One month before, the same fuel had cost $2.363 per gallon and $2.805 per gallon; one year before, these prices had been $2.388 per gallon and $2.699 per gallon.[33]
- Quoted fuel prices include state and federal taxes, which are eliminated from the calculation of sales taxes, on the assumption that these sales taxes would be charged only against fuel prices representing crude oil, refining and distribution/marketing costs. Nationwide, combined federal and state taxes on gasoline average 19% of the cost per gallon and 20% for diesel fuel.[34] In Arizona, the respective percentages are 16% and 20%.
- Arizona "use fuel" taxes are assumed to be 26 cents per gallon for all diesel fuel sold. In fact, fuel taxes on "light class motor vehicles" are 18 cents per gallon, distinguishing diesel fuel vehicles by weight.
- The revenue potential of a sales tax on fuel sales is estimated at 5%.
- The analysis assumes that all sales tax revenue from fuel sales would be used only for transportation purposes.

Based upon these assumptions, a sales tax of 5% levied against fuel sales in FY 2006 would have generated $271.4 million from gasoline sales and $98.4 million from diesel fuel sales, for a total revenue of $369.8 million.

Table 8.13 Potential Revenue from a Statewide Sales Tax on Fuel Sales

Underlying Data	Gasoline	Use Fuel	Total
Total gasoline/diesel gallonage FY 2006	2,756,445,000	890,000,000	3,646,446,000
Arizona statewide fuel prices as of February 9, 2007	$2.342	$2.724	NA
Arizona statewide fuel prices per gallon as of February 1, 2007, minus taxes	$1.969	$2.211	NA
Total Sales	$5,427,441,000	$1,967,790,000	$7,395,231,000
Sales Tax Revenue @ 5%	$271,372,000	$98,391,000	$369,762,000

Sources: ADOT at http://www.azdot.gov/inside_adot/fms/gallon2.asp; American Automobile Association, "Daily Fuel Gauge Report" at http://www.fuelgaugereport.com/sbsavg.asp

Taxes include (a) Gasoline - State: 18 cents per gallon + 1 cent per gallon Underground Storage Tank (UST) tax and Federal: 18.3 cents per gallon; (b) Use Fuel - State: 26 cents per gallon + 1 cent per gallon UST tax and Federal: 24.3 cents per gallon

The impacts of a statewide sales tax on fuel sales, under these assumptions, would be as follows:

- Total HURF revenue in FY 2006 was $1,331,625,000. A sales tax on fuel sales that generated $369,762,000 in additional transportation revenue would represent a 28% increase over the current HURF revenue.
- A motorist who drove 20,000 miles in FY 2006 and obtained 25 miles per gallon would have paid an additional $78.76 in sales taxes, the equivalent of an additional 10 cents per gallon (Table 8.14).

Table 8.14 Impact of Statewide Sales Tax

Hypothetical Sales Tax on Gasoline Impacts	
Annual miles	20,000.00
Gallons assuming 25 miles per gallon	800.00
Expenditures at $1.969 per gallon	$1575.00
Sales Taxes paid (5%)	$78.76
State/federal fuel taxes (37.3 cents per gallon)	$298.40
Total taxes paid	$377.16
% increase in total taxes From sales tax	26%
Converting Sales Tax to Cents per Gallon	
Sales of 20 gallons ($1.969/gallon)	$39.38
Sales taxes paid (5%)	$1.97
Cost per gallon	$0.10

Source: Curtis Lueck & Associates, 2007

Local Options for Levying and Indexing Sales Taxes On Fuel Sales

Some states provide local options for levying sales taxes on fuel sales (for example, California, Hawaii, Illinois, and New York--see Attachment 5).

The revenue increase from a 5% Maricopa County sales tax on fuel would equal the revenue generated by a Maricopa County fuel tax of 10 cents per gallon: $175 million in additional revenue in FY 2006. This is an increase of 50% over the combined HURF receipts for all jurisdictions in the county (Table 8.15).

Table 8.15 Potential Revenue from a Tax on Fuel Sales

Underlying Data	Gasoline	Use Fuel	Total
Total Gas/Diesel Gallonage FY 2006(1)	1,592,470,000	160,777,000	1,753,247,000
Arizona Statewide Fuel Prices as of February 9, 2007(2)	$2.342	$2.724	NA
Arizona Statewide Fuel Prices per gallon as of February 1, 2007 minus taxes(3)	$1.969	$2.211	NA
Total Sales	$3,135,573,000	$355,478,000	$3,491,051,000
Sales Tax Revenue @ 5%	$156,779,000	$17,774,000	$174,553,000

(1) Source: ADOT at http://www.azdot.gov/inside_adot/fms/gallon2.asp
(2) Source: American Automobile Association, "Daily Fuel Gauge Report" at http://www.fuelgaugereport.com/sbsavg.asp
(3) Taxes include (a) Gasoline - State: 18 cents per gallon + 1 cent per gallon Underground Storage Tank (UST) tax and Federal: 18.3 cents per gallon; (b) Use Fuel - State: 26 cents per gallon + 1 cent per gallon UST tax and Federal: 24.3 cents per gallon

Local Option for Vehicle License Taxes and Registration Fees

Amending state statutes to permit a local option to assess registration fees, vehicle license taxes, or both, is another alternative for generating additional transportation revenue. According to the ADOT Motor Vehicle Division, there were approximately 3.72 million vehicles registered in Maricopa County on January 31, 2007 (Table 8.16).

Table 8.16 Maricopa County Vehicle Registration, January 31, 2007

Vehicle Type	Number of Registered Vehicles
Owner Pleasure	2,012,215
Rental Passenger	58,102
Commercial	269,893
Trailer, Non-Commercial, <6,000 lb. gross vehicle weight	228,186
Trailer Commercial	49,638
Motor Cycle Combined	104,313
Pick Up Non-Commercial	379,947
All Other Vehicles	615,281
Total Registered Vehicles	3,717,575

Source: ADOT, Motor Vehicles Division, at "http://www.azdot.gov/mvd/statistics/documents/RegVehbyCountyFY2007.pdf"

The state's vehicle license and registration fees are complex, and not all vehicles would be subject to the annual tax, complicating an estimate of the revenue potential of a Maricopa County registration tax based solely on vehicle registrations. The Motor Vehicles Division data shows that Maricopa County has 57% of all registered vehicles in the state. Statewide vehicle registration fees collected in FY 2006 were $158.8 million,[35] suggesting that a similar fee assessed only in Maricopa County would have generated 57% of that amount, or $90.5 million, a 26% increase over total HURF revenue for Maricopa County jurisdictions ($348.4 million) in FY 2006.
Statewide VLT receipts in FY 2006 were $831,951,000, with 45% or $374.4 million distributed to HURF.[36] Assuming that 57% of VLT receipts are generated in Maricopa County, the county probably accounted for roughly $474,212,000 in VLT revenue. If Maricopa County had set a Vehicle License Tax in FY 2006 to generate the proportionate amount of statewide VLT distributed to HURF (45%), revenue would have been $213,395,000.

If a Maricopa County VLT tax had been set at one-half of the statewide rate, additional transportation revenue might have been $106,698,000, a 31% increase over total HURF revenue for Maricopa County jurisdictions ($348.4 million) in FY 2006. Both of these scenarios assume that a countywide vehicle registration fee or VLT tax would be collected and then distributed to the county and all incorporated jurisdictions, generally in proportion to population.

General Sales Taxes

Another funding option is to impose sales taxes specifically for transportation purposes on all taxable purchases, as the current voter-approved transportation sales taxes in Maricopa County and Pima County allow. New transportation sales taxes could be levied and collected statewide, or as a second (and additional) transportation sales tax for Maricopa County.

Increase in Statewide Sales Tax Dedicated To Transportation

California has a statewide sales tax of 7.75%, of which approximately 3.3% (i.e., a 0.25% sales tax rate) is devoted to transportation, with revenue distributed to each county and then to incorporated jurisdictions within each county.

According to the Arizona Department of Revenue, the gross FY 2006 state sales tax revenue was $6,098,268,000, generated by 5.6 cents per dollar.[37] The 0.6% education tax approved generated $628,471,000 of this revenue. Therefore, an additional statewide sales tax of 0.6% for transportation would generate approximately $628.4 million in revenue. This amount would have represented a 47% increase over total HURF revenue for FY 2006. An increment in the statewide sales tax of 0.3% for transportation would have generated an additional $314.4 million, an increase over total HURF revenue for the year of approximately 24%.

Authorize Maricopa County Board of Supervisors to Add Another Half-Cent Transportation Excise (Sales) Tax

Some state statutes permit Arizona counties to levy and collect sales taxes. Each of these statutes, however, has population limits that exclude Maricopa County. For example, A.R.S. §42-6103 enables a county with a population of fewer than 1.5 million people, upon a unanimous vote of the Board of Supervisors, to levy a sales tax of up to one half-cent.[38] The legislature could amend this section to eliminate the population limits or write a new section under Title 42 (Taxation), Chapter 6, Article 3 (County Excise Taxes) to enable counties with a population of 2.0 million people or more, for example, to levy a county sales tax for transportation. Such legislation could be written to allow expenditure of these revenues for all transportation purposes or only for specific purposes. These revenues could also be allocated among local jurisdictions in accordance with current distribution formulas or on other bases that the jurisdictions might determine to be most appropriate.
The Maricopa County transportation sales tax extended by the voters in 2004 will generate an estimated $3.8 billion over 20 years. If new statutory authority permitted the county to levy an additional one-fourth cent sales tax, additional twenty-year revenue would be approximately $1.9 billion. If the limit were set at one-eighth cent, the twenty-year revenue would be $950 million.

Property-Related Fees or Taxes

A third funding option is to levy fees or taxes on property for transportation purposes, in the form of development impact fees or a property tax levy for county roads.

Development Impact Fees

The Hassayampa Valley will experience tremendous growth over the next 20 to 30 years. Buckeye and Surprise are expected to become the third and fourth largest cities in Arizona. Buckeye alone anticipates a population equaling or exceeding that of Phoenix today."[39] Having impact fees in place before this residential and commercial development occurs would help to pay for new capacity required by the transportation demands that growth will place on the system.

While most of the I-10/Hassayampa Valley study area is located in the Municipal Planning Areas (MPA) of Buckeye, Glendale, Goodyear, and Surprise, much of the area within which future growth will occur is currently in unincorporated Maricopa County. The four incorporated jurisdictions have adopted development impact fees. Maricopa County, while it is permitted by A.R.S. §11-1102, to impose such fees, currently has no impact fee program. Furthermore, growth will place significant pressure on I-10 and other state routes, but the state of Arizona lacks statutory authority to impose impact fees.

The five local jurisdictions and ADOT all have a stake in meeting the future transportation demands in the study area. To meet this demand more effectively, the following steps could be taken:

- Maricopa County could approve a development impact fee program to help fund transportation infrastructure;
- The five local jurisdictions and ADOT could develop a regional impact fee program; and,
- ADOT could recommend proposing a state roadway impact fee to the legislature.

Maricopa County Development Impact Fees

A review of the research literature on impact fees suggests that communities with successful development impact fee programs typically have a large population base, are experiencing moderate to rapid growth, are already facing infrastructure financing constraints, and have a large capital investment to maintain.[40] These characteristics generally describe unincorporated Maricopa County and the study area, although large tracts of the Hassayampa Valley are currently rural and hence have limited capital investment.

Maricopa County is permitted by A.R.S. §11-1102 to impose development impact fees.[41] Three Arizona counties currently impose such fees for transportation: Pima, Pinal, and Yavapai. Pinal County has the most recent program, which was adopted in October 2006 and became effective in January 2007. Pima County's program dates to 1996, but the county has recently amended its program to raise fees, upgrade its coverage of non-residential fees, and subject fees to annual adjustments for inflation. Yavapai County approved its impact fee program in 1998, but the Board of Supervisors has issued a "Notice of Intent to Adopt a New Roadway Development Fee," which will include new fees and the elimination of two benefit areas in favor of a single countywide fee. All three of these counties contain high-growth areas, including unincorporated areas in Yavapai County near Prescott; in Pima County outside Tucson; and in several areas of Pinal County.

There are similarities and differences between the three county development impact fee programs, of which some of the most important are:

- All three programs originally divided their counties into benefit areas, although Yavapai intends to consolidate its areas into a single countywide fee. Pima County has ten benefit areas and Pinal County has seven.
- Both Pima and Yavapai impose impacts fees only for transportation. Pinal County impact fees cover streets as well as parks (fee on residential development only) and public safety.
- Pima County and Pinal County impose impact fees on both residential and non-residential development; Yavapai County does not.
- Pima County automatically adjusts its fees to inflation, as measured by the *Engineering News Record* construction cost index. Pinal and Yavapai adjust fees only through legislative action of their respective boards of supervisors.

Precisely estimating the revenue potential of a countywide roadway development impact program or fee is difficult in the absence of specific knowledge of (a) the future growth that will be subject to a county fee and (b) the level of the fees set. Table 8.17 presents a range of estimates, based on new housing unit projections from MAG's July 2003 socioeconomic data.[42] The analysis assumes that between 2005 and 2030, 435,000 new housing units will be built in what is currently unincorporated Maricopa County. The analysis then examines the revenue potential of 12 scenarios based on the "percentage of growth in unincorporated areas prior to annexation" (the growth that would pay a Maricopa County impact fee) and the level of the fee.[43]

Table 8.17 Revenue Potential of a Countywide Impact Fee

% Growth in Unincorporated Areas Prior to Annexation	New Housing Units	Fee per Housing Unit		
		$3,000	$ 5,000	$10,000
100%	435,000	$1,305,000,000	$2,175,000,000	$4,350,000,000
75%	326,250	$978,750,000	$1,631,250,000	$3,262,500,000
50%	217,500	$652,500,000	$1,087,500,000	$2,175,000,000
25%	108,750	$326,250,000	$543,750,000	$1,087,500,000

Source: Curtis Lueck & Associates, 2007

Under these scenarios, a Maricopa County impact fee program could generate by 2030 anywhere from $326 million (assuming 25% growth in unincorporated areas prior to annexation, and fees of $3,000 per unit) to $4.4 billion (assuming 100% growth in unincorporated areas prior to annexation and fees of $10,000 per unit).

I-10/Hassayampa Valley Regional Impact Fee Program

The five local jurisdictions share an interest in growth and transportation funding in the study area, regardless of which jurisdiction approves the growth or collects the impact fees. In particular, the jurisdictions share a common interest in optimizing the revenue potential of development impact fees.

The jurisdictions could consider "regionalizing" impact fees in the area, assuming, of course, that Maricopa County approves impact fees. The county (A.R.S. §11-1102) and the four municipalities (A.R.S. §9-463.05) have the authority to impose impact fees, delineate benefit areas, and approve benefit area transportation plans.

- Possessing similar authority, the jurisdictions can enter into intergovernmental agreements to mutually exercise shared authority.
- A.R.S. §11-1103 states that counties "may enter into an intergovernmental agreement to accept or disburse development fees for construction of a public facility pursuant to a benefit area plan, including an agreement with a city or special taxing district for the joint establishment of a needs assessment, the adoption of a benefit area plan and the imposition, collection and disbursement of development fees to implement a joint plan for development."

The five local jurisdictions, therefore, could:

- Establish a regional benefit area or benefit areas that extend across jurisdictional lines;
- Develop and approve transportation plans for the benefit area(s) that identify "roads of regional significance,"[44] or other roadway functional classifications to be funded with regional impact fees; and,
- Set common impact fees for specific types of residential and non-residential development within the benefit areas.

A regional impact fee program for the Hassayampa Valley study area would ensure that development is treated consistently throughout the area; provide developers with certainty about impact fees; reduce the ability of developers to play one jurisdiction (city or county) against another in an attempt to avoid fees; and raise some of the revenue necessary to provide the level of transportation capacity that future development will necessitate.

State Impact Fees for Transportation

The study area is defined, in large part, by I-10 as the principal east-west transportation corridor serving existing and future development. Other existing state routes (US-60, SR-74 and SR-85) and future state routes (e.g., SR-801) will also carry large volumes of traffic generated by this development. A conservative reading of the development impact fee statutes for counties and municipalities argues that local impact fees cannot fund capacity improvements on state routes. This restriction is undesirable because the growth approved by local jurisdictions will have some of its largest impacts on I-10 and other state highways.

Assuming that this conservative reading of the statutes is correct, and assuming as well that the idea that "growth should pay its fair share" ought to extend to state facilities, an argument can be made in favor of legislation authorizing "state impact fees."

The idea of a state impact fee has precedents. For example, Title 29, Chapter 91, Subchapter II of Delaware state statutes provides for "Development of State Impact Fees."[45] §9121(3) declares the intent of the section to "establish standards for the determination of impact fees for state facilities and services." §9122(9) defines "state public facilities," including §9122(9)(a) "roads, streets and bridges, including rights of way, traffic signals, landscaping and any local components of state or federal highways."

Three bills have been introduced into the Virginia Legislature authorizing the Commonwealth Transportation Board to "assess and impose reasonable impact fees to be collected by the Virginia Department of Transportation."[46]

- HB 1666 would authorize a statewide impact fee on "new development or new subdivisions that are situated on an access road which has become, or which is to become" part of the primary system of state highways.

- HB 1667 and 1668 are competing bills that would authorize state impact fees "on new development or new subdivisions that abut, are adjacent to, or are alongside U.S. Route 50 in Loudon County between U.S. 15 and the Fairfax County line."

These bills suggest two potential approaches to state impact fees in Arizona. One approach would be to impose impact fees statewide, wherever development affects state facilities. The alternative approach would authorize targeted state transportation impact fees. Legislation could authorize a specific area (i.e., a benefit area), for example the "Hassayampa Valley." Conversely, the legislation could authorize "site specific" state transportation impact fees and develop procedures for the State Transportation Board and ADOT to follow in developing such fees.

The LeRoy Collins Institute, located in Tallahassee and affiliated with the state university system of Florida, issued a report in October 2005 entitled "Tough Choices: Shaping Florida's Future."[47] While the report did not recommend state transportation impact fees, it opened the door to a discussion of state impact fees for other purposes, recommending "impact fees, perhaps a combination of state and local, dedicated to pre-K-12 school construction."

Closer to home, the *Business Journal* of Phoenix of January 12, 2007 carried an article entitled "New state impact fees considered."[48] The article suggests that a coalition of "environmentalists and lawmakers worried about suburban sprawl" might push for state impact fees to "help pay for transportation projects, land conservation and deal with growth."

Tax Levies for County Roads (§A.R.S. 28-6712)

A.R.S. §28-6712 enables a board of supervisors to levy property taxes for transportation purposes. A.R.S. §28-6712(A) states that: "For road purposes the board of supervisors may levy a real and personal property tax of not more than twenty-five cents per one hundred dollars of property in the county as valued for tax purposes." A.R.S. §28-6712(B) specifies that the "monies shall be paid into the county treasury for the benefit of highways in the county."

A.R.S. §28-6712(C) provides that "in counties with an assessed valuation of two hundred million dollars or more, an amount of not more than twenty-five cents per one hundred dollars of assessed valuation may be budgeted, levied, collected and spent for road purposes independently of and in addition to any other amounts lawfully available for road purposes. This levy is in lieu of the levy permitted under subsection A."

If Maricopa County had levied this tax in FY 2007, the levy would have generated $84.5 million (Table 8.18).

Table 8.18 FY 2007 Revenue from A.R.S. §28-6712 Property Tax

2006 Assessed Valuation	$33,807,465,000
$100 of Assessed Valuation	$338,075,000
Property tax levy at $1.1794/$100	$398,726,000
Revenue per cent of levy (118 cents)	$3,379,000
Revenue at $0.25/$100 - 25 cents x revenue per penny	$84,476,000

Source: Maricopa County Tax Levies FY 2006-07 at http://www.maricopa.gov/finance/taxlevy.asp

Road-Use Based Strategies

VTPI maintains an "Online TDM Encyclopedia" of issues related to transportation and transportation demand management (TDM).[49] One of the entries is entitled "Road Pricing, Congestion Pricing, Value Pricing, Toll Roads, and HOT Lanes," which discusses various market-based funding strategies.[50]

VTPI defines road pricing as a funding strategy in which "motorists pay directly for driving on a particular roadway or in a particular area." Value pricing is described as "a marketing term which emphasizes that road pricing can directly benefit motorists through reduced congestion or improved roadways." VTPI further argues that "Economists have long advocated Road Pricing as an efficient and equitable way to pay roadway costs, fund transportation programs, and encourage more efficient transportation. Road Pricing has two general objectives: revenue generation and congestion management."[51] VTPI identifies and discusses several road pricing options, including distance-based charges; road tolls; congestion pricing/cordon (area) tolls, and high occupancy/toll (HOT) lanes.

Following are brief discussions of each of these options. These options are long-term alternatives to current funding and reasonably available funding sources. Some options, such as distance-based charges, are typically discussed as alternatives to fuel-based charges. Toll roads, congestion pricing, and HOT lanes can be used in tandem with other charges and in combination with one another. Some alternatives rely more than others on new technologies, such as global positioning satellites.

Given the lack of detailed planning for any of these alternatives in Arizona, this analysis does not attempt to estimate their revenue potential.

Distance-Based Charges

Distance-based charges would replace the current fuel-based (consumption) taxes with charges based on vehicle miles of travel. Distance-based charges are usually proposed, at least in the United States, to counter the eroding revenue capacity of fuel-based charges due to improvements in fuel efficiency. With fuel taxes tied to gallons purchased, more fuel-efficient vehicles pay less than others to use the same roadway capacity. (If, however, fuel conservation is considered a worthy social objective, this may be viewed as an advantage of the current system.)

A number of countries around the world are actively investigating distance-based charges. In the United States, Oregon has taken the lead in experimenting with a distance-based charge for vehicle use of its roads. FHWA has issued requests for public comments on a "National Evaluation of a Mileage-Based Road User Charge," as required by §1919 of SAFETEA-LU.[52]

Some basic procedural questions need to be addressed. How would payment of distance charges be imposed on tourists, daily visitors, interstate commerce, and drivers who travel through the state without pause? Oregon has experimented with technologies inside the vehicle that communicate with the gasoline pump that the vehicle is participating in the distance-based demonstration. In the exchange, the fuel charges are deducted and the distance-based charges levied. This system collects the fees as part of the fuel purchase, but it works only if the vehicle has the appropriate specialized technology. There is also a need to distinguish between miles driven on state roads and miles driven outside the state.

A vehicle might refuel in New Mexico and drive straight through to California before gassing up again, thereby avoiding any payment for use of Arizona roads. (Of course, these drivers are not paying for their trip through the state under the current system.) A GPS could identify travel on Arizona roads, but it is unclear how the state could compel payment of charges by non-residents. Similarly, residents who refuel in Arizona, drive to San Diego for a holiday, and refuel upon arrival back in the state do not want to pay Arizona for their California driving.
Setting an appropriate cost per mile poses another policy question. Would the intent be to use a mileage-based charge to replace revenue currently raised by fuel taxes; to replace revenue raised by all HURF sources; or to generate revenue more nearly sufficient for total roadway needs?

Table 8.19 estimates the "cents per mile" that would have been necessary to replace (a) total HURF revenue and (b) gasoline and use fuel revenue (only) for each year from FY 1990 to 2004.[53] The data shows that "cents per mile" to replace these revenues would have varied each year, usually increasing from year to year, but occasionally declining.

Replacing total HURF revenue in FY 1990 would have required a distance-based fee of 1.87 cents per mile. Replacement of fuel tax revenue only would have cost 0.96 cents per mile. In FY 2004, these fees would have been 2.06 cents per mile and 1.12 cents per mile.

Table 8.19 also shows the volatility in the relationship between potential VMT and actual HURF revenues from FY 1990 through 2004. This data suggests that a mileage-based charge will not be easy to set properly. Policymakers will need to define clearly and precisely how much revenue they want the fee to raise. It seems that the fee cannot be set once and then left to run its course. If VMT grows more slowly than inflation, an unchanging charge per mile will generate a revenue stream whose purchasing power will gradually erode, just as revenue from fuel taxes is currently eroding. Under these circumstances, policymakers would still face the question of whether to index a mileage-based fee to inflation.

Table 8.19 Cents per Mile Needed to Replace HURF Revenue

Year	Total HURF Revenue	Total Gasoline and Use Fuel Revenue (Only)	ADOT Reported Total VMT	(Total HURF) Cents/Mile Replacement	(Fuel Only) Cents/Mile Replacement
1990	$664,057,000	$339,116,000	$35,455,735,000	1.87	0.96
1991	$679,821,000	$362,018,000	34,926,850,000	1.95	1.04
1992	$675,195,000	$369,789,000	34,952,400,000	1.93	1.06
1993	$717,443,000	$387,235,000	37,653,765,000	1.91	1.03
1994	$776,063,000	$422,556,000	38,775,775,000	2.00	1.09
1995	$800,152,000	$451,090,000	39,652,505,000	2.02	1.14
1996	$859,575,000	$473,741,000	42,010,770,000	2.05	1.13
1997	$896,962,000	$488,701,000	43,490,845,000	2.06	1.12
1998	$887,487,000	$508,544,000	44,989,535,000	1.97	1.13
1999	$982,779,000	$557,775,000	46,829,135,000	2.10	1.19
2000	$1,019,599,000	$565,736,000	49,035,925,000	2.08	1.15
2001	$1,030,965,000	$574,259,000	49,653,505,000	2.08	1.16
2002	$1,076,395,000	$596,325,000	52,013,595,000	2.07	1.15
2003*	$1,114,906,000	$623,020,000	53,486,214,000	2.09	1.17
2004	$1,179,561,000	$642,533,000	$57,260,470,000	2.06	1.12

*VMT data for 2003 is not available, so 2003 numbers were estimated by linear interpolation.
Source: Curtis Lueck & Associates, 2007

Toll Roads

Toll roads are receiving significant attention as an alternative method for funding roadway construction, operation and maintenance. Toll facilities can be publicly owned and operated, privately owned and operated, or a public-private partnership sharing development and operational responsibilities. This organizational flexibility allows a toll project to meet regional needs while complying with complex legislative and financial constraints associated with capital-intense projects.

FHWA identifies some reasons for the current reconsideration of toll roads:[54]

- One set of explanations stems from rapid growth in the purchase and use of motor vehicles; a scarcity of funding at all levels of government along with reluctance to raise taxes, leading to deferred maintenance and reconstruction; and the fact that "roads built in the peak years of new Interstate construction (roughly 1960-1980) were approaching the end of their design life and were wearing out."
- A second set of explanations is technological--"the increasing ability of electronic equipment to identify vehicles and record and store large amounts of data: a technology that is transforming our way of thinking about toll collection."
- A third explanation is economic--"With the possibility of privately financed toll roads, some large engineering and construction management firms believe that a highway market might exist that had not been explored by their firms."

The FHWA report includes a "Fact Sheet" that reports on "Total Toll Road, Toll Bridge, Toll Tunnel Length in Operation as of January 1, 2005." On that date, the United States had 9,815 miles of roadway that were tolled: 4,675 miles (47.6%) on the National Highway System, 3,000 miles (30.6%) on the Rural System, and 2,140 miles (21.8%) on the Urban System.

The FHWA report finds that "States which pass toll road legislation do not follow a fixed pattern," but that "the following provisions in State toll road legislation are common":

- Creation of an authority or commission
- Scope, purpose, and function of the entity
- Delineation of the district within which the entity operates
- Details about the entity's governing board
- The legal powers of the entity
- The authority to issue bonds and use tolls
- Authority to set and revise tolls
- Ability to invest bond proceeds
- Constraints on the use of the revenue
- Rights and remedies of bondholders
- Tax-exempt status of the entity's property and bonds
- Police powers
- Operating, maintenance and repair obligations
- Relationship with other entities

Arizona Revised Statutes treat toll roads in two sections in Title 28: (a) Chapter 22 (§28-7701 to 7758), which enables "transportation project privatization," and (b) under Chapter 19, County Roads, at Article 4 "Toll Roads, Ferries and Bridges" (§28-6801 to 6808). Neither of these sections specifically authorizes either the state or counties to construct and operate public toll roads, but they do create processes for implementing privatized toll facilities.

A.R.S. §28-7701 to 7758 relate exclusively to pilot projects with private entities for transportation facility operations and roadway construction projects. A.R.S. §28-7701 to 7706 (Article 1) permits ADOT to "request competing proposals by private entities" and to "enter into written agreements" with private entities for (a) construction of transportation facilities by the private entity and (b) lease of such projects to the private entity. A.R.S. §28-7701(C) mandates that agreements with private entities provide for state ownership of the constructed facility; lease to the private entity for a mutually agreed period of time; reversion of the facility to the state after expiration of the lease; reimbursement to the state of any costs incurred after execution of the agreement; authority for the private entity to impose and collect tolls; and uses of tolls, including "a reasonable rate of return on investment."

According to A.R.S. §28-7702, a new toll route must (1) have a reasonable alternative route, (2) accommodate the same type of motor vehicles as the existing alternative facility, and (3) must be at least as direct as the existing alternative facility.

A.R.S. §28-7741 to 7758 (Article 2) permits private entities to apply to the state, and for the state to grant an entity authority, to "construct, operate or enlarge a roadway in this state." Under these statutes, the applicant must be incorporated in Arizona and would not have the power of eminent domain. A.R.S. §28-7746 provides for local approvals of such projects. A.R.S. §28-7753 allows ADOT to deposit "all tolls in excess of a reasonable rate of return on investment" in HURF. Both articles provide that toll revenue is not subject to state sales taxes and allow users of a toll facility to apply for a refund for any fuel taxes or motor carrier taxes paid while using the facility.

The literature on toll roads does consider public/private partnerships as one practical structure and funding method for toll roads. A.R.S. Chapter 22 is a good first step in the creation of such partnerships. The same literature, however, provides many examples of successful state-operated toll facilities. A state toll road authority, which would require new legislation, is therefore another option worth exploring.

A.R.S. §28-6801 – 6808 also permits a private entity to apply to a county for the right to operate a toll road, ferry or bridge. A.R.S. §28-6801 defines a toll road as including "trails for the passage of saddle and pack animals and foot passengers, as well as roads designed for the passage of vehicles, if the trails have been built in mountainous or precipitous places or in other places where the building of roads for the passage of vehicles would be impractical." These laws on county toll roads were written for a much earlier time in the state's history and have no relevance to today's transportation systems or needs.

Congestion Pricing

FHWA identifies four main types of [congestion] pricing strategies:

- **Variably priced lanes**, involving variable tolls on separated lanes within a highway, such as express toll lanes or HOT lanes
- **Variable tolls on entire roadways** – both on toll roads and bridges, as well as on existing toll-free facilities during rush hours
- **Cordon charges** – either variable or fixed charges to drive within or into a congested area within a city
- **Area-wide charges** – per-mile charges on all roads within an area that may vary by level of congestion."[55]

Congestion pricing is rooted in basic economic theory: "charge a price in order to allocate a scarce resource to its most valuable use, as evidenced by users' willingness to pay for the resource."[56] According to the testimony of Douglas Holtz-Eakin, then director of the Congressional Budget Office (CBO), "Introducing congestion pricing on a crowded roadway… has two economic effects. First, it dampens demand for the highway during the most congested periods by inducing some motorists to alter their travel plans. Second, continued demand in the face of appropriate congestion pricing serves as a signal for additional investment in road capacity."[57]

In testimony to the congressional Joint Economic Committee in May 2003, the Director for Physical Infrastructure Issues of the U.S. Government Accountability Office (GAO) reported that a GAO study on congestion pricing found that:

> "Evidence from projects (on congestion pricing) both here and abroad shows that this approach can reduce congestion. Such projects have also shown they can generate sufficient revenues to fund operation – and sometimes fund other transportation improvements as well."[58]

The FHWA "Congestion Pricing: A Primer" notes that:

> "Congestion pricing works by shifting purely discretionary rush hour highway travel to other transportation modes or to off-peak periods, taking advantage of the fact that the majority of rush-hour drivers on a typical urban highway are not commuters. By removing a fraction (even as small as 5%) of the vehicles from a congested roadway, pricing enables the system to flow more efficiently, allowing more cars to move through the same physical space."[59]

The GAO testimony provides some "evidence of increased economic efficiency" from congestion pricing. For example, HOT lane projects in Orange County and San Diego, California and in Houston, Texas show that "drivers willing to pay to use the HOT lane saved an average of 12-20 minutes per trip in the peak period." Cordon toll projects in Singapore produced "an immediate 73% decline in the use of private cars, a 30% increase in carpools, and a doubling of buses' share of work traffic." Introduction of cordon charges in London "resulted in traffic decreases of roughly 20%, and about a 14% increase in the use of buses during the morning commute." [60]

Congestion pricing seems to reduce congestion and appears to be a promising avenue toward additional transportation revenue as well. The FHWA primer notes that "net revenues after payment of operating costs can be used to pay for expansion of roadway facilities," (such as) "to support alternatives to driving alone such as public transit, to address impacts on low-income individuals by providing toll discounts or credits, or to reduce other taxes that motorists pay for highways such as fuel taxes, vehicle registration fees or sales taxes."[61] Such excess revenue could also be used to fund highway capacity improvements.

As is true with toll roads, technological advances will facilitate congestion pricing schemes. According to the CBO's Holtz-Eakins, "On all of the congestion-priced highways in the United States, tolls are collected electronically."[62] Electronic billing avoids congestion at tollbooths and technology can allow systems to adjust congestion prices in "real time." On the other hand, electronic billing is not possible if vehicles lack the ability (transponders) to communicate with the system sensors.

Concerns have been raised that congestion pricing cannot be fair and equitable to lower income motorists. The three reports cited here acknowledge this concern, but conclude that it can be addressed. Mr. Holtz-Eakins reports that "preliminary evidence suggests that the new toll lanes in California are used by people of all income groups."[63] Equity and fairness are important values and would demand close examination with any congestion pricing program proposed for Arizona or the Hassayampa Valley. Privacy is also a concern for many.

8.2.2.2 Financing Options: General Obligation Bonding

Arizona counties, cities and towns do not typically use primary property taxes to fund transportation through their general funds, nor do they consistently use secondary property taxes to fund general obligation bond debt service for transportation purposes.

County General Obligation Bonds for Roadway Improvements

On the county level, only Pima County has invested heavily in general obligation bonding for roadway purposes, but this practice ceased in 1997 when voters approved a $350 million HURF revenue bond authorization. Maricopa County and Cochise County have used general obligation bonding for transportation, but those authorizations date back to the 1980s.

As of June 30, 2005, Maricopa County has no outstanding general obligation bond debt and no outstanding general obligation bond authorization.[64] The county held its last general obligation bond election in 1986, "which included several functional categories but no transportation improvements."[65]

Also on June 30, 2005, Maricopa County had a "constitutional general obligation bonding capacity" of $4,510,048,001.[66] The Arizona constitution limits bond debt to 6% of the most recent secondary assessed valuation, but up to 15% of that valuation if voters authorize such debt. The county's 15% debt limit increased from $2.1 billion in FY 1996 to $4.5 billion in FY 2005. Over that ten-year period, the constitutional debt limit increased by 113.1%, or an average of 8.8% annually.

Table 8.20 shows projections for growth in the county's legal debt limit through FY 2016, assuming no new debt is incurred in the interim. There are two scenarios, assuming (A) growth in the debt limit of 8.8%--the average annual growth between FY 1996 and 2005--and (B) a more conservative scenario with annual growth of 5%.

Table 8.20 Maricopa County Legal Debt Limit Through FY 2016

Fiscal Year	Assume 10.1% Annual Growth (Scenario A)	Assume 5.0% Annual Growth (Scenario B)
FY 2005	$4,510,048,000	$4,510,048,000
FY 2006	$4,906,932,000	$4,735,550,000
FY 2007	$5,338,742,000	$4,972,328,000
FY 2008	$5,808,552,000	$5,220,944,000
FY 2009	$6,319,704,000	$5,481,992,000
FY 2010	$6,875,838,000	$5,756,091,000
FY 2011	$7,480,912,000	$6,043,896,000
FY 2012	$8,139,232,000	$6,346,090,000
FY 2013	$8,855,484,000	$6,663,395,000
FY 2014	$9,634,767,000	$6,996,565,000
FY 2015	$10,482,627,000	$7,346,393,000
FY 2016	$11,405,098,000	$7,713,713,000

Source: Curtis Lueck & Associates, 2007

The legal debt limit would climb to $11.4 billion under scenario (A) and to $7.7 billion under scenario (B). Under either scenario, Maricopa County has a very large legal general obligation bond capacity.

Arizona is ranked 35th in the nation in property taxes per capita[67], and Maricopa County has a low property tax rate compared to other counties in the state. For FY 2007, the total county rate was $1.4348 per $100 of assessed valuation, which included $1.1794 for the Operating Levy, $0.2047 for the Flood Control District and $0.0507 for the County Library District. There was no levy for debt service.[68] As a comparison, Pima County's rate is $5.34 and Pinal County's is $4.45 per $100 of assessed valuation.

Maricopa County enjoys a good debt rating. The most recent ratings are: Fitch – AA+; Moody's – Aa3; and Standard and Poor's – A+.

City/Town General Obligation Bonds for Roadway Improvements

Cities and towns can use general obligation bond debt to fund roadway improvements. Glendale and Goodyear have used voter-approved general obligation bonds to fund such improvements. Jurisdictions also use general obligation bonds to fund other public improvements, however, resulting in competition for scarce bonding authorizations.

Table 8.21 reports the debt ceiling limits on Buckeye, Glendale, Goodyear, and Surprise, as of June 30, 2006. Both Glendale and Goodyear have obligated just over one-half of their constitutional debt limit--the second and third highest percentage of bond capacity utilization in the state, behind only Tempe at 60.3%. While these two cities have $154.7 million and $45.9 million in untapped borrowing authority, fiscal prudence may make them reluctant to incur any substantial new bond debt in the near future.

Buckeye and Surprise, on the other hand, have obligated very little of their current bonding capacity--only 1.8% and 2.0%. Buckeye, however, has only $29.4 million in available capacity as of June 30, 2006. Surprise has much more unused capacity: $152.5 million.
While the four cities and towns have a combined $382.1 million in debt capacity, fiscal prudence may limit the amount of this capacity that they are willing to allocate to transportation purposes.

Table 8.21 Municipal Debt Limits as of June 30, 2006

City	Constitutional Debt Limit (A)	Outstanding Debt (B)	Current Legal Debt Limit (A-B)	% of Constitutional Debt Limit Used
Buckeye	$29,983,000	$553,000	$29,430,000	1.8%
Glendale	$330,088,000	$175,350,000	$154,738,000	53.1%
Goodyear	$101,758,000	$56,270,000	$45,488,000	55.3%
Surprise	$155,620,000	$3,157,000	$152,463,000	2.0%
Total	$617,449,000	$235,330,000	$382,119,000	38.1%

Source; Arizona Department of Revenue, "FY 2005/06 Report of Indebtedness," December 2006
http://www.azdor.gov/ResearchStats/bounding/FY06%20Report.pdf

8.2.3 Conclusion

This chapter describes the current transportation funding sources within the study area, and examines myriad strategies to enhance revenues. Building the conceptual roadway network in the Hassayampa Valley study area will cost approximately $22 billion in today's dollars. The roadway projects are not in the adopted MAG RTP and none of them are funded. The study identifies various transportation revenue sources in use today by study area jurisdictions, including the HURF (primarily the state gasoline tax), and the RARF, which comes from the voter-approved half-cent sales tax.

The HURF has been declining in real terms for almost 20 years, and the RARF expires in 2025. Accordingly, these major sources cannot be relied on for the proposed roadway framework. There is a need to identify and commit new funding sources in order to build it. Funding will also be needed for continuing operation and maintenance once construction is complete.

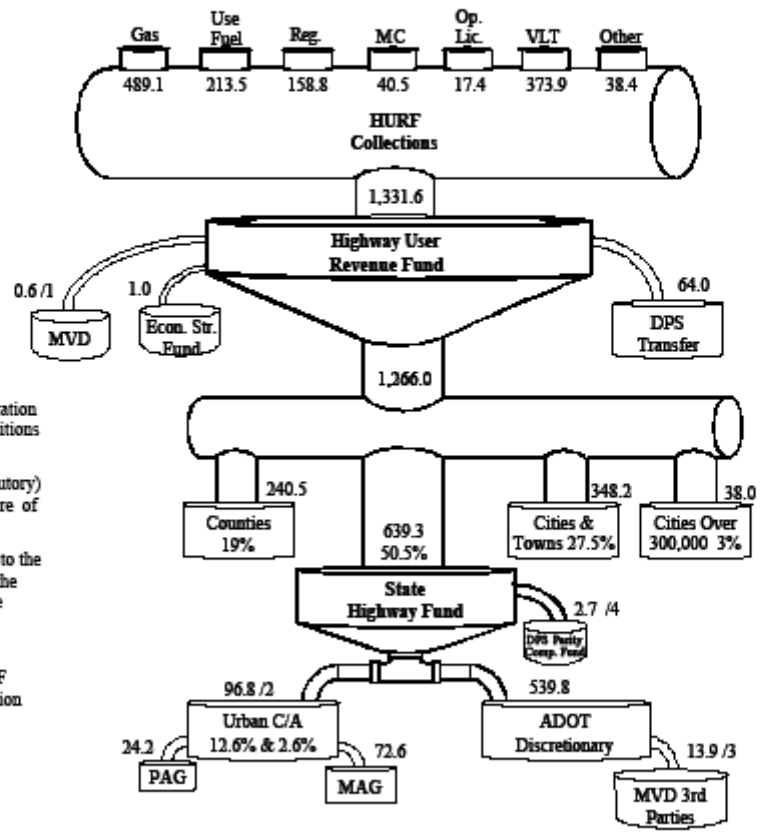
Potential revenue sources identified in this study include user fees, fuel tax increases, toll roads, special taxation districts, another extension of the RARF, and regional development impact fees, among many others. Some new sources require approval by the state legislature and others may require approval by local elected officials or voters. There are no easy solutions to this funding predicament, as the sources that generate the most revenue will likely be the most difficult to enact. However, this study begins to set a strategy for funding policy consensus-building.

Similar funding problems are evident throughout the state, so a broader initiative—perhaps even a coordinated statewide strategy—should be pursued over the coming years. Even though the conceptual network is a long-term vision, planners and decision-makers should begin to think now about how to overcome the funding shortfall.

ATTACHMENTS

Attachment 1: HURF Diagram

ARIZONA DEPARTMENT OF TRANSPORTATION
FY 2006 HURF ACTUAL REVENUE DISTRIBUTION FLOW
(Millions of Dollars)



NOTES:

/1. Appropriation to MVD for vehicle registration enforcement program ($383,300) and 5 FTE positions for 3rd Party program ($250,000).

/2. The 12.6% (statutory) and 2.6% (non-statutory) allocations from the State Highway Fund share of HURF distributions.

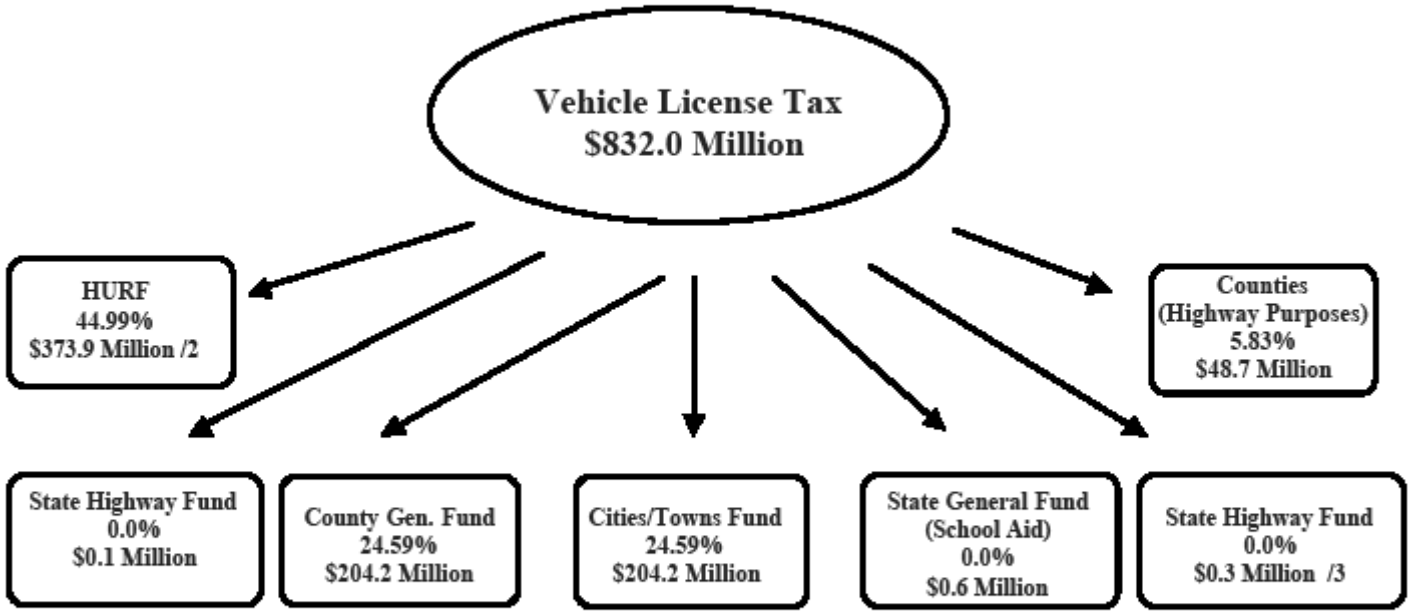
/3. With the elimination of the VLT distribution to the state highway fund, a distribution is made from the state highway fund to MVD Third Parties for the collection of VLT.

/4. Per Laws 2005, Chapter 306 (SB 1119), 1.51 percent of the state highway fund share of HURF VLT is distributed to the DPS Parity Compensation Fund.

Attachment 2: State VLT

VEHICLE LICENSE TAX DISTRIBUTION

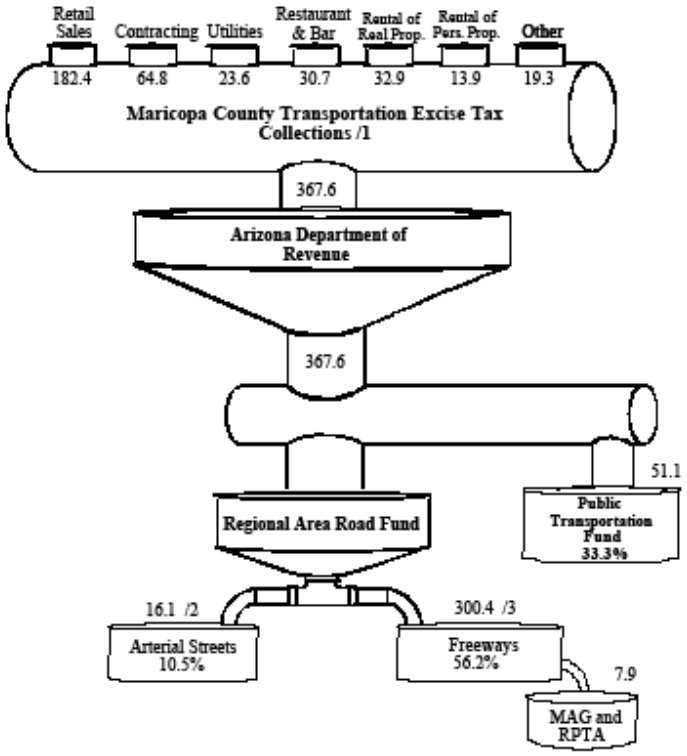
FY 2006 ACTUAL /1



NOTES:
1. The distribution percentage for each recipient based on statutory distribution. The State General Fund and State Highway Fund receive a share of the VLT only from alternative fuel vehicles, rental vehicles and privately owned vehicles used as a school bus, ambulance or fire fighting service. The other VLT recipients also receive a small amount of VLT from these vehicles.
2. Laws 2005, Chapter 306 (SB 1119) distributed 1.51% share of State Highway Fund's share of HURF VLT to DPS Parity Compensation Fund totaling $2.7 million in FY 2006.
3. $13.6 million from the State Highway Fund and the $0.3 million from the State Highway Fund share of VLT was paid to the MVD Third Parties per HB 2026 and HB 2055 from the 1998 and 2001 legislative sessions, respectively in FY 2006. The reimbursements were previously paid solely from the State Highway Fund share of VLT until it was severely reduced from the VLT rate reductions.

Attachment 3: RARF Diagram

MARICOPA COUNTY TRANSPORTATION EXCISE TAX
FY 2006 ACTUAL REVENUE DISTRIBUTION FLOW
(Millions of Dollars)



NOTES:

/1. Prop 300 expired on December 31, 2005 and Prop. 400 became effective on January 1, 2006. FY 2006 collections and distributions are a mix of both Prop. 300 and Prop. 400. Prop. 300 monies will continue over time due to adjustments, refunds and audits.

/2. Under Prop. 400, the Regional Area Road Fund (ADOT) receives the Freeways 56.2% and the Arterial Streets 10.5% revenues. MAG programs projects for the Arterial Streets 10.5% monies and then bills ADOT for the costs.

/3. A portion of the Freeways 56.2% monies are distributed equally to MAG and the Public Transportation Fund to be used for planning purposes.

RARF (m) Actual FY 06 01/05

Attachment 4: State by State Gasoline and Diesel Taxes

State	Gaso-line (cpg)	Diesel (cpg)	Notes
Alabama	18	19	Includes 2 cpg inspection fee. Counties can levy up to 5 cpg with approval of the state legislature. Cities and counties can levy additional tax—rates range from .5 cents per gallon to 4 cents per gallon. An additional 1 cpg UST/AST Trust Fund Environmental Transport Fee is levied at the wholesale level to cover remediation costs.
Alaska	8	8	There is a .06 per gallon tax credit for gasohol used during a mandated control period in a CO non-attainment area. The motor fuel tax rate for marine use is 5 cents/gallon; aviation gasoline is 4.7 cents/gallon; and jet fuel is 3.2 cents/gallon.
Arizona	18	26	Plus 1 cpg UST tax. Use class vehicles pay an additional 9 cpg on diesel (with an exemption for vehicles under 26,000 gw).
Arkansas	21.5	22.5	Plus .2 cpg environmental assurance fee assessed at the wholesale level for underground storage tank fund.
California	18	18	Other taxes include a 6% state sales tax and 1.25% county, plus additional local sales taxes and 1.2 cents per gallon state UST fee.
Colorado	22	20.5	NA
Connecticut	25	26	Plus 5% gross earnings tax collected at wholesale.
Delaware	23	22	NA
Dist. of Columbia	20	20	NA
Florida	14.5	27.2	The statewide sales tax is 14.5 cents per gallon for gasoline and 27.2 cpg for diesel. The 14.5 cents represents 10.5 cpg sales tax plus 4 cpg sales tax. Gasoline tax rate increased .2 cpg on 1/1/05. Tax rate changes annually based on CPI. Does not include 2.2 cpg tax/fee for environmental inspection purposes (5 cents per barrel tax for the Water Quality Assurance Trust Fund, 80 cents per barrel for the Inland Protection Trust Fund, 2 cents per barrel for the Coastal Protection Trust Fund and 1/8 cents per gallon for weights and measures inspection fee). Gasoline rate also does not include additional minimum 9.9 to 17.8 cent per gallon local option tax portion with the weighted average of 14.6 cents per gallon. Therefore, depending on where you live in Florida, your overall gasoline tax can vary from an average of 52.9 cents per gallon to 45 cents per gallon.

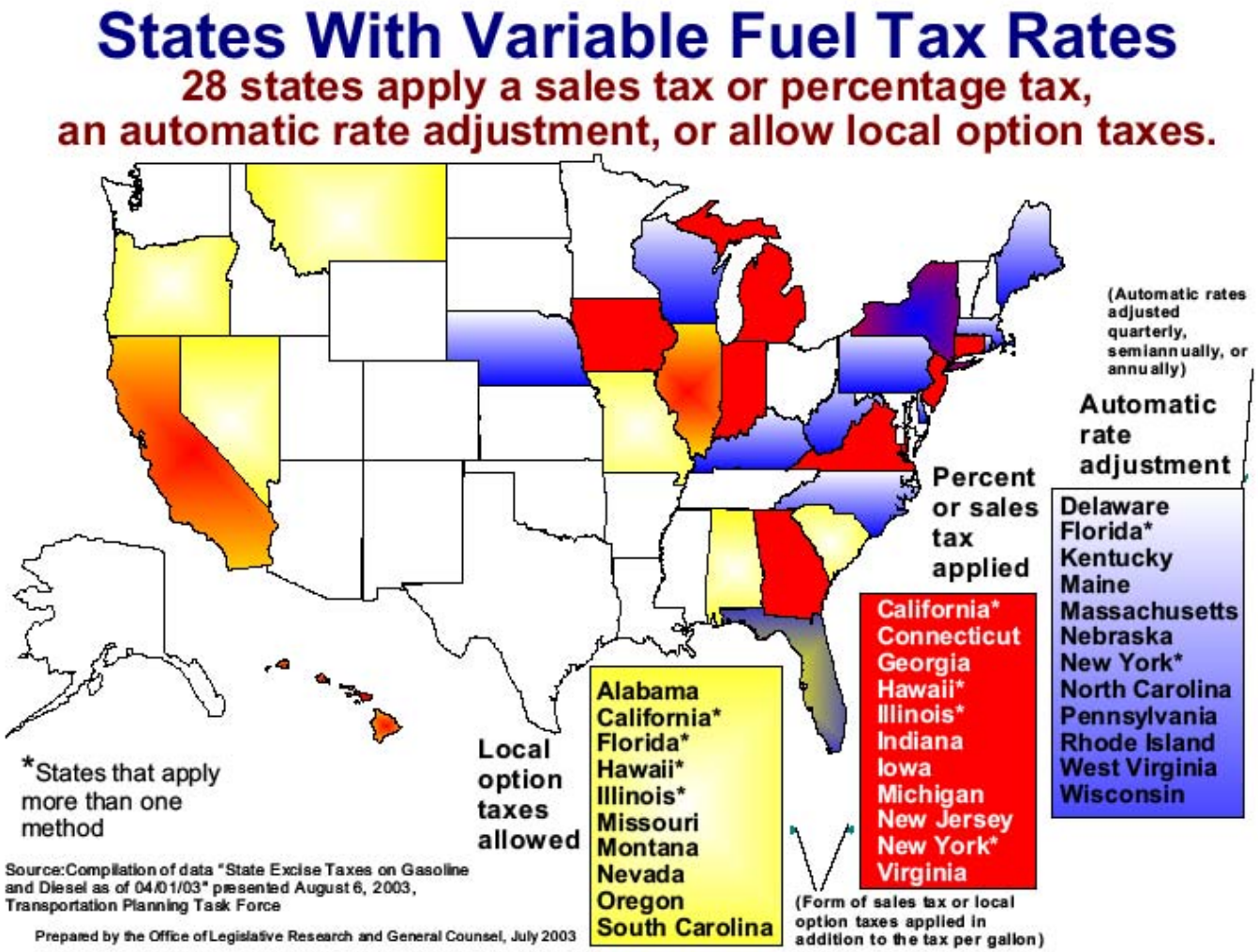
State	Gas (cpg)	Diesel (cpg)	Notes
Georgia	7.5	7.5	Plus 4% sales tax.
Hawaii	16	16	Plus 4% sales tax and additional county taxes and 0.12-cpg environmental response tax.
Idaho	25	25	NA
Illinois	19	21.5	Plus 6.25% sales tax and .3 % tax for underground storage tank fund, and other local sales and gasoline taxes. Diesel fuel taxes are 27.5 cpg for commercial highway users.
Indiana	18	16	Plus 6% sales tax and 0.008 per gallon inspection fee. For diesel, there is an 11-cpg surcharge paid on a quarterly self-reporting basis. Gasoline tax increased 3 cpg effective 1/1/03 per 2002 legislation
Iowa	20	22.5	Plus 1 cpg UST fee. The gasoline tax for ethanol-blended gasoline is 19 cpg. Tax on gasoline is based on the amount of ethanol sold in the state. Ethanol sales review for 2004 will be complete 6/30/05 and the gasoline tax may be increased.
Kansas	24	26	Plus 1 cpg environmental fee. Gasoline tax increased 1 cents per gallon 7/1/03.
Kentucky	15	12	Variable based on 9% of the average wholesale price of gasoline with minimum price of $1.11 or 10 cpg. In addition, there is a supplemental highway user tax of 5 cpg for gasoline and 2 cpg for special fuels plus a 1.4-cpg underground storage tank fee. Com
Louisiana	20	20	NA
Maine	25.2	26.3	Plus for gasoline: .07 cpg for Coastal and Inland Water fund, 1.38 cpg for Groundwater Fund and 40 cpg/10,000 gallons for Petroleum Market Share Act Plus for diesel: .07 cpg for Coastal and Inland Water Fund and .6 cpg
Maryland	23.5	24.25	NA
Massachusetts	23.5	23.5	Includes 2.5 cpg UST fund tax. UST tax increased from .5 cpg on 4/1/03.
Michigan	19	15	Plus 6% sales tax and 0.875 cpg for environmental regulation fee for refined petroleum fund.
Minnesota	20	20	Plus periodic 2 cpg UST cleanup fee at wholesale level which fluctuates depending on the fund balance. UST (Petro-fund) fee reinstated 11/1/04 and will run through February 2005.
Mississippi	18	18	Plus 0.4 cpg Environmental Protection Fee. In Hancock, Harrison and Jackson counties there is an additional 3 cpg Seawall tax.
Missouri	17	17	Governor signed legislation in 2002 that included removal of the 2008 expiration date of the 6-cpg temporary gasoline tax increase adopted by voters in 1992.

State	Gaso-line (cpg)	Diesel (cpg)	Notes
Montana	27.75	28.5	Includes 0.75 cpg fee assessed at the pump to go toward the state cleanup fund.
Nebraska	25.4	25.4	Variable -- 12.5-cent base plus 12.9 cpg variable rate. Does not include 0.9 cpg release prevention fee for gasoline and 0.3 cpg release prevention fee for diesel and other fuels. Variable rate increased 0.6 cents per gallon for the period from 1/1/05 to 6/30/05.
Nevada	23	27	Plus up to 10 cpg county tax on gasoline, 0.75 cpg-cleanup fee, and .055 cpg inspection fee.
New Hampshire	18	18	Plus 0.1 cpg for oil pollution control fund, 1.5 cpg for UST cleanup fund, 1 cpg for AST and bulk storage fund. Also 2 cpg for fuel oil and bulk fuel oil storage.
New Jersey	14.5	17.5	Includes 10.5 cpg sales tax plus 4 cpg Petroleum Products Gross Receipts Tax.
New Mexico	17	18	Plus 1 cpg loading fee.
New York	31.9	28.9	Includes 8 cents per gallon sales tax, Petroleum Business Tax of 15.2 cents per gallon for gasoline and 13.45 cents per gallon for diesel (rate increased .6 cpg 1/1/05). Statewide volume weighted average sales tax increased 6/1/04 to 8.3 for per gallon for gasoline and 7.1 cents per gallon for diesel. Also a spill tax of 0.3 cent per gallon is collected on gasoline and diesel and a petroleum testing fee of 0.05 cent per gallon is levied on gasoline. Does not include an estimated 7.9 cents per gallon for gasoline and 6.7 cents per gallon for diesel from weighted county average sales taxes that range from 3.25% to 4.75%.
North Carolina	26.6	26.6	Plus 0.25 cpg inspection tax. Rate increased 2 cpg from 24.6 cents per gallon to 26.6 cents per gallon 1/1/05. It consists of a 17.5 cpg flat rate plus a variable rate of 9.1 cpg wholesale component based on 7% average wholesale price component based on prices from 4/1/04 to 9/30/04 (the average price for that period was 130.34 cents per gallon).
North Dakota	21	21	NA
Ohio	26	26	Per 2003 legislation, rate increases 6 cpg in 2-year increments. First increase took effect 6/30/03. 7/1/04 rate increased another 2 cents per gallon (to 26 cents per gallon). Surcharge of 3 cpg for commercial vehicles.
Oklahoma	16	13	Plus 1 cpg per gallon UST fee.
Oregon	24	24	NA

State	Gas (cpg)	Diesel (cpg)	Notes
Pennsylvania	31.1	35.1	Plus 1.1 cpg fee on gasoline going into USTs (rate increased 1/1/04 from 1 cpg to 1.1 cpg). Includes 18 cent per gallon oil company franchise tax on liquid fuels (primarily gasoline) and 23 cents per gallon oil company franchise tax on fuels (primarily diesel) and a 12 cents per gallon tax liquid fuels tax rate. (Oil company franchise tax rate increased from 14.2 cents per gallon to 18 cents per gallon for gasoline and from 19.2 cents per gallon to 23 cents per gallon for diesel on 1/1/05.) Franchise tax based on the average wholesale price of gasoline during a 1-year period. For 2004 the average price was $1.17, up from 91.9 in 2003.
Rhode Island	30	30	Includes 3-cpg wholesale distributor tax. Does not include 1 cent per gallon environmental protection regulatory fee for UST program. Tax increased 2 cpg on 7/1/02.
South Carolina	16	16	Plus a 0.25 cpg inspection fee for inspection program and 0.50-cpg environmental fee for UST cleanup. Assessed on all petroleum products at the wholesale level.
South Dakota	22	22	Plus a 2-cpg throughput tax on distributors.
Tennessee	20	18	Plus 1-cent special petroleum tax for gasoline and .4 cpg environmental assurance fee.
Texas	20	20	NA
Utah	24.5	24.5	NA
Vermont	17.5	26	Rate includes 1 cpg license fee for UST fund.
Virginia	17.5	16	Plus 0.6-cpg petroleum storage tank fee and 2% sales tax on motor fuels in localities that are part of the Northern Virginia Transportation District.
Washington	28	28	Per legislation passed in 2003, rate increased 5 cpg effective 7/1/03.
West Virginia	20.5	20.5	Plus a 5% variable wholesale tax, presently 6.5 cpg, based on statewide average wholesale price of gasoline with a minimum price of $1.30 per gallon. Variable wholesale tax increased 1/1/05 from 4.85 cpg to 6.5 cpg.
Wisconsin	32.1	32.1	Variable -- adjusted annually on 4/1. Rate calculated by multiplying the current rate by an inflation factor (annual change in the consumer price index.) Includes 3-cpg oil inspection fee on gasoline and diesel. Gasoline and diesel tax increased 0.6 cpg o
Wyoming	14	14	Includes base rate of 13 cpg plus 1 cpg to the environmental cleanup costs.

Source: GasPriceWatch, "Gasoline tax Rates by State," at "http://www.gaspricewatch.com/usgastaxes.asp"

Attachment 5: States with Variable Fuel Tax Rates



Attachment 6: Basic Data on Statewide Gasoline and Use Fuel Tax Increases

OPTION 1 Raise Statewide Gasoline Tax Rate from 18 Cents per Gallon to 24 Cents per Gallon

	Gasoline Taxes			Use Fuel Taxes			Statewide Totals	
	Tax per Gallon	Statewide Gasoline Sold	Estimated Statewide Gasoline Tax Collections	Tax per Gallon	Statewide Use Fuels Sold	Estimated Statewide Use Fuel Collections	Statewide Total Fuel Sold	Estimated Statewide Total Fuel Tax Collections
FY 2006	$0.24	2,814,403,178	$675,456,763	$0.26	870,823,783	$226,414,184	3,685,226,962	$901,870,946
FY 2007	$0.24	2,896,020,870	$695,045,009	$0.26	930,910,625	$242,036,762	3,826,931,495	$937,081,771
FY 2008	$0.24	2,980,005,475	$715,201,314	$0.26	995,143,458	$258,737,299	3,975,148,933	$973,938,613
FY 2009	$0.24	3,066,425,634	$735,942,152	$0.26	1,063,808,356	$276,590,173	4,130,233,991	$1,012,532,325
FY 2010	$0.24	3,155,351,978	$757,284,475	$0.26	1,137,211,133	$295,674,895	4,292,563,110	$1,052,959,369
FY 2011	$0.24	3,246,857,185	$779,245,724	$0.26	1,215,678,701	$316,076,462	4,462,535,886	$1,095,322,187
FY 2012	$0.24	3,341,016,043	$801,843,850	$0.26	1,299,560,531	$337,885,738	4,640,576,575	$1,139,729,589
FY 2013	$0.24	3,437,905,509	$825,097,322	$0.26	1,389,230,208	$361,199,854	4,827,135,717	$1,186,297,176
FY 2014	$0.24	3,537,604,768	$849,025,144	$0.26	1,485,087,092	$386,122,644	5,022,691,861	$1,235,147,788
FY 2015	$0.24	3,640,195,307	$873,646,874	$0.26	1,587,558,102	$412,765,106	5,227,753,408	$1,286,411,980
FY 2016	$0.24	3,745,760,971	$898,982,633	$0.26	1,697,099,611	$441,245,899	5,442,860,581	$1,340,228,532
FY 2017	$0.24	3,854,388,039	$925,053,129	$0.26	1,814,199,484	$471,691,866	5,668,587,523	$1,396,744,995
FY 2018	$0.24	3,966,165,292	$951,879,670	$0.26	1,939,379,248	$504,238,605	5,905,544,540	$1,456,118,275
FY 2019	$0.24	4,081,184,085	$979,484,180	$0.26	2,073,196,416	$539,031,068	6,154,380,502	$1,518,515,249
FY 2020	$0.24	4,199,538,424	$1,007,889,222	$0.26	2,216,246,969	$576,224,212	6,415,785,393	$1,584,113,434
FY 2021	$0.24	4,321,325,038	$1,037,118,009	$0.26	2,369,168,010	$615,983,683	6,690,493,048	$1,653,101,692
FY 2022	$0.24	4,446,643,464	$1,067,194,431	$0.26	2,532,640,603	$658,486,557	6,979,284,067	$1,725,680,988
FY 2023	$0.24	4,575,596,125	$1,098,143,070	$0.26	2,707,392,804	$703,922,129	7,282,988,929	$1,802,065,199
FY 2024	$0.24	4,708,288,412	$1,129,989,219	$0.26	2,894,202,908	$752,492,756	7,602,491,320	$1,882,481,975
FY 2025	$0.24	4,844,828,776	$1,162,758,906	$0.26	3,093,902,908	$804,414,756	7,938,731,685	$1,967,173,662
FY 2026	$0.24	4,985,328,811	$1,196,478,915	$0.26	3,307,382,209	$859,919,374	8,292,711,020	$2,056,398,289
Total		101,274,432,060	$19,162,760,012		54,294,417,680	$10,041,154,022	155,568,849,740	$29,203,914,034

OPTION 2 Index Gasoline and Use Fuel Tax Rates

	Gasoline Taxes			Use Fuel Taxes			Statewide Totals	
	Tax per Gallon	Statewide Gasoline Sold	Estimated Statewide Gasoline Tax Collections	Tax per Gallon	Statewide Use Fuels Sold	Estimated Statewide Use Fuel Collections	Statewide Total Fuel Sold	Estimated Statewide Total Fuel Tax Collections
FY 2006	$0.1800	2,814,403,178	$506,592,572	$0.2600	870,823,783	$226,414,184	3,685,226,962	$733,006,756
FY 2007	$0.1841	2,896,020,870	$533,273,283	$0.2660	930,910,625	$247,603,608	3,826,931,495	$780,876,891
FY 2008	$0.1884	2,980,005,475	$561,359,187	$0.2721	995,143,458	$270,776,087	3,975,148,933	$832,135,274
FY 2009	$0.1927	3,066,425,634	$590,924,291	$0.2784	1,063,808,356	$296,117,208	4,130,233,991	$887,041,500
FY 2010	$0.1971	3,155,351,978	$622,046,501	$0.2848	1,137,211,133	$323,829,930	4,292,563,110	$945,876,431
FY 2011	$0.2017	3,246,857,185	$654,807,824	$0.2913	1,215,678,701	$354,136,201	4,462,535,886	$1,008,944,025
FY 2012	$0.2063	3,341,016,043	$689,294,588	$0.2980	1,299,560,531	$387,278,746	4,640,576,575	$1,076,573,334
FY 2013	$0.2111	3,437,905,509	$725,597,666	$0.3049	1,389,230,208	$423,523,002	4,827,135,717	$1,149,120,668
FY 2014	$0.2159	3,537,604,768	$763,812,718	$0.3119	1,485,087,092	$463,159,249	5,022,691,861	$1,226,971,967
FY 2015	$0.2209	3,640,195,307	$804,040,442	$0.3190	1,587,558,102	$506,504,934	5,227,753,408	$1,310,545,376
FY 2016	$0.2260	3,745,760,971	$846,386,840	$0.3264	1,697,099,611	$553,907,211	5,442,860,581	$1,400,294,051
FY 2017	$0.2312	3,854,388,039	$890,963,496	$0.3339	1,814,199,484	$605,745,725	5,668,587,523	$1,496,709,221
FY 2018	$0.2365	3,966,165,292	$937,887,871	$0.3416	1,939,379,248	$662,435,650	5,905,544,540	$1,600,323,521
FY 2019	$0.2419	4,081,184,085	$987,283,611	$0.3494	2,073,196,416	$724,431,015	6,154,380,502	$1,711,714,627
FY 2020	$0.2475	4,199,538,424	$1,039,280,877	$0.3575	2,216,246,969	$792,228,341	6,415,785,393	$1,831,509,218
FY 2021	$0.2532	4,321,325,038	$1,094,016,683	$0.3657	2,369,168,010	$866,370,615	6,690,493,048	$1,960,387,298
FY 2022	$0.2590	4,446,643,464	$1,151,635,260	$0.3741	2,532,640,603	$947,451,641	6,979,284,067	$2,099,086,901
FY 2023	$0.2649	4,575,596,125	$1,212,288,434	$0.3827	2,707,392,804	$1,036,120,798	7,282,988,929	$2,248,409,232
FY 2024	$0.2710	4,708,288,412	$1,276,136,029	$0.3915	2,894,202,908	$1,133,088,235	7,602,491,320	$2,409,224,264
FY 2025	$0.2773	4,844,828,776	$1,343,346,285	$0.4005	3,093,902,908	$1,239,130,564	7,938,731,685	$2,582,476,849
FY 2026	$0.2837	4,985,328,811	$1,414,096,304	$0.4097	3,307,382,209	$1,355,097,076	8,292,711,020	$2,769,193,380
Total		101,274,432,060	$18,645,070,763		54,294,417,680	$13,415,350,019	155,568,849,740	$32,060,420,782

OPTION 3 Raise Gasoline Tax Rate to 24 Cents per Gallon and Index Gasoline and Use Fuel Taxes

	Gasoline Taxes			Use Fuel Taxes			Statewide Totals	
	Tax per Gallon	Statewide Gasoline Sold	Estimated Statewide Gasoline Tax Collections	Tax per Gallon	Statewide Use Fuels Sold	Estimated Statewide Use Fuel Collections	Statewide Total Fuel Sold	Estimated Statewide Total Fuel Tax Collections
FY 2006	$0.2400	2,814,403,178	$675,456,763	$0.2600	870,823,783	$226,414,184	3,685,226,962	$901,870,946
FY 2007	$0.2455	2,896,020,870	$711,031,044	$0.2660	930,910,625	$247,603,608	3,826,931,495	$958,634,652
FY 2008	$0.2512	2,980,005,475	$748,478,916	$0.2721	995,143,458	$270,776,087	3,975,148,933	$1,019,255,003
FY 2009	$0.2569	3,066,425,634	$787,899,055	$0.2784	1,063,808,356	$296,117,208	4,130,233,991	$1,084,016,264
FY 2010	$0.2629	3,155,351,978	$829,395,335	$0.2848	1,137,211,133	$323,829,930	4,292,563,110	$1,153,225,264
FY 2011	$0.2689	3,246,857,185	$873,077,099	$0.2913	1,215,678,701	$354,136,201	4,462,535,886	$1,227,213,300
FY 2012	$0.2751	3,341,016,043	$919,059,450	$0.2980	1,299,560,531	$387,278,746	4,640,576,575	$1,306,338,196
FY 2013	$0.2814	3,437,905,509	$967,463,554	$0.3049	1,389,230,208	$423,523,002	4,827,135,717	$1,390,986,556
FY 2014	$0.2879	3,537,604,768	$1,018,416,957	$0.3119	1,485,087,092	$463,159,249	5,022,691,861	$1,481,576,206
FY 2015	$0.2945	3,640,195,307	$1,072,053,923	$0.3190	1,587,558,102	$506,504,934	5,227,753,408	$1,578,558,857
FY 2016	$0.3013	3,745,760,971	$1,128,515,787	$0.3264	1,697,099,611	$553,907,211	5,442,860,581	$1,682,422,998
FY 2017	$0.3082	3,854,388,039	$1,187,951,328	$0.3339	1,814,199,484	$605,745,725	5,668,587,523	$1,793,697,053
FY 2018	$0.3153	3,966,165,292	$1,250,517,161	$0.3416	1,939,379,248	$662,435,650	5,905,544,540	$1,912,952,811
FY 2019	$0.3225	4,081,184,085	$1,316,378,148	$0.3494	2,073,196,416	$724,431,015	6,154,380,502	$2,040,809,164
FY 2020	$0.3300	4,199,538,424	$1,385,707,836	$0.3575	2,216,246,969	$792,228,341	6,415,785,393	$2,177,936,177
FY 2021	$0.3376	4,321,325,038	$1,458,688,911	$0.3657	2,369,168,010	$866,370,615	6,690,493,048	$2,325,059,525
FY 2022	$0.3453	4,446,643,464	$1,535,513,680	$0.3741	2,532,640,603	$947,451,641	6,979,284,067	$2,482,965,321
FY 2023	$0.3533	4,575,596,125	$1,616,384,579	$0.3827	2,707,392,804	$1,036,120,798	7,282,988,929	$2,652,505,377
FY 2024	$0.3614	4,708,288,412	$1,701,514,705	$0.3915	2,894,202,908	$1,133,088,235	7,602,491,320	$2,834,602,940
FY 2025	$0.3697	4,844,828,776	$1,791,128,380	$0.4005	3,093,902,908	$1,239,130,564	7,938,731,685	$3,030,258,944
FY 2026	$0.3782	4,985,328,811	$1,885,461,739	$0.4097	3,307,382,209	$1,355,097,076	8,292,711,020	$3,240,558,814
Total		101,274,432,060	$24,860,094,350		54,294,417,680	$13,415,350,019	155,568,849,740	$38,275,444,370

Attachment 7: Projected Increases in HURF Revenue from Three Options for Raising Fuel Taxes

OPTION 1 Raise Statewide Gasoline Tax Rate to 24 Cents per Gallon ($Million)

Fiscal Year	Original Total HURF Estimates	Original Gas/Use Fuel Taxes	Revised Gas/Use Fuel Taxes	Revised Total HURF Estimates	Increase in HURF Revenue	% Increase in HURF Revenue
2006	$1,303.1	$721.9	$901.8	$1,483.0	$179.9	13.8%
2007	$1,378.1	$763.5	$937.1	$1,551.7	$173.6	12.6%
2008	$1,443.4	$799.6	$973.9	$1,617.7	$174.3	12.1%
2009	$1,511.8	$837.5	$1,012.5	$1,686.8	$175.0	11.6%
2010	$1,574.4	$872.2	$1,053.0	$1,755.2	$180.8	11.5%
2011	$1,645.5	$911.6	$1,095.3	$1,829.2	$183.7	11.2%
2012	$1,715.4	$950.3	$1,139.7	$1,904.8	$189.4	11.0%
2013	$1,794.3	$994.0	$1,186.3	$1,986.6	$192.3	10.7%
2014	$1,871.7	$1,036.9	$1,235.1	$2,069.9	$198.2	10.6%
2015	$1,958.4	$1,084.9	$1,286.4	$2,159.8	$201.5	10.3%
2016	$2,049.1	$1,135.2	$1,340.2	$2,254.1	$205.0	10.0%
2017	$2,144.0	$1,187.8	$1,396.7	$2,352.9	$208.9	9.7%
2018	$2,243.3	$1,242.8	$1,456.1	$2,456.6	$213.3	9.5%
2019	$2,347.2	$1,300.3	$1,518.5	$2,565.3	$218.2	9.3%
2020	$2,455.9	$1,360.6	$1,584.1	$2,679.4	$223.5	9.1%
2021	$2,569.6	$1,423.6	$1,653.1	$2,799.1	$229.5	8.9%
2022	$2,688.6	$1,489.5	$1,725.7	$2,924.8	$236.2	8.8%
2023	$2,813.1	$1,558.5	$1,802.1	$3,056.8	$243.6	8.7%
2024	$2,943.4	$1,630.7	$1,882.5	$3,195.3	$251.8	8.6%
2025	$3,079.7	$1,706.2	$1,967.2	$3,340.8	$261.0	8.5%
2026	$3,222.4	$1,785.2	$2,056.2	$3,493.4	$271.0	8.4%
Total	$44,752.4	$24,792.8	$29,203.5	$49,163.1	$4,410.7	9.9%

OPTION 2 Index Gasoline and Use Fuel Tax Rates ($Million)

Fiscal Year	Original Total HURF Estimates	Original Gas/Use Fuel Taxes	Revised Gas/Use Fuel Taxes	Revised Total HURF Estimates	Increase in HURF Revenue	% Increase in HURF Revenue
2006	$1,303.1	$721.9	$733.0	$1,314.2	$11.1	0.9%
2007	$1,378.1	$763.5	$780.9	$1,395.5	$17.4	1.3%
2008	$1,443.4	$799.6	$832.1	$1,475.9	$32.5	2.2%
2009	$1,511.8	$837.5	$887.0	$1,561.3	$49.5	3.3%
2010	$1,574.4	$872.2	$945.9	$1,648.1	$73.7	4.7%
2011	$1,645.5	$911.6	$1,008.9	$1,742.8	$97.3	5.9%
2012	$1,715.4	$950.3	$1,076.6	$1,841.7	$126.3	7.4%
2013	$1,794.3	$994.0	$1,149.1	$1,949.4	$155.1	8.6%
2014	$1,871.7	$1,036.9	$1,227.0	$2,061.8	$190.1	10.2%
2015	$1,958.4	$1,084.9	$1,310.5	$2,183.9	$225.6	11.5%
2016	$2,049.1	$1,135.2	$1,400.3	$2,314.2	$265.1	12.9%
2017	$2,144.0	$1,187.8	$1,496.7	$2,452.9	$308.9	14.4%
2018	$2,243.3	$1,242.8	$1,600.3	$2,600.8	$357.5	15.9%
2019	$2,347.2	$1,300.3	$1,711.7	$2,758.5	$411.4	17.5%
2020	$2,455.9	$1,360.6	$1,831.5	$2,926.8	$470.9	19.2%
2021	$2,569.6	$1,423.6	$1,960.4	$3,106.4	$536.8	20.9%
2022	$2,688.6	$1,489.5	$2,099.1	$3,298.2	$609.6	22.7%
2023	$2,813.1	$1,558.5	$2,248.4	$3,503.1	$689.9	24.5%
2024	$2,943.4	$1,630.7	$2,409.2	$3,722.0	$778.5	26.5%
2025	$3,079.7	$1,706.2	$2,582.5	$3,956.1	$876.3	28.5%
2026	$3,222.4	$1,785.2	$2,769.2	$4,206.4	$984.0	30.5%
Total	$44,752.4	$24,792.8	$32,060.3	$52,019.9	$7,267.5	16.2%

OPTION 3 Raise Gasoline Tax Rate to 24 Cents per Gallon and Index Gasoline and Use Fuel Taxes ($Million)

Fiscal Year	Original Total HURF Estimates	Original Gas/Use Fuel Taxes	Revised Gas/Use Fuel Taxes	Revised Total HURF Estimates	Increase in HURF Revenue	% Increase in HURF Revenue
2006	$1,303.1	$721.9	$901.9	$1,483.1	$180.0	13.8%
2007	$1,378.1	$763.5	$958.6	$1,573.2	$195.1	14.2%
2008	$1,443.4	$799.6	$1,019.3	$1,663.1	$219.7	15.2%
2009	$1,511.8	$837.5	$1,084.0	$1,758.3	$246.5	16.3%
2010	$1,574.4	$872.2	$1,153.2	$1,855.4	$281.0	17.8%
2011	$1,645.5	$911.6	$1,227.2	$1,961.1	$315.6	19.2%
2012	$1,715.4	$950.3	$1,306.3	$2,071.4	$356.0	20.8%
2013	$1,794.3	$994.0	$1,391.0	$2,191.3	$397.0	22.1%
2014	$1,871.7	$1,036.9	$1,481.6	$2,316.4	$444.7	23.8%
2015	$1,958.4	$1,084.9	$1,578.6	$2,452.0	$493.7	25.2%
2016	$2,049.1	$1,135.2	$1,682.4	$2,596.3	$547.2	26.7%
2017	$2,144.0	$1,187.8	$1,793.7	$2,749.9	$605.9	28.3%
2018	$2,243.3	$1,242.8	$1,913.0	$2,913.5	$670.2	29.9%
2019	$2,347.2	$1,300.3	$2,040.8	$3,087.6	$740.5	31.5%
2020	$2,455.9	$1,360.6	$2,177.9	$3,273.2	$817.3	33.3%
2021	$2,569.6	$1,423.6	$2,325.1	$3,471.1	$901.5	35.1%
2022	$2,688.6	$1,489.5	$2,483.0	$3,682.1	$993.5	37.0%
2023	$2,813.1	$1,558.5	$2,652.5	$3,907.2	$1,094.0	38.9%
2024	$2,943.4	$1,630.7	$2,834.6	$4,147.4	$1,203.9	40.9%
2025	$3,079.7	$1,706.2	$3,030.3	$4,403.9	$1,324.1	43.0%
2026	$3,222.4	$1,785.2	$3,240.6	$4,677.8	$1,455.4	45.2%
Total	$44,752.4	$24,792.8	$38,275.6	$58,235.2	$13,482.8	30.1%

ENDNOTES

[1] The federal rate also includes 0.1¢ for the leaking underground storage tank (LUST) cleanup program, for a total of 18.4¢ per gallon.

[2] A.R.S. §28-5433

[3] Data obtained from the World Bank, 2005.

[4] As a simplified example, Phoenix has a tax rate of 1.8% and a population of about 1.5 million. It generates about $440 million in taxes, or about $162 per capita for each 1% of sales tax. For the overall County, the collections equate to about $200 per capita. Data from City of Phoenix budget and RARF reports.

[5] Counties cannot impose this type of sales tax.

[6] The calculation is thus: $300,000 x 65% x 2% = $3900. The 65% factor is imposed by state law.

[7] Minor allocations from the motor fuel taxes are allocated to the Leaking Underground Storage Tank Trust Fund and the General Fund.

[8] The Equity Bonus Program provides funding to states to ensure a minimum rate of return to the state of contributions from the state to the Highway Account.

[9] See Arizona Department of Transportation, "Highway User Revenue Fund: Fiscal year 2006 Year-End Report," August 2006

[10] Ibid; Maricopa County estimates include total population in the County.

[11] Ibid

[12] Under Collections, ADOT reports General Fund Transfers of $58 million between FY 1998 and 1991.

[13] Source ADOT 2006 Vehicle License Tax report

[14] Source ADOT Public Transportation Division

[15] "Onboard Transportation Program Annual Report," at http://www.phxurs.com/go/

[16] See A.R.S. 28-6712, which say in part: "For road purposes the board of supervisors may levy a real and personal property tax of not more than twenty-five cents per one hundred dollars of property in the county as valued for tax purposes. The board of supervisors shall levy and collect the tax at the same time and in the same manner as other primary property taxes are levied and collected."

[17] Assessed valuation from Maricopa County Assessors 2006 Tax Levy report.

[18] A.R.S. §28-6801 defines county "toll roads" as "includes trails for the **passage of saddle and pack animals** and foot passengers, as well as roads designed for the passage of vehicles, if the trails have been built in mountainous or precipitous places or in other places where the building of roads for the passage of vehicles would be impracticable." (emphasis added)

[19] See Arizona State Senate Fact Sheet on HB 2149, March 2, 1998.

[20] Curtis Lueck & Associates, "Existing Transportation Revenues," January 10, 2007.

[21] Use fuels include all gases and liquids suitable or used to propel motor vehicles, except gasoline. Diesel fuel is a use fuel.

[22] VTPI's website is at http://www.vtpi.org/tdm/tdm119.htm. Santa Cruz County TFTF is at http://www.tftaskforce.org.

[23] Source "http://www.gaspricewatch.com/usgastaxes.asp"

[24] "Light class motor vehicles" are defined as a vehicle that "uses use fuel,' but is not "a road tractor, truck tractor, truck or passenger carrying vehicle having a declared gross vehicle rate of more than twenty-six thousand pounds or having more than two axles." (A.R.S. § 28-5601(17)

[25] "Use class motor vehicles" are defined as "a road tractor, truck tractor, truck or passenger carrying vehicle having a declared gross vehicle rate of more than twenty-six thousand pounds or having more than two axles" (A.R.S. § 28-5601(37)

[26] Wachs, Martin, "A Dozen Reasons for Raising Gasoline taxes," Institute of Transportation Studies, University of California at Berkeley, Research report UCB-ITS-RR-2003-1, March 2003

[27] Data on inflation from 1990 to 2005 is from the Federal Reserve Bank of Minneapolis, at "http"//www.minneapolisfed.org/research/data/us/calc/hist1913.cfm." An inflation rate of 2.3% was assumed for 2006 to 2010.

[28] Legislation to index fuel taxes to inflation might use the Engineering News Record Construction Cost Index (ENR-CCI) instead of the CPI. The ENR-CCI would be a more

precise measure of inflation in roadway construction. Between 1991 and 2005, the ENR-CCI averaged a slightly higher rate of increase (3.05%) than the CPI (2.67%). Information on the ENR-CCI can be found in the monthly Engineering News Report. Information on CPI can be found at the Federal Reserve Bank of Minneapolis, op cit.

[29] The data in Attachments 4 and 5 is based upon estimates gallons of gasoline and use fuel that will be sold statewide between FY 2006 and 2026. Data on gallons sold in FY 2006 are from Arizona Department of Transportation at "http://www.azdot.gov/inside_adot/fms/gallon2.asp." Projections for future sales are based upon the average growth in sales from FY 1990 to 2006 of 2.9% for gasoline and 6.9% for use fuel. Past sales of fuel by gallons is also at the ADOT site identified in this footnote.

[30] ADOT at "http://www.azdot.gov/inside_azdot/fms/gallon2.asp."ADOT does not provide estimates of gallons sold by incorporated jurisdictions, only at the county level.

[31] See ADOT, "Highway User Revenue Fund: Fiscal Year 2006 Year-End Report," at "http://www.azdot.gov/inside_adot/fms/pdf/hurf06.pdf"

[32] A.R.S. §42-5061(A)(22) excludes from the transaction privilege tax "Motor vehicle fuel and use fuel which are subject to a tax imposed under title 28, chapter 16, article 1," as well as the sales of other fuels.

[33] See "http://www.fuelgaugereport.com/AZmetro.asp"

[34] U.S. Department of Energy, Energy Information Administration, "A Primer on Gasoline Prices" and "A Primer on Diesel Fuel Prices," at "http://www.eia.doe.gov"

[35] Arizona Department of Transportation, "Highway User Revenue Fund, Fiscal Year 2006 Year-End Report"

[36] See "http://www.azdot.gov/inside_adot/fms/pdf/vlt06det.pdf" and "http://www.azdot.gov/inside_adot/fms/pdf/vlt06sum.pdf"

[37] Arizona Department of Revenue, ""June 2006 Tax Facts," at "http://www.ador.gov/Newsroom/TaxFacts/2006/0606Taxfact.pdf"

[38] See also A.R.S. §42-6111 and §42-6110.

[39] Maricopa Association of Governments, "Developer Forum # 2, I-10/Hassayampa Valley Roadway Framework Study," July 26, 2006, Slide 2

[40] Curtis Lueck and Associates, "Analysis of the Potential of Development Impact fees and Improvement Districts for Providing New Revenues for Maricopa County Department of Transportation," March 2006

[41] For a more complete discussion of a Maricopa County impact fee program, see the Curtis Lueck and Associates report cited above.

[42] Maricopa Association of Governments, "Interim Projections of Population, Housing, and Employment by Municipal Planning Areas and Regional Analysis Zone, July 2003."

[43] Table 8.17 is adapted from "Chapter 5, Needs Assessment and Options for Securing Additional Revenues," in Maricopa County Transportation System Plan.

[44] Surprise uses this term for its newly approved impact fees for "Roads of Regional Significance."

[45] See "http://www.delcode.state.de.us/title29/c091/sc02/index.htm"

[46] See "http://leg1.state.va.us/cgi-bin/legp504.exe?071+sum+HB1666," as well as "+HB1667" and "+HB1668"

[47] The report is available at "http://www.fsu.edu/~collins/index.html

[48] See "http://phoenix.bizjournals.com/phoenix/stories/2007/01/15/story6.html." The full article is available only to paid subscribers to the print edition of the Business Journal.

[49] See "http://www.vtpi.org/tdm"

[50] See "http://www.vtpi.org/tdm/tdm35.htm"

[51] ibid

[52] AMPO, Regulatory Alert," October 11, 2006

[53] Data for VMT was obtained from ADOT's Highway System Performance Monitoring System, at "http://tpd.azdot.gov/datateam/hpms.php." Data for HURF revenues was obtained from ADOT's year-end reports, at "http://www.azdot.gov/inside_dot/fms/archive.asp." The HPMS data was not available for FY 2003 and data for FY 2005 is reported as still under development.

[54] FHWA, "Toll Facilities In The United States: Bridges-Roads-Tunnels-Ferries," June 2005, at "http://www.fhwa.dot.gov.ohim/tollpage.htm"

[55] Federal Highway Administration, "Congestion Pricing: A Primer," December 2006, at "http://ops.fhwa.dot.gov/publications/congestionpricing/index.htm." This classification scheme is similar to that offered by the Victoria Transport Policy Institute, at http://www.vtpi.org/tdm/tdm35.ht5m"

[56] Statement of Douglas Holtz-Eakin, Director of the Congressional Budget Office, before the Joint Economic Committee, U.S. Congress, "Congestion Pricing for Highways," May 6, 2003, page 2, at "http://www.cbo.gov/ftpdocs/41xx/doc4197/05-06-CongestionPricing.pdf."

[57] Eakin, page 2-3

[58] Testimony of JayEtta Z. Hecker before the Joint Economic Committee, U.S. Congress, "Reducing Congestion: Congestion Pricing Has Promise for Improving Use of Transportation Infrastructure," May 6, 2003, at "http://www.gao.gov/new.item.d03735t.pdf."

[59] FHWA, op. cit., Page 1

[60] Hecker, op. cit., Page 10 – 12.

[61] FHWA, op cit., Page 4

[62] Holtz-Eakins, op. cit., Page 4

[63] Holtz-Eakins, op.cit., Page 5

[64] Maricopa County, Arizona, "FY 2006-07 Annual Business Strategies – Debt Service," pages 877 to 894

[65] Ibid, page 885

[66] Maricopa County, Arizona, "Comprehensive Annual Financial Report: Fiscal Year Ended June 30, 2005, Page 268. The data in this CAFR differs from information presented in the FY 2006-07 Business Strategies regarding assessed value and debt limit. Since the data for previous years is taken from the CAFR, the report uses the CAFR data for FY 2005 as well. The FY 2006-07 Business Strategies reported assessed value of $33.2 billion compared to $30.1 billion and legal debt limit of almost %5.0 billion compared to $4.5 billion.

[67] Based on state and local property tax data for FY 2004 data from The Tax Foundation, http://www.taxfoundation.org/taxdata/show/251.html

[68] Total County property tax rates have declined from $1.6248 in FY 2000 to $1.4348 in FY 2007 Source: "http://www.maricopa.gov/finance/taxlevy.asp"