MARICOPA ASSOCIATION of GOVERNMENTS

COMMUTER RAIL
STRATEGIC PLAN

MARCH 2008

submitted by: URS

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1 INTRODUCTION

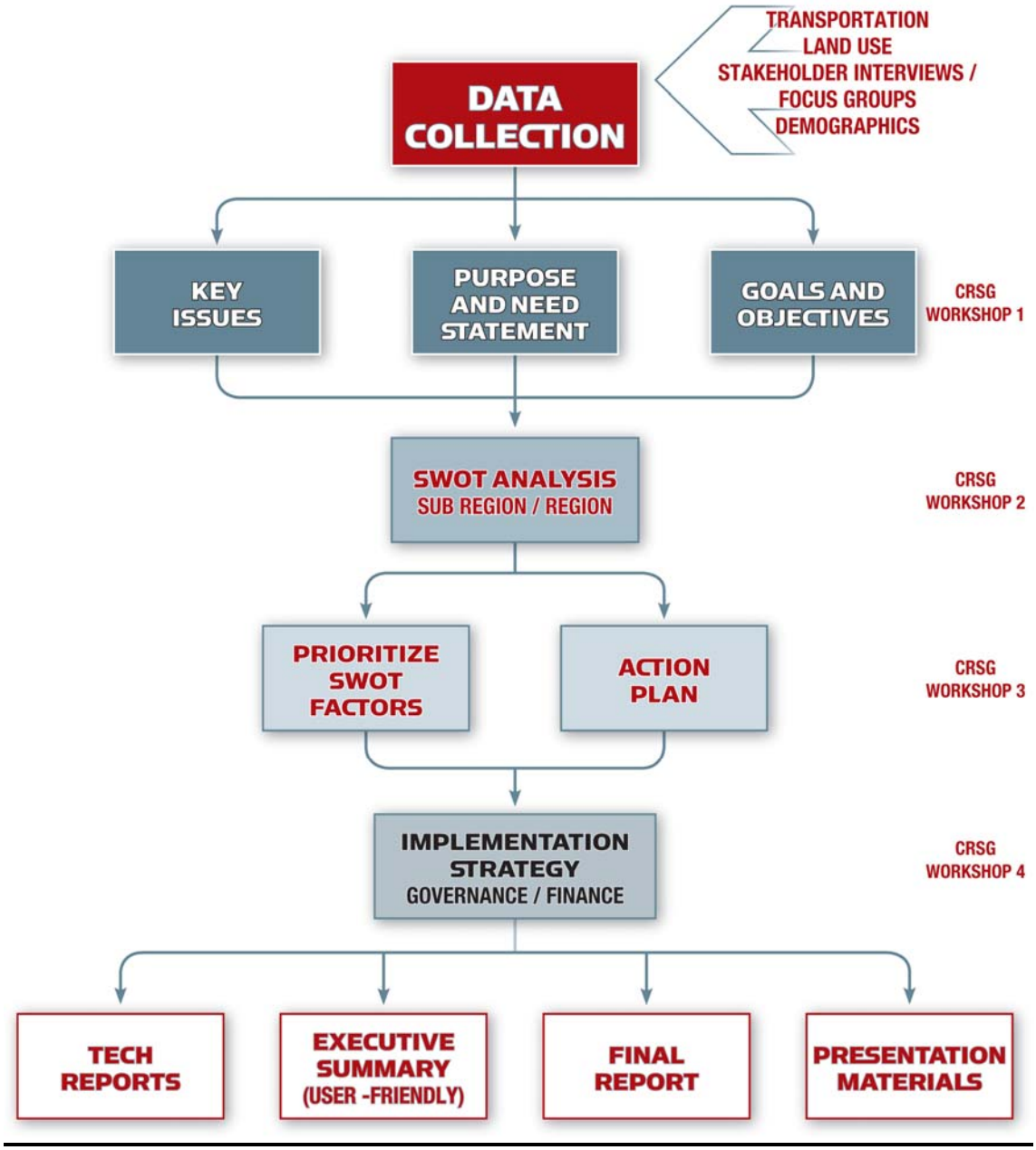
The Maricopa Association of Governments (MAG) has been actively exploring potential options for enhancing the longer-term economic vitality of the county and the mobility and well-being of its citizens. MAG further recognizes that commuter rail corridors may potentially serve a critical function in addressing future travel needs in the region. The MAG Commuter Rail Strategic Plan provides a framework on how commuter rail could be implemented in the MAG region and northern Pinal County. The MAG Commuter Rail Strategic Plan provides three core elements developed through a twelve month integrated planning process. These core elements are the foundation for a targeted commuter rail action plan and include:

1. A framework of goals, objectives, and action items to implement commuter rail;
2. A series of implementation steps for commuter rail investment; and
3. A consensus agreement of a large and diverse group of stakeholders.

1.1. Overview of the Planning Process

The planning process for the MAG Commuter Rail Strategic Plan began in February 2007. Several organizations and groups have contributed to the development of the Strategic Plan. These include MAG, the Commuter Rail Stakeholders Group (CRSG), and staff representatives from Arizona Department of Transportation (ADOT), Valley Metro Rail Inc. (METRO), and the Regional Public Transportation Authority (RPTA). The CRSG consists of public and private agencies and entities with an interest in transportation and those involved in past transportation studies, specifically those focused on transit. The CRSG met a total of four times throughout the planning process and helped to identify opportunities and threats of commuter rail and developed action plans to identify strategies to implement commuter rail in the region. Figure 1-1 illustrates the commuter rail strategic planning process.

Figure 1-1: Commuter Rail Strategic Planning Process



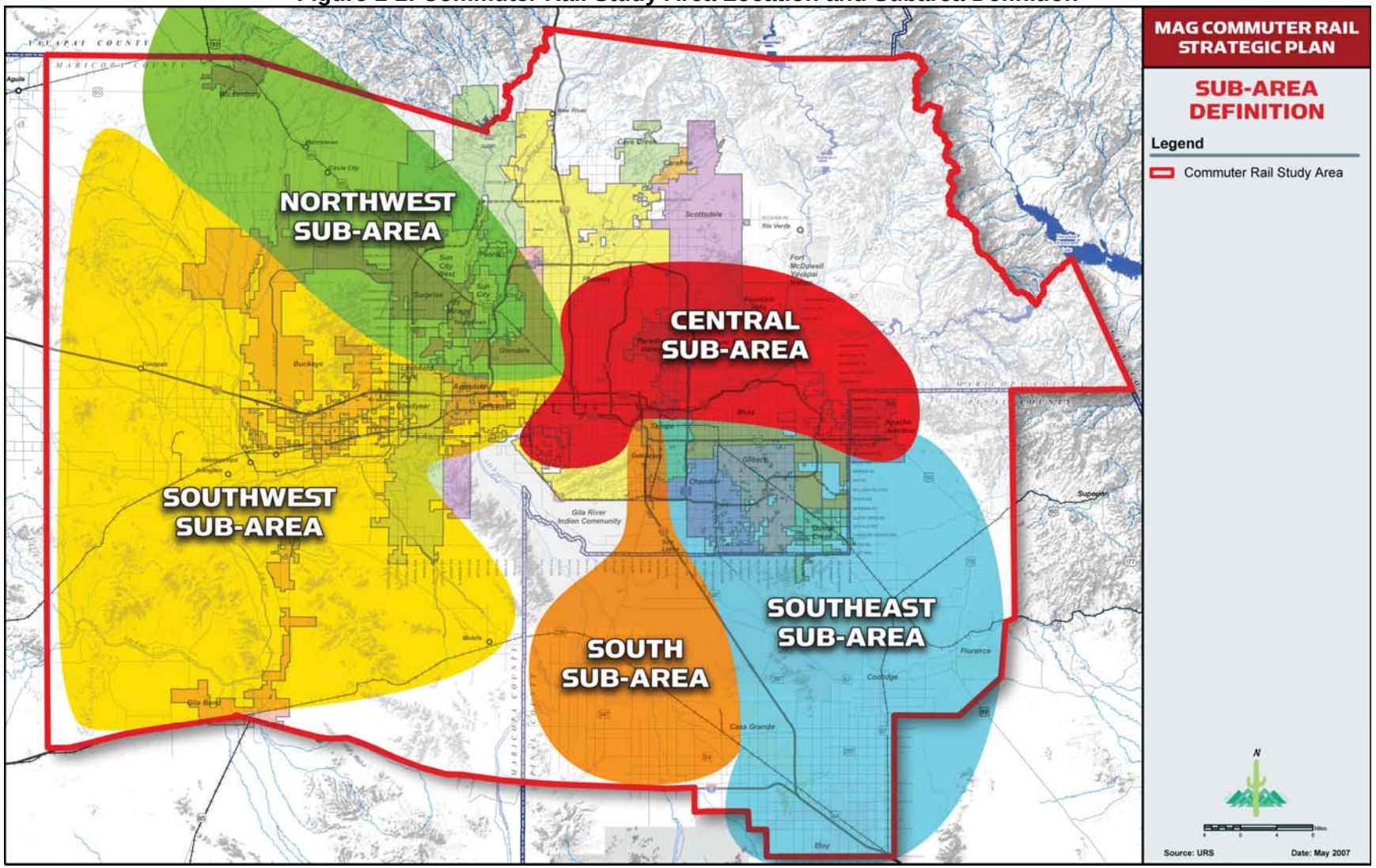
1.2. Study Area

The MAG Commuter Rail Strategic Plan study area includes the MAG region and portions of northern Pinal County, including the cities of Casa Grande, Coolidge, Florence, Eloy and Apache Junction. The study area is depicted with a red line in Figure 1-2.

The CRSG also defined smaller geographic study areas that helped to focus stakeholder involvement and create a sense of community building and linkages as part of the overall regional planning effort. These subareas were developed around existing rail lines that would facilitate commuter rail implementation. These subareas consist of the Southwest, Southeast, Northwest, Central, and South corridors. Figure 1-2 depicts the location of all five subareas.

Throughout the document, the term “study area” is used to describe a geography that includes the MAG region and northern Pinal County, whereas “subareas” denote groups of smaller areas that serve to provide demographic comparisons based on MAG model data.

Figure 1-2: Commuter Rail Study Area Location and Subarea Definition



2 PURPOSE AND VISION:

This Chapter describes the purpose that commuter rail would serve and is largely based on the dynamic population growth in the MAG Commuter Rail Strategic Plan study area. It is important to note that, as described in the previous section, the study area includes the entire MAG region as well as portions of northern Pinal County. The plan compiles socioeconomic projections for 2030 for the study subareas and for the region as a whole. Since population is integrally related to travel demand, reviewing current demographic information in relation to projected future growth will provide a broad indication of future travel demand potential within the study area.

2.1. Population Growth

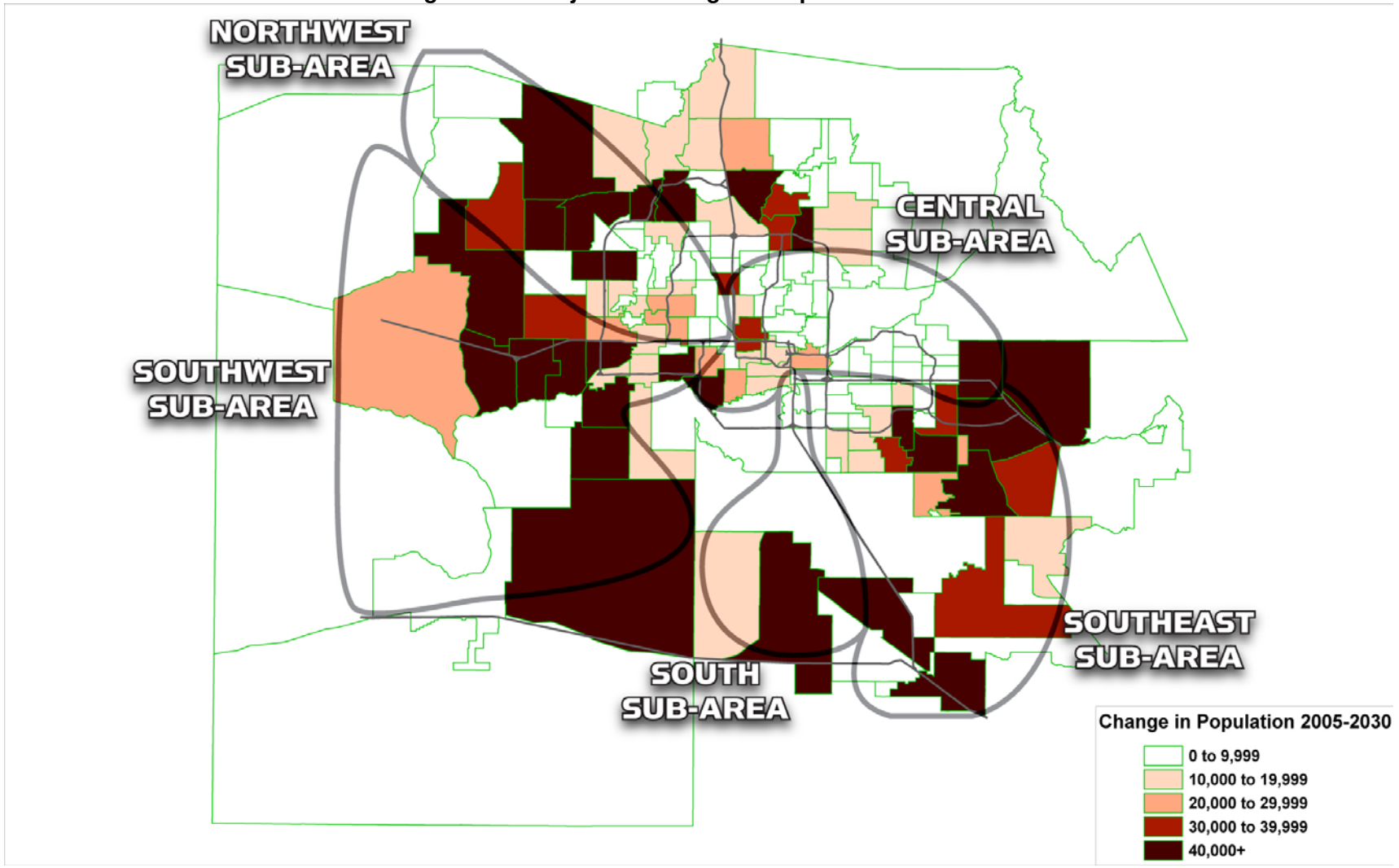
Continued population growth and associated land development in the outlying areas of Maricopa County and nearby Pinal County will dramatically increase travel demands throughout the region. Population growth in households within the study area is projected to nearly double from the 2005 base of 3.9 million to a total population of 7.0 million people in 2030, an increase of 82%. Table 2-1 shows base (2005) and forecasted (2030) population for the study area. Figure 2-1 illustrates subarea projected growth in relation to the study area as a whole.

Table 2-1: Total Population by Subarea

Subarea	Total Population**				
	2005	2030	Change 2005-2030	% Change	Average Annual Growth
Southwest (Buckeye, Goodyear, Gila Bend, Avondale; Litchfield Park)	157,900	890,100	732,200	464%	7.2%
Northwest (Surprise, El Mirage, Peoria, Wickenburg, Glendale; Youngtown)	589,700	1,156,200	566,500	96%	2.7%
Central (Salt River Pima Maricopa Indian Community, Cave Creek, Tolleson, Carefree, Fort McDowell Yavapai Nation, Phoenix, Fountain Hills, Paradise Valley; Scottsdale)	1,776,900	2,534,500	757,600	43%	1.4%
Southeast* (Queen Creek, Pinal, Maricopa, Superior, Apache Junction, Gilbert, Chandler, Mesa, Florence, Guadalupe; Tempe)	1,248,000	2,163,300	915,300	73%	2.2%
South * (Pinal County, Gila River Indian Community, Casa Grande; Coolidge, Eloy)	82,400	248,700	166,300	202%	4.5%
Other County Areas	100	4,400	4,300	4300%	16.3%
TOTAL (Study Area)*	**3,855,000**	**6,997,200**	**3,142,200**	**82%**	**2.4%**

*Includes northern Pinal County data
** Resident population in households
Source: MAG (June 2007)

Figure 2-1: Projected Change in Population 2005-2030



*Note- Resident population in households
Source: MAG, 2007

2.2. Employment Growth

By 2030, employment in the study area is also projected to nearly double from the 2005 base of 1.8 million to a total of almost 3.6 million in 2030, an increase of 98%. The majority of employment growth is occurring in the Central subarea with a forecast of 576,100 additional jobs, an increase of 56%. Other subareas within the study area are expected to see employment growth ranging from 80,600 to 463,200. Table 2-2 shows base employment levels (2005) and forecast employment levels (2030) for the five subareas within the study area. Figure 2-2 illustrates subarea projected employment growth in relation to the study area as a whole.

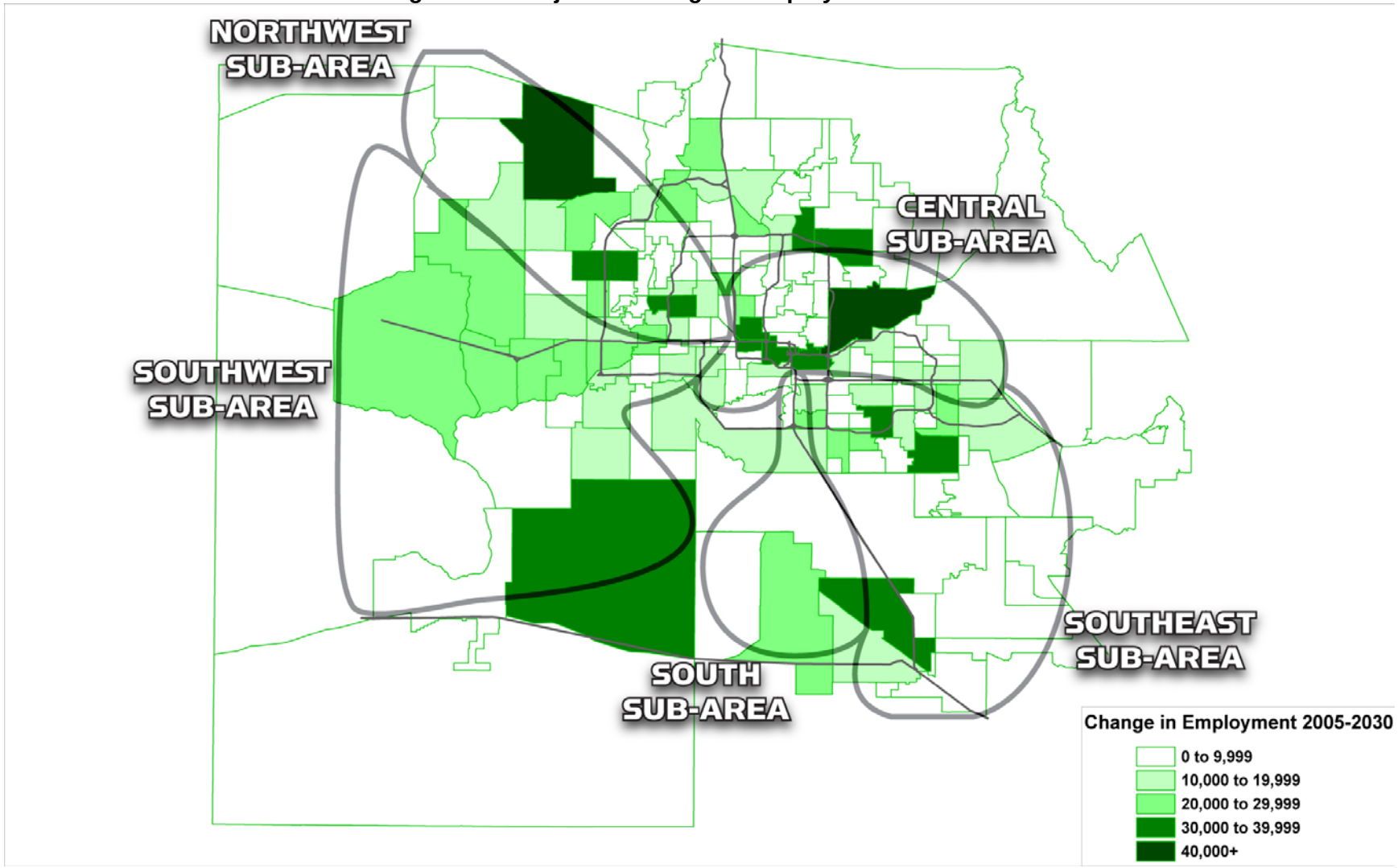
Table 2-2: Employment Growth by Subarea

Subarea	Total Employment				
	2005	2030	2005-2030 Change	% Change	Average Annual Growth
Southwest (Buckeye, Goodyear, Gila Bend, Avondale; Litchfield Park)	43,300	377,700	334,400	772%	9.1%
Northwest (Surprise, El Mirage, Peoria, Wickenburg, Glendale; Youngtown)	165,600	484,200	318,600	192%	4.4%
Central (Salt River Pima Maricopa Indian Community, Cave Creek, Tolleson, Carefree, Fort McDowell Yavapai Nation, Phoenix, Fountain Hills, Paradise Valley; Scottsdale)	1,032,200	1,608,300	576,100	56%	1.8%
Southeast* (Queen Creek, Pinal, Maricopa, Superior, Apache Junction, Gilbert, Chandler, Mesa, Florence, Guadalupe; Tempe)	530,700	993,900	463,200	87%	2.5%
South * (Pinal County, Gila River Indian Community, Casa Grande; Coolidge, Eloy)	47,700	128,300	80,600	169%	4.0%
Other County Areas	10	1,600	1,590	15900%	22.5%
TOTAL (Study Area)	**1,819,510**	**3,594,000**	**1,774,490**	**98%**	**2.8%**

*Includes northern Pinal County data

Source: MAG (June 2007)

Figure 2-2: Projected Change in Employment 2005-2030



Source: MAG, 2007

2.3. Increase in Households

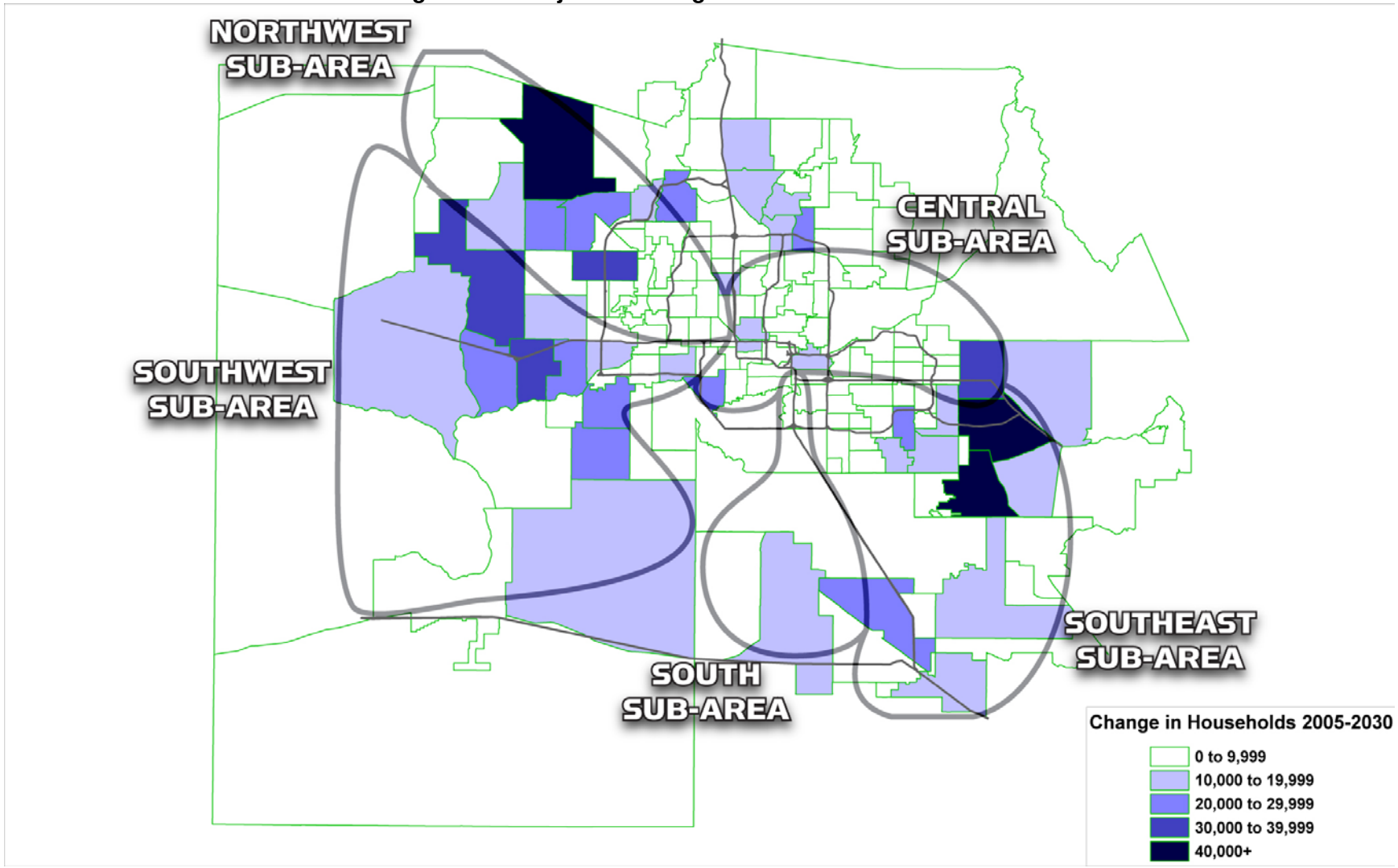
Total base households (2005) and forecast households (2030) are provided by subarea in Table 2-3. By 2030, households in this region are projected to increase by 1.3 million, an increase of 87%. All of the subareas within in the study area are projected to have substantial increases in growth. The Southeast subarea is forecast to increase by an additional 366,000 households, an increase of 78%. Figure 2-3 illustrates subarea projected employment growth in relation to the study area as a whole.

Table 2-3: Households by Subarea

Subarea	Households				
	2005	2030	2005-2030 Change	% Change	Average Annual Growth
Southwest (Buckeye, Goodyear, Gila Bend, Avondale; Litchfield Park)	52,500	336,500	284,000	541%	7.7%
Northwest (Surprise, El Mirage, Peoria, Wickenburg, Glendale; Youngtown)	226,300	459,700	233,400	103%	2.9%
Central (Salt River Pima Maricopa Indian Community, Cave Creek, Tolleson, Carefree, Fort McDowell Yavapai Nation, Phoenix, Fountain Hills, Paradise Valley; Scottsdale)	665,200	974,700	309,500	47%	1.5%
Southeast* (Queen Creek, Pinal, Maricopa, Superior, Apache Junction, Gilbert, Chandler, Mesa, Florence, Guadalupe; Tempe)	469,500	835,500	366,000	78%	2.3%
South * (Pinal County, Gila River Indian Community, Casa Grande; Coolidge**,** Eloy)**)**	28,300	94,300	66,000	233%	4.9%
Other County Areas	30	1,800	1,770	5900%	17.8%
TOTAL (Study Area)	**1,441,830**	**2,702,500**	**1,260,670**	**87%**	**2.5%**

*Includes northern Pinal County data
Source: MAG (June 2007)

Figure 2-3: Projected Change in Households 2005-2030



Source: MAG, 2007

Demographic Summary and Trends

The majority of population growth in the study area is occurring in the Southeast subarea, with 915,300 additional people anticipated to populate the area by 2030. According to the MAG model, the communities of Apache Junction, Gilbert and Pinal County areas have the greatest growth forecast. The Central, Southwest and Northwest subareas are also experiencing substantial population growth.

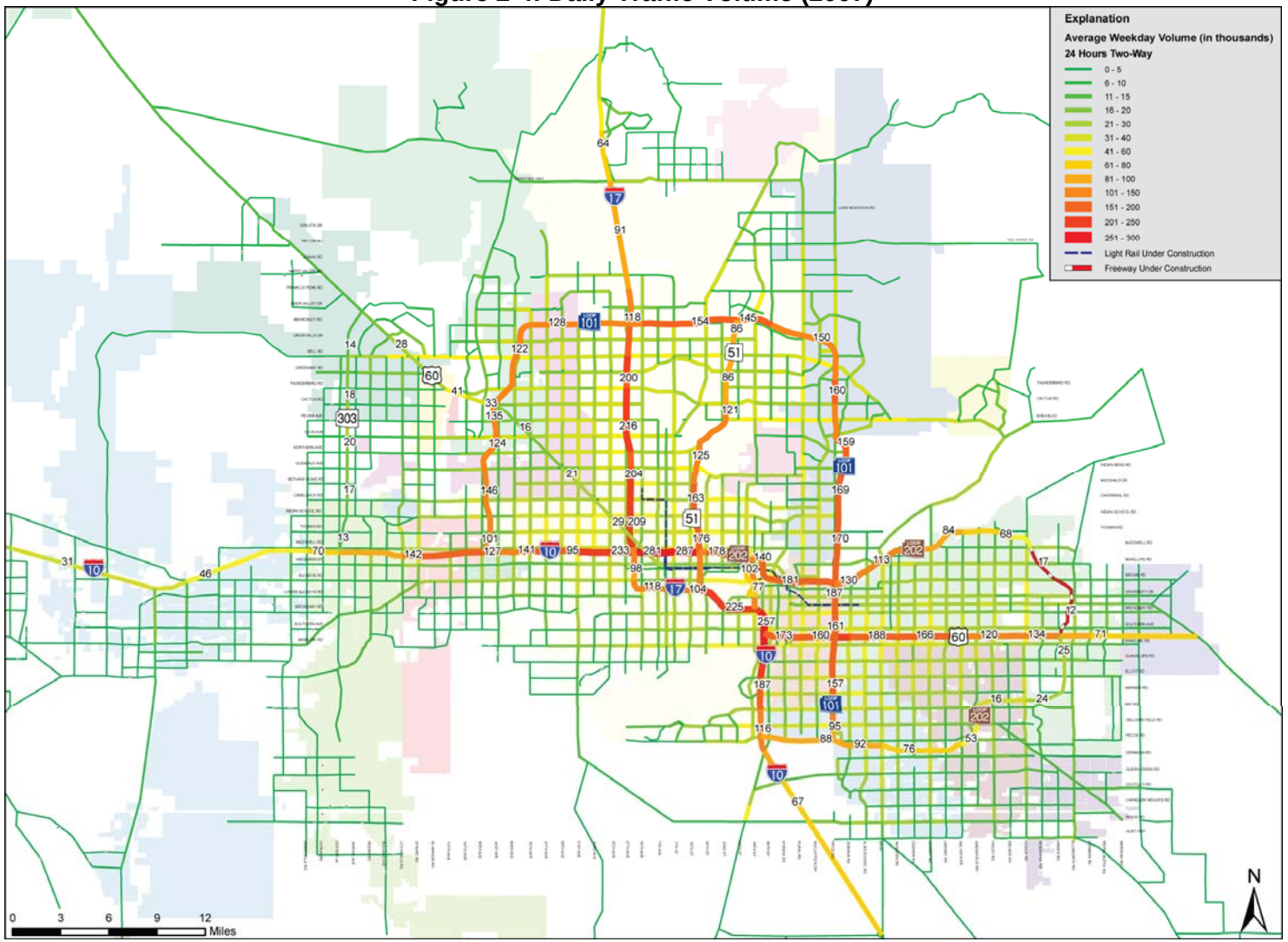
The majority of employment growth is occurring in the Central subarea with a forecast of 576,100 new jobs by the year 2030. Almost all of the employment growth within the Central subarea, is occurring in the Phoenix area/Central Business District (CBD). The Southeast, Southwest, and the Northwest subareas are also experiencing a substantial employment growth.

The majority of the jobs in the study area will be located in the central subarea. In contrast, the majority of population growth is forecasted to occur in the outlying areas of the Central subarea. As outlying areas continue to grow, access to jobs in the CBD will be needed. These growth areas will generate additional travel demand for use of routes through and within the study area and greatly increase the demand placed on highways and arterials. The capacity available on the existing highways and arterials may not be able to meet projected demand unless substantial improvements are made. Alternatives to roadway capacity improvements such as commuter rail should be considered. Appendix A provides detailed demographic projections for the study area.

2.4. Regional Travel Demand

In many parts of the study area, affordable housing is being built farther away from the major employment centers such as Downtown Phoenix, north Central Avenue employment, the Sky Harbor Airport complex and Tempe/ASU. This requires heavy commuter demands to be focused along the major highway corridors of Interstate 10, Interstate 17, US 60, Grand Avenue, and State Routes 101 and 202. Figure 2-4 illustrates 2001 daily traffic volume for the study area.

Figure 2-4: Daily Traffic Volume (2007)



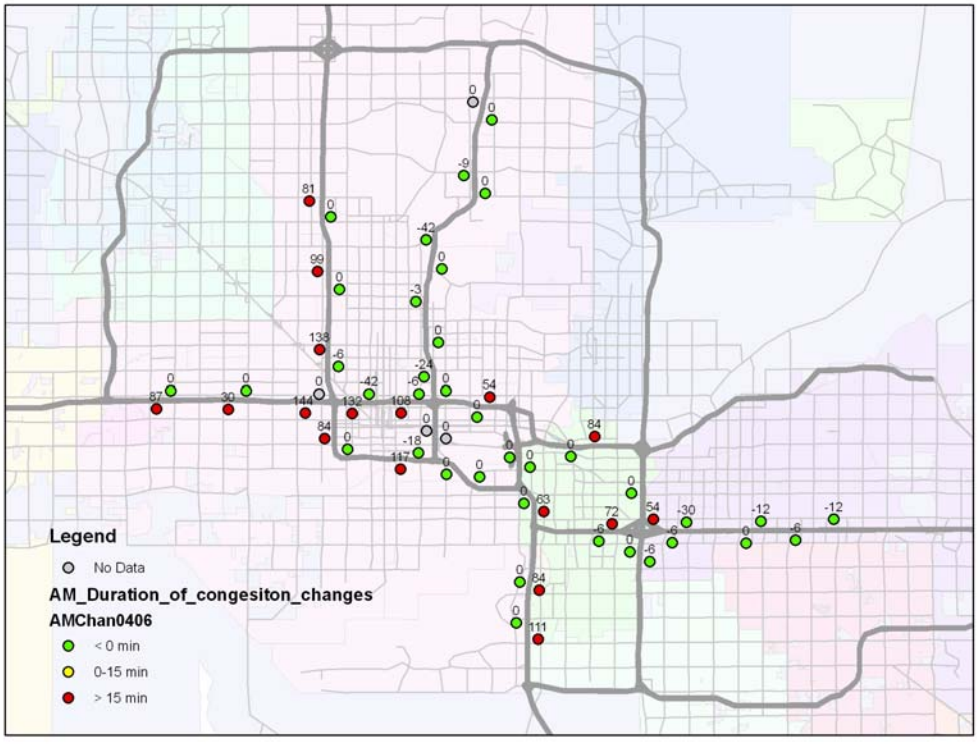
Source: MAG, 2007

2.5. Traffic Congestion

Today, most of the major highways in the region operate at poor levels of service in peak periods. This congestion is expected to worsen over the next 25 years. Travel times are already more than an hour each direction for many commuters, and with incidents the travel times become much longer. The increased demands will further diminish the reliability of the highway system for autos and buses. Commuter rail service would offer higher speeds for trips over 25 miles in length and would be more reliable because trains would operate on a schedule and would not compete with automobile traffic.

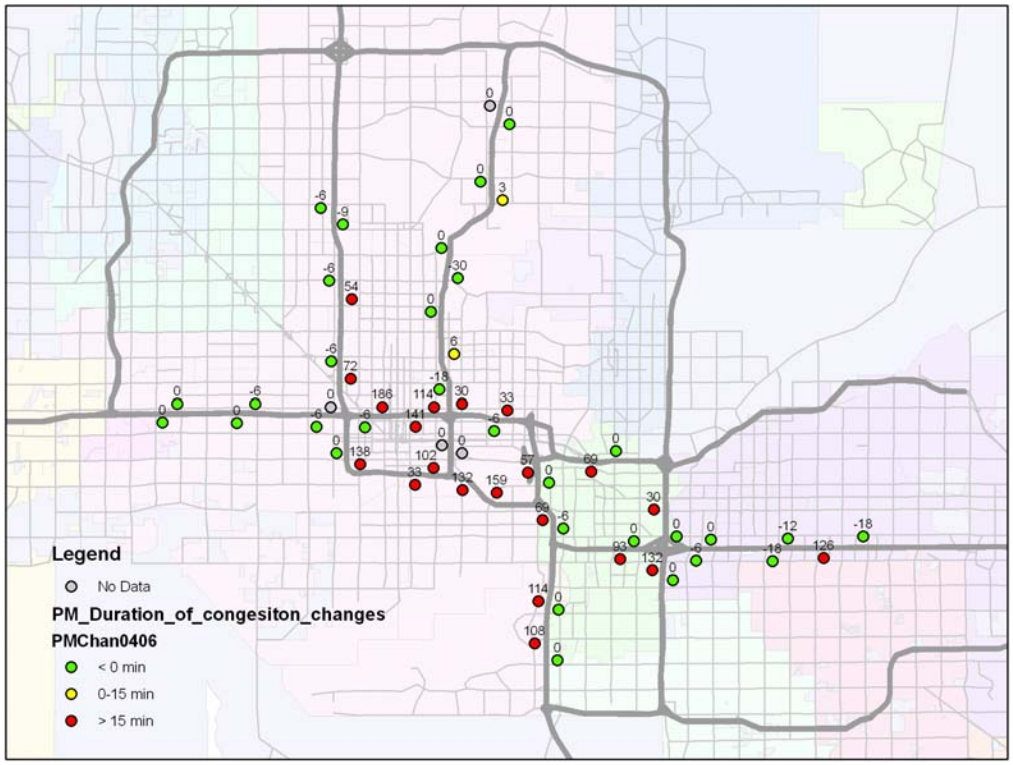
Projected and future growth in the region combined with fundamental constraints on the ability to provide for this growth through highway improvements alone, have created greater interest in providing travel alternatives to the automobile. The development of a commuter rail system would offer an alternative to highway travel in congested corridors within the region and would support economic development in the study area. Morning and evening peak period congestion duration is illustrated in
Figure 2-5 and Figure 2-6 respectively. Congestion is defined as the average freeway travel speed below 50 miles per hour. These tables depict the change in minutes of average travel speed above and below 50 miles per hour during the specified peak periods.

Figure 2-5: Change in Morning Congestion Duration 2004 to 2006



Source: MAG Freeway Traffic Conditions and Trends in the Phoenix Region, 2006

Figure 2-6: Change in Evening Congestion Duration 2004 to 2006



Source: MAG Freeway Traffic Conditions and Trends in the Phoenix Region, 2004

2.6. Transportation Corridor Development Constraints

Topographic barriers to development of new and expansion of existing transportation facilities exist in the study area such as mountains, rivers and sensitive environmental habitat areas. Jurisdictional boundaries including state and federal lands and Indian Reservations also pose challenges in implementing new transportation corridors that could require development on new right-of-way. Therefore consideration of the use of existing freight lines for future commuter rail service offers an alternative that may be more quickly implemented.

2.7. Statewide Alternatives

The State of Arizona continues to investigate the potential for intercity rail service between Phoenix and Tucson, expanding to other parts of the state over time. Ongoing studies have defined possible facilities and operating strategies that could be used in conjunction with a regional commuter rail system. Cooperative planning and partnership with the freight railroad companies may offer combined benefits for passenger rail services.

3 BACKGROUND

The passage of Proposition 400 and planned implementation of projects as described in the MAG Regional Transportation Plan (RTP) are two key elements of the foundation that has been built for commuter rail in the MAG region. Proposition 400 dedicates approximately one-third of half-cent sales tax at the regional level to public transportation. Prior to the voter approval of Proposition 400, the MAG 2003 High-Capacity Transit Study was prepared that demonstrated sufficient travel need to justify additional high capacity transit corridors, including commuter rail. The current MAG RTP reflects this significant increase in transportation funding, with expanded transit plans and programs. The Commuter Rail Strategic Plan will be a resource for possible adjustments and expansion of the RTP, as part of future updates. These combined efforts, including other rail corridor studies and plans not included in the 2003 High Capacity Transit Study, are important to the background and development of an implementation strategy for future commuter rail in the study area.

3.1. Proposition 400

Proposition 400 was passed by Maricopa County voters on November 2, 2004 and authorizes a 20-year half-cent sales tax for transportation projects in Maricopa County. The tax was initiated on January 1, 2006 and continues the half-cent sales tax for transportation that was approved by the voters in 1985 through Proposition 300. The MAG RTP provides the blueprint for the implementation of Proposition 400. By Arizona State law, the revenues from the half-cent sales tax for transportation must be used on projects and programs identified in the RTP adopted by MAG. The RTP identifies specific projects and revenue allocations by transportation mode, including public transportation systems.

On July 26, 2006, the MAG Regional Council approved the 2006 Update of the MAG Regional Transportation Plan. As part of this update, the Life Cycle Programs for freeways/highways, arterial streets, and transit were added to the RTP. The Transit Life Cycle Program is maintained by the RPTA and implements transit projects in the RTP. Although the RPTA maintains responsibility for the distribution of half-cent funds for light rail projects, METRO, a public nonprofit corporation, was created to form a partnership among the cities of Phoenix. METRO is responsible for overseeing the design, construction and operation of the light rail starter segment, as well as future corridor extensions to the system.

The Commuter Rail Strategic Plan will address administration and governance as part of the implementation plan for the proposed commuter rail system. The Strategic Plan will need to take the various organizations and responsibilities into account in forming concepts and recommendations.

Currently, MAG is in the process of updating the RTP and key transit elements of the Draft 2007 Update are summarized in the following section.

3.2. RTP 2007 Update

With the passage of Proposition 400, approximately one-third of the regional half-cent sales tax for transportation is being devoted to public transportation. The RTP reflects this significant increase in funding, with transit plans and programs providing for expanded regional bus service and new light rail transit facilities. The RTP provides for a range of transit facilities and services throughout the region. The bulk of the transit funding identified in the RTP will be used for expanded regional bus service and new light rail transit facilities, with a portion of the funds to be used for commuter rail planning, as described in the following paragraphs.

- **Regional Bus:** Regional transit services include both arterial grid and express type services that are designed to provide for regional connections. Routes are designed to connect activity centers, transportation nodes, or residential areas across jurisdictional boundaries. Regional bus service consists of three categories of service: Supergrid routes, which are arterial grid routes that provide a regional connection function; Arterial Bus Rapid Transit (BRT) Routes, which operate as overlays on corridors served by local fixed route service, but provide higher speed services by operating with limited stops; and Freeway BRT Routes, which use existing and future high occupancy vehicle (HOV) facilities to connect remote park-and-ride lots with major activity centers, including core downtown areas.

- **Light Rail Transit:** The RTP includes a 57.7-mile Light Rail Transit (LRT) system, which incorporates the 20-mile minimum-operating segment (MOS) as designated in the Central Phoenix/East Valley Major Investment Study (MIS); a five-mile extension to Metro center; a five-mile extension to downtown Glendale; an 11-mile extension along I-10 west to 79th Avenue; a 12-mile extension to Paradise Valley Mall; a two-mile extension south of the MOS on Rural Road to Southern Avenue; and a 2.7-mile extension from the east terminus of the MOS to Mesa Drive.

- **Commuter Rail:** The RTP also provides for the continued preparation of commuter rail implementation strategies for the region, including development of the Commuter Rail Strategic Plan. The RTP recognizes that the 129 miles of potential commuter rail corridors identified in the MAG High Capacity Transit Study may help to address future travel needs in the region, especially as continuing land development limits opportunities for entirely new high capacity corridors.

- Conclusions from the Commuter Rail Strategic Plan project will guide future RTP updates of commuter rail service in the metropolitan area. The Strategic Plan project will specifically evaluate the development of a commuter rail system that does not duplicate bus and LRT transit services outlined in the RTP, but instead enhances regional transit by allowing for transfers between systems.

3.3. ADOT High Speed Rail Strategic Plan (2007)

ADOT recently updated the 1998 ADOT Arizona High Speed Rail Feasibility Study. The 1998 Feasibility Study concluded that high speed rail was a possibility for the Phoenix-Tucson corridor. As a mitigation method to relieve traffic while the Interstate-10 corridor is widened and improved, the 1998 Feasibility Study recommended that up to three round trip passenger trains per day operate between the two metropolitan areas.

The distance, a total of 119 miles between downtown Phoenix and downtown Tucson, would be served with Amtrak style intercity passenger trains operating at approx 90-110 mph on the existing Union Pacific Railroad alignment. New dual-track improvements would need to be made, as well as signaling, equipment purchases and station enhancements. The total cost of this service was estimated between $500 million and $1 billion (in 1998 dollars).

The 2007 Strategic Plan will focus on the initial conclusions of the 1998 Study and will validate alternatives considered, update costs and other financial issues, and define a collector/distributor system plan based upon station alternatives.

The ADOT High Speed Rail Strategic Plan will likely recommend a high speed rail system between Phoenix and Tucson with the following characteristics:

- An alignment along the UP railroad tracks, with double tracking in the Phoenix area.
- A rail travel time between Phoenix and Tucson of equal or less than two hours in order to be competitive with autos.
- Track speeds up to 110 mph south of Gilbert.
- Four stations in the Phoenix area are proposed at the following locations:
  - Downtown Phoenix
  - 44th Street (providing connections to the airport via an automated train and to the CP/EV LRT Line)
  - Downtown Tempe (providing an LRT connection)
  - Gilbert

3.4. ADOT State of Arizona Railroad Inventory & Assessment (2007)

The ADOT, Public Transportation Division (PTD) and Transportation Planning Division (TPD) developed the State of Arizona Railroad Inventory and Assessment. As an update to a 2000 effort, PTD and TPD completed a baseline assessment of the state's current rail infrastructure, including condition, usage, and short-range improvement plans, in cooperation with several other state and regional partners.

3.5. MAG High Capacity Transit Study-Final Report (2003)

The High Capacity Transit Study presented a network of new transit services designed to meet growing travel demand in the MAG region. The overall objective of the Recommended High Capacity Transit Network was the creation of an intergraded system of high capacity transit corridors providing efficient and convenient travel throughout the MAG region. Connections between the corridors should facilitate the movement of riders between systems no matter which transit technology is being operated. Figure 3-1 illustrates the Recommended High Capacity Transit Network.

This long-range study considered projected travel demand in the MAG region with a forecast horizon year of 2040 when the MAG region population is expected to reach over 7 million residents. The focus of this study was to identify proven technologies that were capable of meeting the levels of travel demand projected in the MAG region while also serving several types of trips, both long range and shorter distance. The identified technologies included commuter rail, light rail transit, and bus rapid transit along sixteen corridors.

Figure 3-1: Recommended High Capacity Transit Network from the MAG High Capacity Transit Study

Source: MAG High Capacity Transit Study, 2003.
Note: Project study did not include Pinal County

Commuter Rail Network and Operating Characteristics

Three levels of service for the operation of a commuter rail system were initially identified in the MAG High Capacity Transit Study, 2003. The three levels described for service in the MAG region include:

Phase 1: Start-Up/Introductory Services: Limited peak hour, peak direction service composed of three trains inbound in the a.m. peak and outbound in the p.m. peak on each of the corridors.

Phase 2: Intermediate Services: 20-minute peak hour headways with limited counter-flow service. Midday service would consist of hourly trains in each direction.

Phase 3: Full Commuter Train Operation: 15-minute peak hour headways and 30-minute off-peak headways, with 30-minute peak period interval counter-flow services.

Based upon the results of the capital cost estimates and discussions with representatives from BNSF and Union Pacific (UP), it was determined that only the Phase 1 and Phase 3 levels of service would be carried forward into further evaluation.

Commuter Rail Infrastructure Requirements

Implementing commuter rail service in freight rail corridors in the study are would require the following infrastructure enhancements:

- **BNSF** – A second main track would be required on the BNSF line between downtown Phoenix and Surprise.
- **UP** – This corridor would require a second main track between downtown Phoenix and the McQueen Junction in Gilbert, just south of US-60.

Additional infrastructure improvements required in these corridors would include stations, signals, and sidings to allow for trains to pass each other.

Common Issues in Commuter Rail Operations

Key issues to consider based on other commuter rail operations include:

- Ownership – The commuter rail agency would either purchase freight right-of-way or lease access.
- Liability- The commuter rail agency and the railroads would have to come to an agreement on who would hold liability for the shared right of way.
- Capacity Conflicts – Coordination between passenger rail and freight rail traffic would be essential to ensure efficient operations for both.
- Grade Crossings – Street/rail crossings could cause impacts to automobile traffic in the corridor.

- Neighborhoods/Sensitive Uses – Additional rail traffic could impact neighborhoods.
- Station Impacts – Additional automobile traffic would be created near stations as commuters access park-and-ride facilities.
- Capital Needs – Rail infrastructure and vehicles must be purchased and maintained.
- Operating Costs- Rail system will have an associated cost for operations.
- Governance – How the system is administered when the corridor passes through several jurisdictions.

Commuter Rail Ridership and Cost Estimates

Ridership and cost estimates were developed using population projections, operating and implementation characteristics of peer systems, and input from the Agency Working Group, a committee of representatives from MAG, local cities, METRO, and ADOT who convened throughout the study process to review and refine the inputs and results of this study.

Ridership

Commuter rail ridership was forecasted using a direct demand model (DDM). The DDM estimates weekday boarding passengers per station based on the catchment population and level of service factors such as train frequency and journey time savings. Station catchment areas were developed for each proposed station to represent the major source of all trip origins within a ten mile radius, taking into account land use development patterns present in the MAG region and likely travel distances for commuters based upon reviews of riders from other West Coast commuter rail services. Table 3-1 summarizes ridership forecasts obtained from a sketch planning model.

Table 3-1: Commuter Rail Total Ridership Forecasts

Corridor	Total Boardings	
	Initial 2020 (Phase 1)	Ultimate 2040 (Phase 3)
BNSF/ Grand Avenue	4,900	16,100
UP Mainline/Chandler	1,400	4,600
UP Mainline/Southeast	2,000	6,500
UP Yuma	2,700	12,000

Source: MAG High Capacity Transit Study, 2003.

Capital and Operating Costs

Capital and operating costs were developed for the four alternative commuter rail corridors consistent with the phased levels of service described above using conventional locomotive-hauled equipment. Capital costs were developed using standard unit cost rates obtained from several rail infrastructure cost estimates prepared for West Coast rail properties during the previous five years. Commuter

rail operating costs were estimated using the comparison of Year 2001 bus and commuter rail operating and maintenance costs from three commuter rail service providers, the Dallas Trinity Railway Express, San Diego Coaster, and San Jose Altamont Commuter Express. Table 3-2 below summarizes the capital costs for each commuter rail corridor by phase.

Table 3-2: Commuter Rail Capital and Operating Costs*

Commuter Rail Corridor	Capital Costs ($ millions)	Annual Operating Costs ($ millions)
BNSF Phase 1	$290	$5
BNSF Phase 3	$446	$22
BNSF/ Grand Avenue Capital Cost Total	**$736**	**N/A**
UP Mainline/Chandler Phase 1	$270	$2
UP Mainline/Chandler Phase 3	$260	$14
UP Mainline/Chandler Capital Cost Total	**$530**	**N/A**
UP Southeast Phase 1	$270	$3
UP Southeast Phase 3	$297	$17
UP Mainline /Southeast Capital Cost Total	**$567**	**N/A**
UP Yuma Phase 1	$143	$4
UP Yuma Phase 3	$309	$22
UP Yuma Capital Cost Total	**$452**	**N/A**

*Note: All costs are in Year 2001 dollars.
Source: MAG High Capacity Transit Study, 2003.

Evaluation of Commuter Rail Alternatives

The High Capacity Transit corridors identified in this study were evaluated using a measure of project cost effectiveness developed specifically for this study.

Table 3-3 below summarizes the results of the ridership and cost estimates. Included in the final column of

Table 3-3 is the cost effectiveness category.

The Benefit-Cost analysis, like the cost effectiveness calculation, reflects the relationship between ridership and costs. However, the results of the Benefit-Cost are in inverse relation to those of the cost effectiveness calculation. The Benefit-Cost calculations were designed to act as a check against the cost effectiveness ratings received by each of the corridors and to assist in recommendations for phasing and prioritization. It is important to recognize that the key additional factor at work in the Benefit-Cost analysis is the level of roadway congestion forecast for the competing arterial or freeway segment.

Table 3-3: Commuter Rail Cost Effectiveness

Corridor	Length (miles)	Annual Boardings	Annual Capital Cost ($millions)	Annual Operating Cost ($millions)	Cost Effectiveness	Benefit-Cost
UP Yuma	31	3,610,000	$36	$22	$16.22	4.19
BNSF	26	4,844,000	$59	$22	$16.84	1.69
UP Southeast	36	1,859,000	$45	$17	$33.83	1.30
UP Mainline/ Chandler	28	1,368,000	$42	$14	$41.41	n/a

Note: All ridership figures have been obtained from a sketch planning model. All costs are in Year 2001 dollars. In the case of Cost Effectiveness the lowest figures represent the best performance, while in Benefit-Cost the higher figures are the top performers.
Source: MAG High Capacity Transit Study, 2003.

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Conclusions

The Recommended High Capacity Transit Network from the 2003 MAG High Capacity Transit Study represented the culmination of a process that identified 29 potential high capacity transit corridors throughout the MAG region, refined these corridors, and evaluated them against each other to determine which corridors were best suited to serve growing demand for transportation capacity in the MAG region. It should be noted that this study area did not include high capacity transit needs in Pinal County.

Action Plan for Implementation of High Capacity Transit

The following key tasks below were designed to ensure that proper preparations would be made for implementing the network:

- **Relocation of the BNSF Freight Facilities** – BNSF has been considering the relocation and consolidation of several freight rail facilities in downtown Phoenix to sites north of the BNSF mainline north of the existing intermodal facility in El Mirage.

- **Begin Negotiations with Union Pacific** –It will be important to have a full understanding of what types of access rights UP will allow in both the UP Yuma and UP Southeast corridors in order to determine what capital costs will be involved in possible track upgrades and additions.

- **Develop a Specific Commuter Rail Network Plan** – Previous studies have already considered commuter rail, largely on a corridor basis, but not in the context of the High Capacity Transit network. The analysis of Commuter Rail suggests very attractive ridership performance for the Startup Phase of commuter rail. However, a separate action-oriented plan

is needed to assess the full viability of the startup service, take forward the initial discussions with UP and BNSF during the course of the High Capacity Transit Study, and run the network assumptions through an analysis based on the FTA New Starts criteria.

- **Perform Detailed Major Investment Studies on Early Implementation Corridors** – Each corridor contained within the Recommended High Capacity Transit Network will require some form of Major Investment Study (MIS) to determine precise alignments, operating characteristics, preferred technology, and the overall design of the system.

Relationship of the MAG High Capacity Transit Study to the MAG Commuter Rail Strategic Plan

The MAG High Capacity Transit study is a physical plan that presents a network of new transit services designed to meet travel demand in the MAG region. By comparison the MAG Commuter Rail Strategic Plan is policy oriented and provides a framework on how to implement commuter rail in study area. The MAG Commuter Rail Strategic Plan focuses on three areas, to provide a: framework of goals, objectives and action items to implement commuter rail, series of implementation steps for commuter rail investment and, consensus agreement of large and diverse stakeholders group.

3.6. Summary of Previous Studies

Appendix B contains a summary of comparative information from previous commuter rail studies conducted between 1980 and 2003.

4 COMMUTER RAIL TECHNOLOGY AND SYSTEMS

This chapter provides a general overview and definition of commuter rail transit including vehicles, service, and stations. Also provided in this chapter is a listing of other operating and proposed commuter rail systems in the United States and considerations for potential corridors in the study area.

4.1. Commuter Rail Vehicles

Commuter rail vehicles, also referred to as rolling stock, may consist of self-propelled diesel multiple unit cars or conventional commuter coaches hauled by diesel locomotives on a push –pull configuration. Both types of vehicles can operate between 60 miles and 100 miles per hour depending on the track design and/or condition. The preferred maximum grade for operation of commuter rail is between 3 and 4 percent.

Push-Pull Locomotive Hauled Coaches (LHC)

These types of commuter rail trains consist of diesel-electric, straight electric, or dual-mode (which can operate as either diesel or electric) locomotives. In push-pull service, the locomotive pulls the train in one direction and pushes the train in the opposite direction. The commuter coach cars can be either single-level or bi-level in configuration. The number of seated passengers per car ranges from 80 to 150 depending on the configuration of the car. There are several examples of transit systems in the United States that operate LHC technology including: Maryland Rail Commuter (MARC); Virginal Railway Express (VRE); Rail Runner, New Mexico, Metrolink, Los Angeles; and the San Diego Coaster.

Diesel Multiple Unit (DMU)

DMU passenger rail technology is an evolving technology that is a cross between light rail and conventional commuter rail. DMU operations provide short-to medium-distance commuter service (typically 30 to 100 miles) either between urban and suburban areas or between suburban areas. DMU passenger capacity ranges from 64 to 172 per car set depending on the manufacturer and style or model. DMU is extensively used in Europe. The use of DMU in the United States is currently limited but growing. There are several examples of transit systems in the US that operate DMU including: TriRail, Florida; Washington County Commuter Rail, Portland; and the Camden-Trenton River Line, New Jersey.

Regulatory Compliance

Federal Railroad Administration (FRA):A major issue regarding rail technology is its compliance with Federal Railroad Administration regulation 49CFR Part 238. Compliant technology can operate concurrently with freight traffic; in other words, it can share tracks with freight trains (all push-pull locomotive-hauled coaches are compliant, as are some DMUs). Non-compliant technology, such as light rail cannot generally share track with freight trains and must be separated either physically or temporally from freight traffic. In several metropolitan areas major railroad companies have not allowed new transit projects to operate in railroad right of way using vehicles that do not meet FRA safety requirements for crashworthiness.

Americans with Disabilities Act (ADA) Compliance

Federal Transit Administration (FTA): a major requirement regarding commuter rail facilities is its compliance with the Americans with Disabilities Act of 1990 and in particular, 49CFR Part 37 - Transportation Services for Individuals with Disabilities (ADA). This requirement applies to the construction of a new station for use in intercity or commuter rail transportation as well for purchase or lease of new intercity and commuter rail cars. The requirement states that facilities must be "readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs".

4.2. Commuter Rail Service Features

Commuter rail typically provides service between a central city and outlying suburban areas. Commuter rail service has the potential to carry substantial volumes of commuters during peak periods over longer distances and with reliable travel times. These features are important to provide mobility choices in congested travel corridors.

Commuter rail typically provides more carrying capacity for longer distances when compared to other modes of travel such as LRT, BRT, and Express Bus. As shown in Figure 4-1, there is more seating capacity on a typical commuter rail car or series of coupled cars. This figure also shows an added efficiency that can be provided by commuter rail in that fewer operators are needed to carry a greater number of passengers.

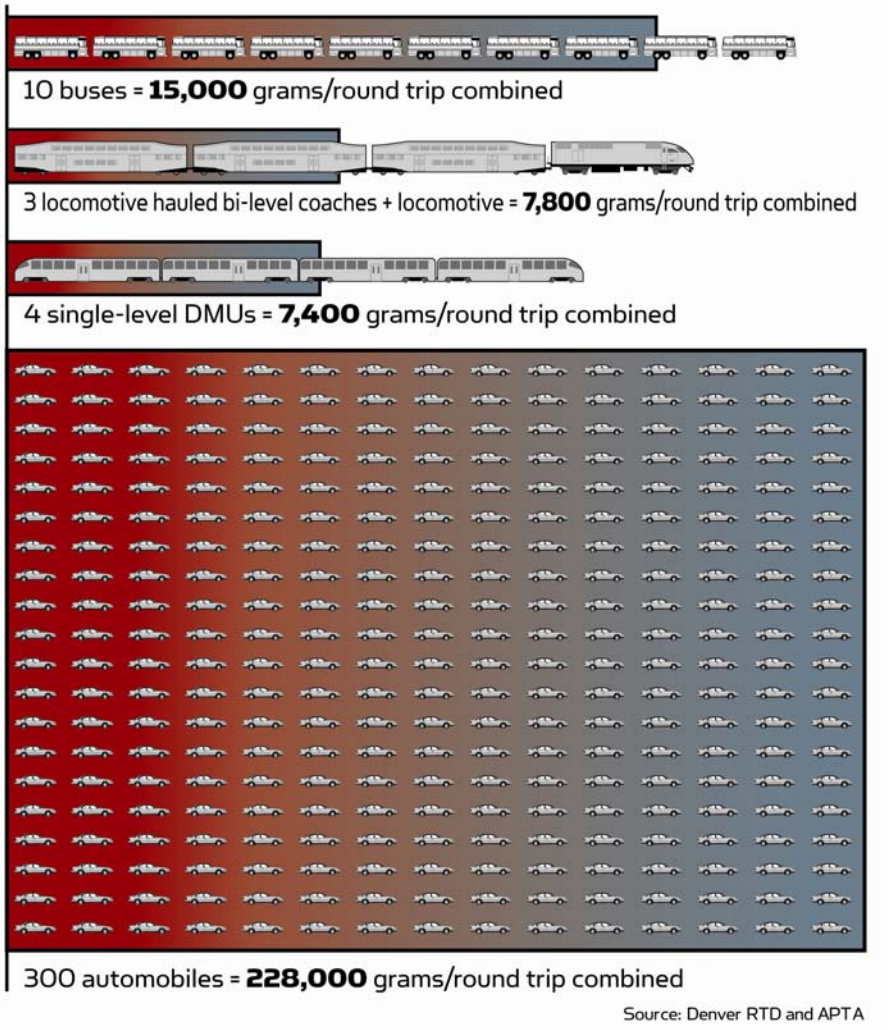
Figure 4-1: Commuter Rail Efficiency

Because commuter rail is separated from the roadway and not impacted by motor vehicle congestion or accidents, it can offer more efficient and reliable travel times than the automobile. The implementation of commuter rail can maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.

In addition, the implementation of commuter rail could decrease emissions by reducing pollution generated by automobile combustion engines.

Figure 4-2 illustrates the overall net benefit to regional air quality for commuter rail due to reduction in regional VMT. Three locomotive hauled bi-level coaches have the same capacity as 300 automobiles, carrying 300-400 passengers, 50 miles round trip. By reducing the number of automobiles, total emissions of PM_{10}, NO_x, and CO would be reduced.

Figure 4-2: Air Quality Impact Comparisons



4.3. Commuter Rail Stations – Concept

Each community has different levels of existing and potential transit services that fit in a variety of land use patterns. The different levels of service and land uses determine the types of station to be built. The passenger stations themselves could serve as the most critical link between communities and transit systems, or the region as a whole. In many cases the station will become the gateway into the community it serves.

To develop a vibrant, functional, and convenient station, community integration, mobility, and sustainability elements need to be considered. Stations should integrate with existing neighborhoods while minimizing negative impacts. The station should serve surrounding neighborhoods and enhance community attributes. The station site plan should also allow for all functions needed on the site, including access for buses, autos, pedestrians, and bicyclist. In addition, a station site should create environmental benefits and minimize negative environmental impacts.

Because these locations would serve as a focal point from which to make connections to other parts of the region, joint development of more intensive land uses could be supported.

Station Types

Station areas can be distinguished by their use and location. The basic station area characteristics generally fall into four categories:

- local/urban station
- neighborhood station
- community/suburban station
- regional station.

Local/urban stations are walk-up in nature and intended to serve nearby residential and employment destinations in mature areas. Typically, these local stations consist of simple structures that include a platform, shelter and ticket vending. Where as, the regional station concept is typically associated with a regional mixed-use center (such as downtown or regional shopping center) and is integrated with other transit services.

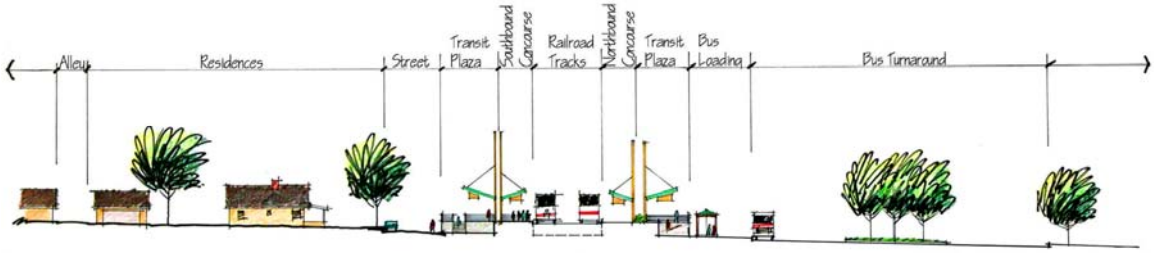
Station Design Features

There are generally four major categories of design features of passenger rail stations:

- Station platform or concourse (the area providing direct interface between passengers and the rail system).

- Transition plaza (where passengers move between the rail vehicles to another mode of access.
- Modal access facilities (defining how passengers arrive at and depart from the station.
- Other design elements (station shelters, windscreens, furniture, public art etc.)

Figure 4-3: Typical Station Design Features



Source: URS, 2004

4.4. Operations Support Facilities

Another essential element to operate commuter rail is locating and designing operation support facilities along the railroad corridors. Commuter rail support facilities typically include at least one maintenance and layover facility per system.

Maintenance Facility

A commuter rail maintenance facility provides the supporting infrastructure for train operations and is used to inspect, repair, maintain, clean, and store commuter rail vehicles. A maintenance facility also typically includes vehicle storage, a maintenance shop(s), employee offices, locker rooms, train operation reporting and briefing rooms and parking. A maintenance facility requires approximately 10 to 20 acres depending upon the specific technology selected and the fleet size.

Layover Facility

A layover/storage facility is used for the overnight storage of trains, light cleaning, daily train servicing and minor inspection and repair. Some trains are stored at the layover facility to allow trains to begin or end the service day from each end of the corridor. This allows equal service to be operated in both directions much sooner and more cost effectively, than if all trains had to start from one end of a corridor. A layover facility site can range from two to five acres depending on the level of service and the selected technology.

4.5. Commuter Rail Systems in the United States

The development of this strategic plan has included a review of other systems to gain a better understanding of the priority actions needed to implement commuter rail in the study area.

Operating and Proposed Commuter Rail Systems

The majority of commuter rail systems in the US rely on the use of existing rail lines. This includes both the purchase and activation of abandoned rail lines and the shared use of lines that are currently in service for freight, and in some cases, other types of passenger service. Nationwide, there are also several proposed systems that are currently in development with a variety of operating characteristics. These existing and proposed systems are shown in Table 4-1.

Table 4-1: Existing and Proposed Commuter Rail Systems (January 2008)

Existing Commuter Rail Systems	
Albuquerque, NM	RailRunner (New Mexico Rail Runner)
Alexandria, VA	VRE (Virginia Railway Express)
Anchorage, AK	ARC (Alaska Railroad Corporation)
Baltimore, MD	MARC (Maryland Transit Administration, MTA)
Boston, MA	MBTA (Massachusetts Bay Transportation Authority)
Chesterton, IN	NICTD (Northern Indiana Commuter Transportation District)
Chicago, IL	METRA (Northeast Illinois Regional Commuter Railroad Corporation)
Dallas, TX	TRE (Trinity Railway Express)
Harrisburg, PA	PennDOT (Pennsylvania Department of Transportation)(unofficial)
Los Angeles, CA	Metrolink (Southern California Regional Rail Authority)
Nashville, TN	Music City Star (Regional Transportation Authority, RTA)
New Haven, CT	SLE (Connecticut Department of Transportation Shore Line East)
New York, NY	LIRR (MTA Long Island Rail Road) MNRR (MTA Metro-North Railroad)
Newark, NJ	NJT (New Jersey Transit Corporation)
Oceanside, CA	Coaster (North County Transit District, NCTD)
Philadelphia, PA	SEPTA (Southeastern Pennsylvania Transportation Authority)
Pompano Beach, FL	Tri-Rail (South Florida Regional Transportation Authority)
San Carlos, CA	CALTRAIN (Peninsula Corridor Joint Powers Board)
Seattle, WA	Sound Transit (Central Puget Sound Regional Transportation Authority)
Stockton, CA	ACE (Altamont Commuter Express)
Syracuse, NY	On Track
Proposed Commuter Rail Systems	
Aspen, CO	RFTA (Roaring Fork Transportation Authority)
Atlanta, GA	GDOT (Georgia Department of Transportation) GRPP (Georgia Rail Passenger Program)
Austin, TX	ASA (Austin-San Antonio Corridor) ASG (Capital Metropolitan Transportation Authority All Systems Go! Project) GASACC (Greater Austin-San Antonio Corridor Council Commuter Rail Project)

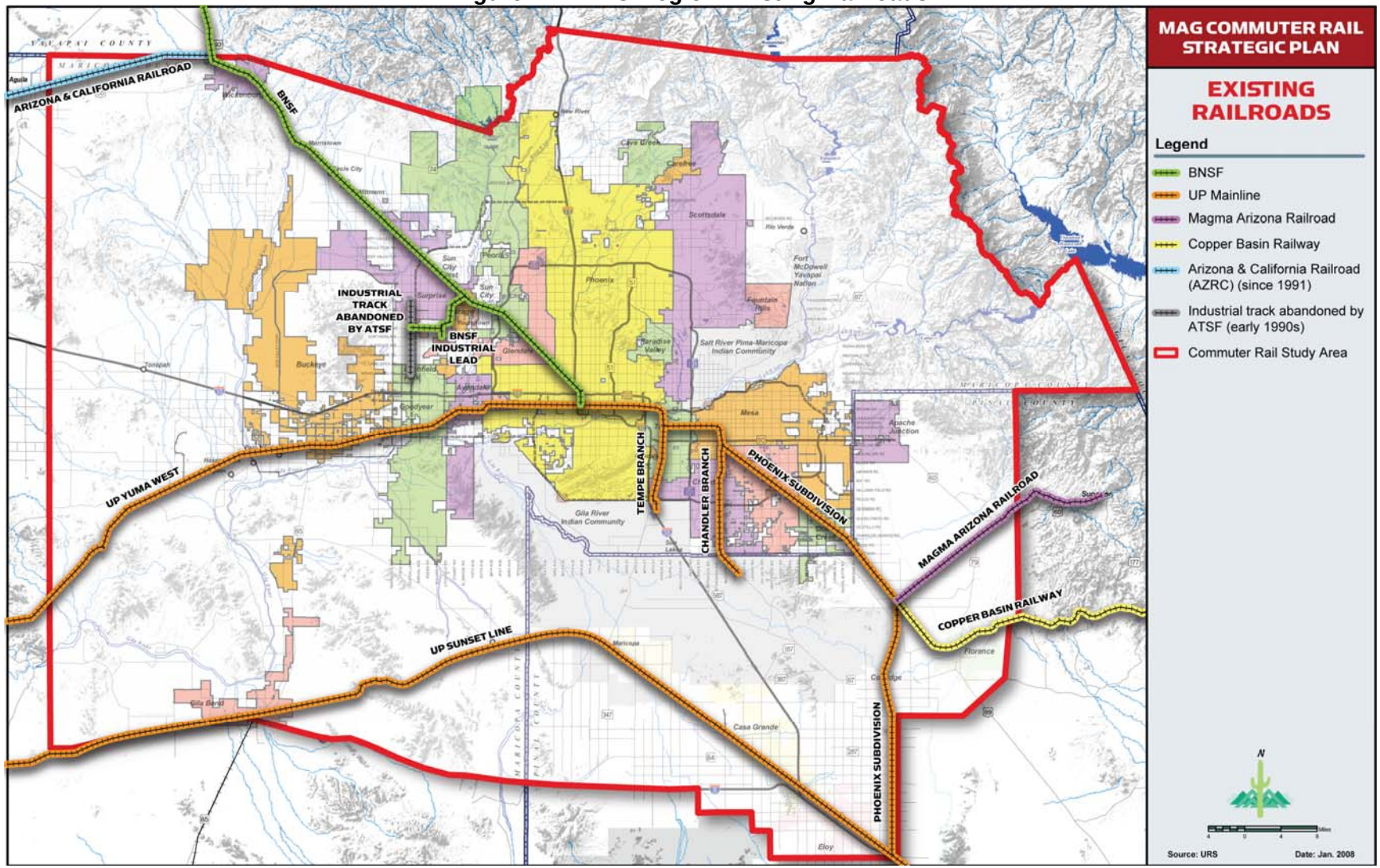
Charlotte, NC	CATS (Charlotte Area Transit System)
Cincinnati, OH	EC (Eastern Corridor)
Cleveland, OH	NEOrail (Northeast Ohio Commuter Rail Feasibility Study)
Columbus, OH	Fast Trax (Central Ohio Transit Authority)
Denver, CO	CDOT (Colorado Department of Transportation)
Greensboro, NC	PART (Piedmont Authority for Regional Transportation)
Harrisburg, PA	CAT (Cumberland-Dauphin-Harrisburg Transit Authority)
Hartford, CT	NHHS Rail (New Haven-Hartford-Springfield Commuter Rail Implementation Plan)
Kansas City, MO	The Jo (Johnson County Transit)
Las Vegas, NV	RTC (Regional Transportation Commission of Southern Nevada)
Madison, WI	DC (Dane County) T2020 (Transport 2020)
Milwaukee, WI	Wise Ride (Kenosha-Racine-Milwaukee Corridor Wise Ride Transit Study)
Minneapolis, MN	NC (Northstar Corridor) PRM (Passenger Rail in Minnesota)
Napa, CA	NSPFRS (Napa/Solano Passenger/Freight Rail Study)
Novato, CA	SMART (Sonoma-Marin Area Rail Transit Rail District)
Proposed Commuter Rail Systems (Cont)	
Orlando, FL	CFR (Central Florida Rail)
Philadelphia, PA	SVM (Schuylkill Valley Metro)
Portland, OR	WCCR and WCCR (Washington County Commuter Rail, Tri-County Metropolitan Transportation District of Oregon)
Providence, RI	RIDOT (Rhode Island Department of Transportation)
Saint Paul, MN	RRC (Red Rock Corridor) RLC (Rush Line Corridor)
Salt Lake City, UT	UTA (Utah Transit Authority Commuter Rail)
San Antonio, TX	ASA (Austin-San Antonio Corridor) GASACC (Greater Austin-San Antonio Corridor Council Commuter Rail Project)
Santa Fe, NM	NMSHTD (New Mexico Department of Transportation Eldorado Line)

Source: APTA, January 2008

4.6. Existing Railroads in the Commuter Rail Study Area

Currently, three operational railroads exist in the study area. These railroads include the BNSF, the Union Pacific Railroad (UP), and the Arizona and California Railroad (ARZC). As of 2003, the BNSF maintained approximately 70 miles of active track, while the UP maintained a total of approximately 254 miles of active track, and the ARZC maintained a total of about 22 miles of active track. In addition, two short line railroads exist in the study area and include Magma Arizona Railroad and Copper Basin Railway. The Magma Arizona Railroad maintains approximately 28 miles and the Copper Basin Railway maintains approximately 51 miles. Figure 4-4 illustrates the existing railroads in the study area.

Figure 4-4: MAG Region-Existing Railroads



Source: URS, 2007

5 REGIONAL RAIL CONCEPT SYSTEM PLAN

Information regarding the potential for a Regional Commuter Rail System in the study area was researched and documented as part of a System Concept to provide background data for the Commuter Rail Strategic Planning process. Basic conceptual information was gathered prior to stakeholder involvement and presented for comment, analysis, and as a basis for discussion of service implementation.

Three primary elements were incorporated into the Regional Commuter Rail System Concept (System Concept) including:

1) Description of Concept Corridors;
2) Conceptual Corridor Travel Conditions; and
3) Corridor Community and Land Use Relationships.

The System Concept is built on the premise that commuter rail could most easily be implemented on an existing rail line that serves a parallel congested corridor and supports existing and future land use. This System Concept could be applied to one or more corridors within the study area.

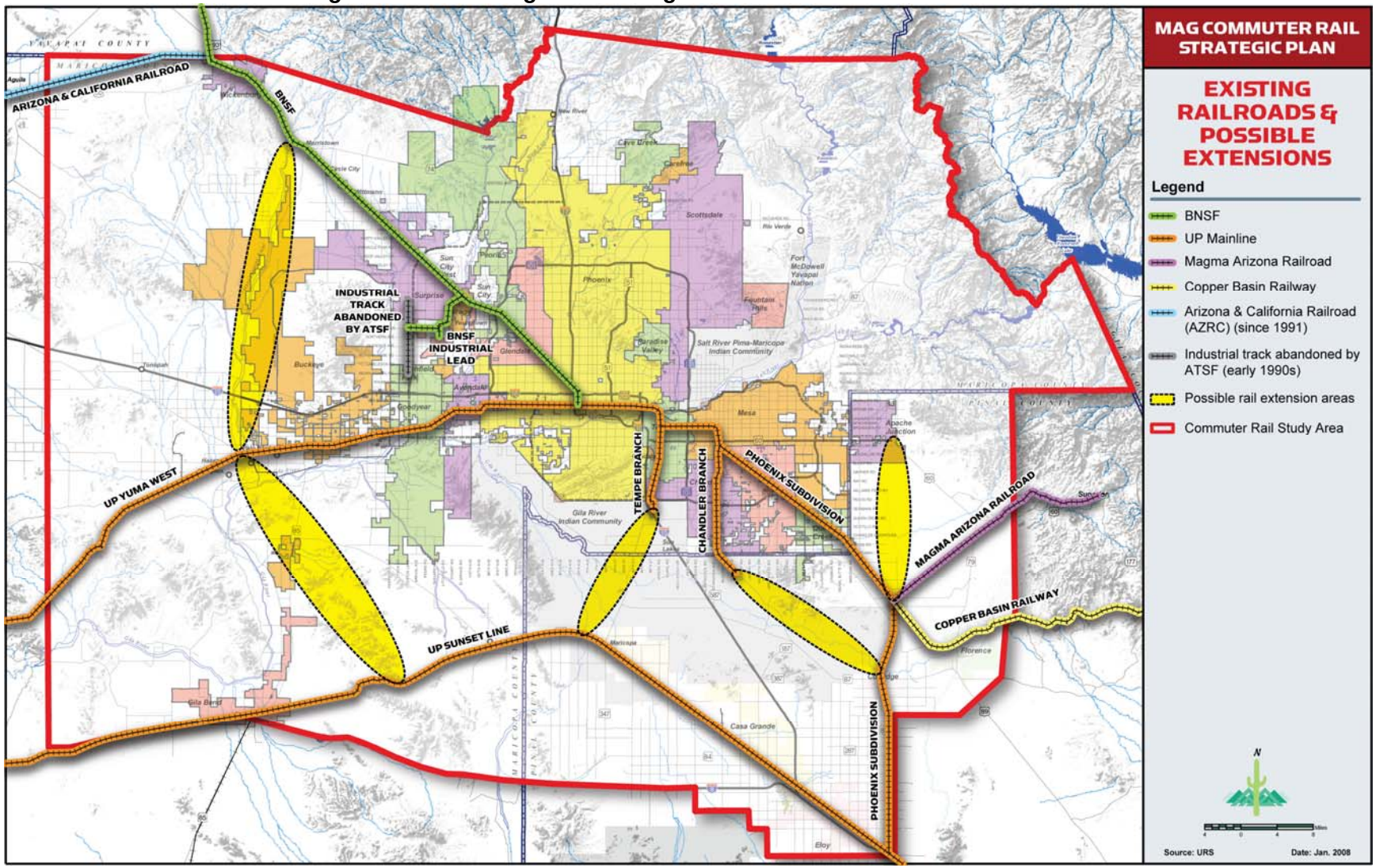
5.1. Description of Conceptual Corridors

The System Plan concept is oriented around the five freight rail lines that are currently in place in the study area. The system plan is based on the recommendations from the High Capacity Transit Study, (MAG, 2003) and the alignments that were subsequently incorporated into the 2030 RTP vision plan for commuter rail. These corridors are:

- BNSF-Grand Avenue
- UP Mainline-Southeast
- UP Mainline-Chandler Branch
- UP Mainline-Tempe Industrial Lead
- UP Mainline-Yuma/West
- Possible Extensions/northern Pinal County

Figure 5-1 illustrates the existing railroad corridors and potential extensions in the study area.

Figure 5-1: MAG Region- Existing Railroads and Possible Extensions



Source: URS, 2008

BNSF-Grand Avenue

The BNSF alignment currently has a single-track, non-signalized (dark territory) line along Grand Avenue from Wickenburg to Phoenix. BNSF has a consistent right-of-way of 100 feet along Grand Avenue. The width profile transitions from 75 feet to 100 feet beyond Grand Avenue. There are numerous passing tracks, sidings, switching leads and yards along the 54 mile route. A total of fifty-two grade crossings are located in the corridor between Surprise and Downtown Phoenix. The local freight service along this line is currently eight to ten trains per day.

Implementing commuter rail in this corridor would require joint operation with the BNSF mainline which is a single line corridor and currently operating near capacity. BNSF has stated that there is limited right-of-way in the Grand Avenue corridor for both the required new second mainline track as well as a third parallel switching lead track. There is ample right-of-way for a new, second main track. However, significant right-of-way acquisition in certain areas along Grand Avenue corridor between Phoenix and Surprise would be necessary in order to build these sections of a third parallel switching lead next to the new second mainline track, which would require negotiations between the transit agency, the railroad and adjacent property owners (*BNSF Railway Principles and Criteria for Passenger Rail Service, 2007*).

As mentioned above there are several complex at-grade crossings and several crossings are located next to six-legged street intersections. These grade crossings have the potential to complicate automobile movements and create safety concerns. Another complication for implementing commuter rail on the BNSF-Grand Avenue line is the major BNSF yard located at 19th Avenue, south of I-10. BNSF has presented the idea of relocating their yard facilities to a location west of their current intermodal facility in El Mirage.

Instead of operating jointly with the BNSF, there is the possibility that the freight rail mainline operations could be moved out of the central area to the northwest. The City of Surprise recently approved a General Plan amendment for a parcel of BNSF owned property near the US-60 and Dove Valley Road. The approval provides an opportunity for BNSF to proceed with a future classification yard at that location. By relocating the main storage yard out of downtown Phoenix, the frequency of freight train traffic on the rail line could be substantially reduced. Only deliveries to local businesses would need to use the rail line. These deliveries could be scheduled for non-peak periods thus providing operating windows during peak periods for commuter rail service. In this case the regional transportation agencies or ADOT may need to lease or purchase the rail line from BNSF to run the commuter service.

UP Mainline/Southeast

The UP Main/ Southeast line is a single track line that provides service to the Phoenix area through a subdivision of the mainline that runs between California and Texas along I-8 and I-10. The subdivision enters the northern Pinal/Phoenix area

from the southeast and continues across the metropolitan area to the West Valley, eventually tying back to the UP mainline just east of US 95 at Wellton Junction. From this primary subdivision line two other secondary branches extend into Chandler and into south Tempe.

The segment of the UP Phoenix Subdivision from the mainline to Phoenix is being considered by ADOT as one of the preferred routes for high speed train service between Phoenix and Tucson. ADOT has completed the phase one of the *High Speed Passenger Rail Strategic Plan* (ADOT, 2007) that validates conclusions of previous studies and outlines an alternative that will be considered for implementation. Key features of that alternative include:

- Upgraded trackway is needed to be competitive with automobile travel; speeds above 79 MPH would be needed. This is because the driving time between Phoenix and Tucson is about two hours and the train would be supported by passengers if this travel time could be shorter on the train.
- A new track dedicated to passenger rail would be needed from Picacho to Tucson.
- It is likely that a second track would be needed in the Phoenix Subdivision from Phoenix to Picacho to support the service. Adjustments to rail-related industrial services would be needed.
- Preliminary planning identified eight station locations including downtown Phoenix and downtown Tucson.

For the Commuter Rail Strategic Plan, the UP Phoenix Subdivision/Southeast corridor would extend 32 miles from Downtown Phoenix to Ellsworth Road. The possible build-out extension would include an additional 42 miles to Eloy/Picacho resulting in a corridor length totaling 74 miles. There are numerous passing tracks, sidings, switching leads and yards along the 74 mile route. A total of 158 grade crossings are located in the corridor between Phoenix to Picacho. The local freight service along this line is currently eight to ten trains per day.

Implementing commuter rail in this corridor would require joint operation with UPRR for the entire length of the line and will most likely require double track, especially if the inter-city rail service to Tucson is implemented. A number of sidings would need to be adjusted and improvements at the numerous at-grade crossings would be required to accommodate the increased frequency of commuter rail service. The corridor right-of way is generally 100 feet wide. The main track is signaled with an Automatic Block System (ABS), and a dispatcher controls train movements.

This corridor would offer direct service for East Valley and northern Pinal County commuters to the central portion of the region. Access to Mesa Gateway Airport and Sky Harbor International Airport as well as the downtowns of Gilbert, Mesa, Tempe and Phoenix would be provided. This corridor would offer an alternative travel mode for commuters that use US-60 and SR-101 to I-10, providing relief during peak periods.

UP Mainline/Chandler Branch

The UP Main/ Chandler Branch extends 15 miles from Downtown Phoenix to Mesa/Gilbert before turning south to run just east of Arizona Avenue. The total length of the route would be 28 miles. The UP line is single track with a total of 10 sidings. Similar to the UP/Southeast, the corridor right-of-way is generally 100 feet wide. The main track is signaled with an Automatic Block Signal System (ABS) and a dispatcher controls train movements (DTC). The Union Pacific line is single track with a total of 10 sidings and 27 grade crossings. The local freight service along this line is currently two trains per day.

Implementing commuter rail in this corridor would require 15 miles of joint operation with UPRR Phoenix subdivision line from Mesa/Gilbert to downtown Phoenix. In addition, improvements at numerous at-grade crossings would be required to accommodate increased train frequency. Congestion relief to travel using Loop 101 and US 60 would be available on this branch.

UP Mainline/Tempe Branch

The UP system in the MAG region also includes the Tempe Branch, which is a single track industrial lead from the Phoenix subdivision line. The Tempe Industrial Branch diverges from the main track at Tempe after about eight miles from central Phoenix and continues south to West Chandler, a distance of approximately eight miles. This branch is operated in non-signalized dark territory with a maximum speed of 20 mph. There are a total of 25 grade crossings along the eight mile line. The local fright service along this line includes two trains per day.

Implementing commuter rail in this corridor would require eight miles of joint operations with the UPRR Phoenix Subdivision line. A study is currently under development by METRO for transit improvements in South Tempe that could include a major improvement along the Tempe Branch. In addition improvements at at-grade crossings would be required each mile of track. This branch would provide a north/south alternative mode to I-10.

UP Mainline/Yuma-West

The UP Yuma/West extends 31 miles from Downtown Phoenix to Buckeye. The corridor right-of-way is generally 100 feet wide. The main track is signaled with an Automatic Block Signal System (ABS) and a dispatcher controls train movements (DTC) for a portion of the line. The Union Pacific line is single track with a total of 89 grade crossings. The local freight service is limited along this line with service of one train per day.

Implementing commuter rail in this corridor would require joint operations with the UPRR mainline but freight service may be scheduled at times other than the peak periods. Because of the limited freight service, a single-track line may be possible and track upgrades would be required to improve the rail corridor. In addition, at grade crossings would need to be improved along the entire alignment to ensure safe operations. Depending upon future demands to the west including

development in the Hassayampa Valley or to serve employment at the Palo Verde power plant, this line could be extended. This line would serve as an alternative mode to West I-10.

Potential Extensions/northern Pinal County

The rapid growth of Maricopa and northern Pinal counties has led to planning efforts in outlying areas that are currently defining required infrastructure to support future developments. Stakeholders in the strategic planning process helped to identify future corridors where passenger rail service could be part of a multimodal approach to serving travel demands. The critical consideration is to identify these corridors so that rights-of-way can be preserved in advance of new development.

Corridors where potential extensions of existing rail lines and new alignments in developing areas are possible are summarized in the following section.

Hassayampa Valley – This area is west of Buckeye and the White Tank mountains and is being planned as a future development that would support almost one million people. Planning concepts have preserved a multimodal transportation corridor that could accommodate passenger rail facilities that would connect from the north at the BNSF mainline south through the area to the UP/Yuma line or further south into the Hidden Valley planning area. Continued planning efforts should preserve right-of-way for a rail line in this area.

Hidden Valley – This area is west of Buckeye extending between I-10 and I-8. A comprehensive planning project is defining the development pattern along with transportation corridors. A multimodal corridor has been defined that could accommodate passenger rail facilities that would connect with the UP/Yuma line and possibly to an intercity line that would follow the UP Gila Subdivision mainline along I-8. Continued planning efforts should preserve right-of-way for a rail line in this area.

UP/Tempe Branch Extension – The Tempe Branch line could be extended to the City of Maricopa in Pinal County alongside SR-347. Maricopa and communities in the vicinity are rapidly growing because of the lifestyle and the affordable housing. However many of the residents work in the Phoenix metropolitan area and therefore commute daily north along SR-347 or I-10. The Tempe branch extends south of Loop 202 (Santan Freeway) onto the Gila River Indian Community (GRIC) boundary. The new alignment would require close coordination with and approval by the GRIC.

UP/Chandler Branch Extension – Similar to the Temp Branch Extension, this line would continue south and east from the current end of line near Hunt Highway and SR-87. An abandoned rail bed runs along SR-87 to the southeast on GRIC lands to join the UP/Main Phoenix subdivision line just north of Coolidge. This extension would be used to serve the northeast portion of Pinal County with connections into the Phoenix area for employment and other types of commute trips. The extension would require close coordination with and approval by the GRIC.

Copper Basin Railway-This existing short line railroad operates southeasterly from Magma Junction, a point on the UPRR Phoenix Subdivision main line north of Coolidge, to the vicinity of Florence and beyond. A future commuter rail extension over this corridor would enable travel between Florence and the metropolitan Phoenix area. The existing rail line would need to be upgraded to passenger standards between Magma and Florence and one or more passing sidings installed depending upon commuter train traffic volume. This concept would require close coordination with and approval by the Copper Basin Railway.

North/South Highway in Pinal County - A proposed highway in the far eastern portion of the region is currently under study and is referred to as the North-South Freeway in Pinal County. The corridor extends from US 60 about two to four miles east of the Maricopa County line southward to near Florence and then continues southward to intersect I-10 at a point about two or three miles east of the SR 87 interchange in Eloy. No route number has been assigned. The highway would serve developing State of Arizona lands. This corridor could serve multimodal travel in the future and as such continued planning efforts should preserve right-of-way for passenger rail facilities along the final alignment.

Table 5-1 provides a summary of the conceptual corridor descriptions for all five freight rail lines that are currently in place in the study area as well as each of the extensions. Possible extensions were illustrated previously in Figure 5-1

Table 5-1: Conceptual Corridor Description

Corridor/Line	Limits	One-Way Miles (1)	Buildout Extension (1)	Ease of Implementation
BNSF – Grand Avenue	Downtown Phoenix to Loop 303	26	To Wickenburg (add 28 miles; total 54 miles)	▪ Requires joint operation with BNSF mainline ▪ Complex at-grade crossings (6 approach legs) each mile ▪ Numerous at-grade crossings to be improved ▪ Multiple industrial users along length ▪ Major BNSF yard on 19th Ave/South of I-10
UP Main/Southeast	Downtown Phoenix to Ellsworth Road	32	To Eloy/Picacho (add 42 miles; total 74 miles)	▪ May be implemented as part of intercity passenger rail service between Phoenix and Tucson under study by ADOT. ▪ Requires joint operation with UPRR for entire length; most likely will need double track ▪ Numerous at-grade

Corridor/Line	Limits	One-Way Miles (1)	Buildout Extension (1)	Ease of Implementation
				crossings to be improved
UP Main/Chandler Branch	Downtown Phoenix to Queen Creek Road	28	NA	▪ Requires 15 miles joint operations with UPRR mainline ▪ Numerous at-grade crossings to be improved
UP Main/Tempe Branch	Downtown Phoenix to Chandler Boulevard	17	NA	▪ Requires 8 miles joint operations with UPRR mainline ▪ Corridor under study by METRO for transit improvement ▪ Numerous at-grade crossings to be improved
UP Yuma/West	Downtown Phoenix to Buckeye	31	NA	▪ Limited railroad service ▪ Numerous at-grade crossings to be improved.
Potential Extensions/New Alignments				
Hassayampa Valley	Connection between BNSF and UP/Yuma west of White Tank mountains	20 to 30 miles	Connect to BNSF, UP/Yuma and Hidden Valley Corridor	▪ New multimodal transportation corridor ▪ Preserve right-of-way
Hidden Valley	West of Estrella and Rainbow Valley between I-10 and I-8	20 to 30 miles	Connect to UP/Yuma, I-8 intercity rail and Hassayampa Corridor	▪ New multimodal transportation corridor ▪ Preserve right-of-way
UP/Tempe Branch Extension	Extend from I-10 south along Maricopa Road to Town of Maricopa	15 to 20 miles	Extension through GRIC	▪ Requires close cooperation with and approval by GRIC
UP/Chandler Branch Extension	Extend from Hunt Highway southeast to Coolidge	20 to 25 miles	Extension through GRIC	▪ Requires close cooperation with and approval by GRIC
Copper Basin Railway (CBRY)	Rehab existing alignment to	10-15 miles	Serves developing state and privately held	▪ Require close cooperation with and approval by CBRY ▪ Existing rail line

Corridor/Line	Limits	One-Way Miles (1)	Buildout Extension (1)	Ease of Implementation
	Florence		lands areas	
North/South Highway in Pinal County	New alignment	25 to 35 miles	Serves developing state lands areas	▪ New multimodal transportation corridor ▪ Preserve right-of-way

URS; October 5, 2007

(1) As described in the MAG High Capacity Transit Study; 2005

5.2. Travel Conditions in Conceptual Corridors

Commuter rail service has the potential to carry substantial volumes of commuters during peak periods over longer distances and with reliable travel times. These features are important to provide mobility choices in congested travel corridors. Parallel highway congestion (peak hour/peak direction in 2006) was assessed and compared to the conceptual commuter rail operation (peak hour/peak direction) for all five existing freight corridors. The auto volume on parallel highways in the five freight corridors currently ranges from 2,700 cars on route US 60 (parallel to BNSF-Grand Avenue) to 11,000 cars on I-10 West (parallel to UP Yuma/West.

In 2006 the auto volume resulted in level of service (LOS) ranging from LOS E-capacity and LOS F-failure. Roadway segment level of service (LOS) is a widely used measure of traveler convenience that employs letter grades from A to F to illustrate varying ranges of highway traffic density. The letter grade A indicates very low delay and F indicates very large delay.

The LOS estimation method is described for many types of transportation facilities in Transportation Research Board Special Report 209, also called the " Highway Capacity Manual" (TRB 2000). Highway level of service takes into account not only auto congestion but also the effects of heavy vehicles, the width of lanes, the width of shoulders, and the level of influence that vertical grades have on travel.

The travel time for parallel highways in 2006 ranged from about 52 minutes, on I-10 East parallel to UP Main/Tempe Branch to about 65 minutes for US 60/Grand Ave parallel to BNSF-Grand Avenue. The implementation of commuter rail within the five freight corridors would save travel time and remove automobiles from the highway system ultimately helping to relieve peak period congestion and helping to improve air quality for the region.

Commuter rail trains would primarily run during peak periods of each work day. Trains would start services from outlying areas and run inbound to serve the central employment areas around downtown Phoenix, Sky Harbor Airport and central Tempe/ASU. One or more reverse-commute trips could be employed as well. The

evening peak period would offer similar service levels. Depending upon demands, mid-day and evening trips could be added.

The potential ridership capacity would be about 2,000 riders during a peak hour for corridors when assuming four trains per hour, with trains of five cars each. If the ridership of 2,000 is realized, then the adjacent highway system would experience a reduction in auto congestion equivalent to one highway lane. This reduction in auto travel would have a positive impact on saving energy and improving air quality and would help to meet other goals such as sustainability.

Table 5-2: Conceptual Corridor Travel Conditions

Corridor/Line	Limits	Parallel Highway Congestion (Peak Hour/ Peak Direction in 2006)				Commuter Rail Operation (Peak Hour/ Peak Direction)		
		Route	Auto Volume	Level of Service	Auto Travel Time (1)	Commuter Rail Travel Time (1)	Peak Hour Potential Riders (2)	Highway Lane Equivalent
BNSF – Grand Avenue	Downtown Phoenix to Loop 303	US 60/ Grand Ave	2,700	LOS F	65 mins	45 mins	2,000	1.5
UP Main/Southeast	Downtown Phoenix to Ellsworth Road	US 60/ Loop 202 I-10 East	8,400	LOS E/F	55 mins	50 mins	2,000	1.0
UP Main/Chandler Branch	Downtown Phoenix to Queen Creek Road	US 60/ I-10 East	7,100	LOS F	55 mins	45 mins	2,000	1.0
UP Main/Tempe Branch	Downtown Phoenix to Chandler Boulevard	I-10 East	7,100	LOS F	52 mins	40 mins	2,000	1.0
UP Yuma/West	Downtown Phoenix to Buckeye	I-10 West	11,000	LOS F	60 mins	45 mins	2,000	1.0

URS: October 5, 2007

(1) Travel time for typical 25 mile commute trip; train trip times from MAG HCT; 2003

(2) Four trains per hour; trains of five cars each

5.3. Description of Community and Land Use Relationships in Corridors

The five existing freight corridors have the potential to link major activity centers throughout the region. The existing railroad corridors also intersect or parallel several major regional thoroughfares, and travel through numerous jurisdictions in the study area. This section outlines key land use relationships that would be enhanced with commuter rail linkages. Table 5-3 identifies major activity centers and regional thoroughfares in close proximity to the existing freight lines. The table also summarizes local community support.

Proximity to Major Activity Centers

Several major activity centers are located along existing freight corridors in Maricopa and Pinal Counties. Examples of major activity centers include uses such as stadiums/arenas, convention centers, university campuses, and large downtowns (which may also function as major activity centers). Activity centers vary greatly in size and offer a wide variety of uses. Activity centers are used everyday as people shop, work, or seek entertainment. Table 5-3 lists major activity centers potentially served by existing corridor. Several of the identified activity centers would be served by multiple corridors such as downtown Phoenix and ASU downtown Center.

Proximity to Regional Thoroughfares

The existing freight lines run parallel to or bisect several regional thoroughfares in Maricopa and Pinal Counties. These regional thoroughfares include: I-10, Loop 101, Loop 202, Loop 303 and SR-60 in addition to the LRT Starter Line. This interwoven relationship will increase regional connections and allow for a more integrated transportation system that once in place could help to determine appropriate station locations. Refer to Table 5-3 for more detail on regional thoroughfares that are in close proximity to the existing freight lines.

Local Comprehensive Plans

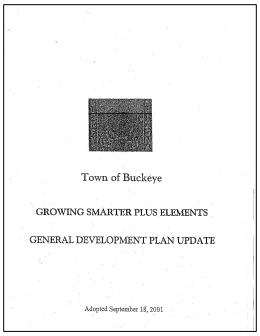
To assess potential community acceptance, compliance with local comprehensive general plans was reviewed. Given the expected increase in population over the next several decades, jurisdictions in the study area have clearly taken a proactive approach to planning for commuter rail and other alternative transportation modes. General plans for communities along the existing freight lines were found to generally be in support of commuter rail serving their jurisdiction. To better understand the level of community acceptance, reviews of comprehensive plans for jurisdictions in close proximity to the rail corridor was assessed and are summarized below. In addition, Table 5-3 includes a brief summary of the local community support.

City of Avondale

The purpose of the 2002 Avondale General Plan is to provide guidance to City decision-makers to help them achieve the relationships between land use, transportation, quality of life, the environment, and economic prosperity desired by Avondale residents and businesses.

The City of Avondale's General Plan provides strong support for commuter rail. One of the goals provided in the plan is to enhance opportunities for non-vehicular travel. An objective listed to help achieve this goal is to provide mass transit opportunities for Avondale residents and business by pursuing funding to convert the existing rail line into a commuter rail system. Another objective identified a possible transit center location at Dysart and Buckeye roads.

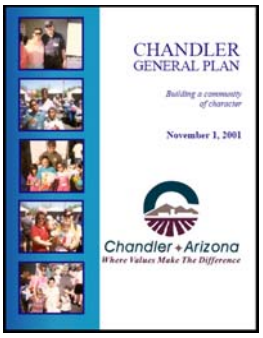
Town of Buckeye



The Town of Buckeye 2001 General Plan supports careful municipal growth, blending areas with distinct rural identity and agricultural heritage that characterizes it unique, neighborly style. Citizens foresee a balance of business, jobs, housing, culture, recreation and education. The variety of land uses will be located strategically so as to maintain natural space in multiple use parks and trails with an array of activities or themes.

The General Plan for the Town of Buckeye generally supports public transportation. One goal included in the plan is to contribute to sense of place and quality of life by establishing connections among neighborhoods and adjacent areas. Another goal is to maintain Buckeye's advantage as a regional Eye of Growth and promote transportation.

City of Chandler

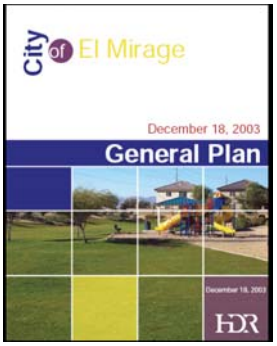


The General Plan for the City of Chandler was adopted in November, 2001. Opportunities for mobility are addressed in the Circulation Element of the General Plan. This includes public transit routes and stations; and pedestrian facilities and other facilities that provide mobility options for Chandler residents, businesses and visitors. The City of Chandler initiated a major investment study looking at high capacity transit connections from Chandler to downtown Tempe and the Central Phoenix/East Valley Light Rail Transit project.

The City of Chandler General Plan provides general support of commuter rail. There are several goals listed in the plan, two of the goals address transit. The first goal is to develop an integrated city wide transportation system that facilitates the use of alternative modes of travel. A listed objective to achieve this goal is the identification

of corridors where transit can be integrated most effectively. Another identified goal is the coordination between adjoining communities and to explore the development of a regional high capacity transit system.

City of El Mirage



The 2003 General Plan for El Mirage provides a vision for the community that states “Today El Mirage is a dynamic and culturally-diverse city with residents that work together to address the challenge of the future. We have parks for our residents, good schools for our children, affordable housing, and good regional access. As we move towards the future we know El Mirage will be a lively place”

The City of El Mirage General Plan provides support for commuter rail throughout the document referencing the MAG High Capacity Transit Plan. Within the Land Use Section of the general plan, Grand Avenue is identified as offering unique infill opportunities largely related to the MAG High Capacity Transit Plan which identifies a commuter rail stop in El Mirage.

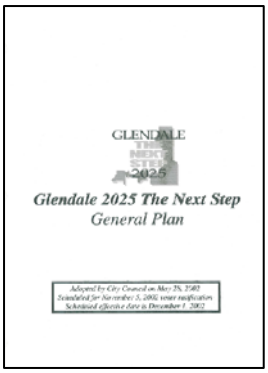
A variety of land uses including medium-density residential development, mixed-use transit-oriented development and regional commercial is planned for the area north of Thunderbird Road and east of Grand Avenue. This is a new development area that offers tremendous potential for the City to take advantage of regional access that could support retail uses, a potential commuter rail station supporting residential and commercial uses, and vacant land that could provide additional residential development to support Grand and Thunderbird Avenue retail. Specifically, a transit oriented development is recommended for the area immediately surrounding the planned commuter rail stop along Grand Avenue.

Town of Gilbert

The Town of Gilbert General Plan was adopted in 2001 and provides a vision and direction for the community. The General Plan indicates that the Town is in support of commuter rail, stating that commuter and/or light rail may become feasible in the future. Two future rail transit station sites were identified—one west of Gilbert Road in the Heritage District, and one south of Williams Field Road in the Gateway Character Area. Land has been acquired for a park-and-ride lot in the Heritage District downtown area. This land could serve as a future downtown rail transit station site.

City of Glendale

The 2002 General Plan for the City of Glendale, Arizona provides general support for commuter rail. The plan states that the City is maturing, yet the community is embarking on exciting plans for continuing growth that will establish its prominence in Arizona and the Western United States.



General support for commuter rail can be found in the Circulation element of the General Plan. This element includes two goals that address support for transit including: Support alternative modes of travel and Ensure regional connectivity. The plan states that Glendale will foster options to automobile travel by seeking to expand the range of service levels of its transit system. The plan also indicates that the Glendale transportation system will be effectively connected to the regional transportation system by working with adjacent jurisdictions and MAG to ensure synchronized transportation links and supporting the completion of regional facilities.

City of Goodyear

The Goodyear General Plan was adopted in 2003 and provides the foundation for the elements and implementation program that will guide growth and development decisions within the City. The vision of the General Plan states: Goodyear is an adaptable community that strives to maintain its traditional values - independence, family, free enterprise, and community involvement - while creating a unique blend of residential, cultural, industrial, open space/recreational, commercial, and agricultural opportunities. The goals, objectives, and policies presented in the Circulation Element of the Goodyear General Plan serve as the City's guide to appropriately extend and provide vehicular, transit and non-motorized movement within and outside of the Goodyear Planning Area.

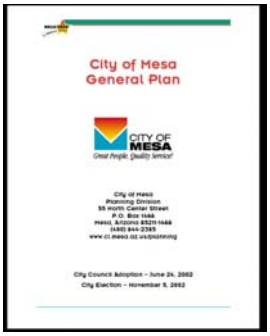
The Plan includes goals and policies within the Circulation element that provide support for commuter rail. One goal included is to link the Community internally and externally with adequate transit service to meet the needs of its residents, workforce, and visitors. A policy included in support of this goal is for the City to continue to work with the START committee to identify and implement the Union Pacific/Southern Pacific railroad track as the commuter rail corridor to effectively serve the transportation needs of residents, employees and visitors between Southern California, the Palo Verde Nuclear Generating Station, Goodyear, and downtown Phoenix if identified in the MAG Regional Transportation Plan. Another policy included that supports commuter rail is to evaluate the potential of a commuter rail station north and east of the intersection of MC-85 and Estrella Parkway if identified in the MAG Regional Transportation Plan.

Maricopa County

The Maricopa County 2020 Comprehensive Plan seeks to create strong and vibrant communities within Maricopa County by encouraging orderly development while creating a healthy environment and a healthy economy. The vision of the Comprehensive Plan is to accommodate growth in a fashion that will preserve sense of community and protect and enhance quality of life. Priorities include protecting unique desert environment, cultural heritage, and Southwestern lifestyle. These unique features define the region and provide an identity that is recognizable in the international arena. Recognition and enhancement of these characteristics are critical to our future success.

The Comprehensive Plan states that a continuing regional effort has been looking for better ways to encourage development patterns that reduce the need for automobile travel through alternative modes and shortened trips. The Transportation element within the Plan provides support for rail systems, including commuter rail and support for the development of rail service studies.

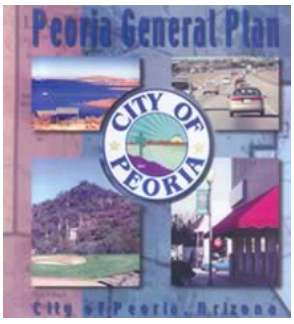
City of Mesa



The City of Mesa General Plan provides a vision and guide to the community's citizens, businesses, and officials as the community grows and develops in the future. The vision of this General Plan is to provide for a prosperous and economically balanced community, to address the need for future housing and employment opportunities, and to support Mesa as a sustainable community in the 21st century.

The City of Mesa General Plan supports commuter rail and other alternative modes of travel. The General Plan indicates that the City will strive to resolve problems created by traffic congestion. This vision includes alternatives to automobile transportation providing a wide variety of bus, light rail, bicycle, commuter rail, and air travel opportunities.

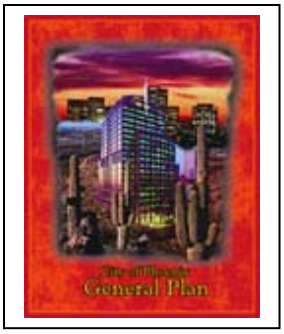
City of Peoria



The Peoria General Plan strives to build a synchronous vision of the City's future from the visions of a diverse population. It integrates the aspirations of the City's residents, businesses and officials into a strategy for managing change. The General Plan is the primary tool for guiding the future development of the City. It provides a framework for making decisions by describing long-term goals for the City's future as well as policies to guide day-to-day decisions.

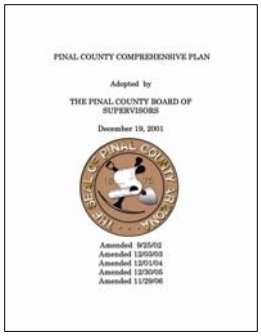
The City of Peoria General Plan provides general support for public transit within the Circulation element. The Plan includes a goal to provide multimodal transportation system that will serve the community and region. Policies to support this goal included coordination efforts in transit with ADOT, MCDOT and METRO to ensure timely provision of required transportation improvements and coordination with RPTA to develop passenger transit and Park and Ride facilities at selected locations in commuter corridors.

City of Phoenix



The purpose of the Phoenix General Plan is to provide a comprehensive direction for the growth, conservation and redevelopment of all physical aspects of the city through goals, policies and recommendations. The Phoenix General Plan provides support for multimodal transportation systems within the Circulation element of the plan. The plan states that an effective multimodal transportation system should be developed that will allow for movement of goods and all people safely and efficiently throughout the city; especially into and between the urban village cores. The Plan also identifies the need to develop an integrated, comprehensive, multi-modal transportation plan for Arizona.

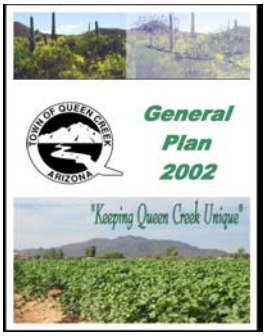
Pinal County



The Pinal County General Plan, 2001 strives to create strong and vibrant communities within Pinal County by encouraging orderly development. By accommodating new growth in areas that can sustain additional development, the plan endeavors to conserve scarce resources and to build communities based on well-protected environmental resources and to build a strong diversified economy. The plan's elements reflect the character of the County's population, while the goals, policies and implementation tools guide future land use and transportation decisions.

The General Plan for Pinal County supports alternative modes of transportation within the Transportation element. The General Plan states that continued efforts should be taken to encourage alternative modes of transportation and provides several goals and objectives that promote public transit. Table 5-3 lists major activity centers, regional thoroughfares and the review of local general plans for all five existing railroad corridors.

Town of Queen Creek



The Queen Creek General Plan was adopted in October 1996. The Plan indicates that the community vision is to provide a quality rural living environment with a focus on continuous improvement of the social, environmental, economic, cultural, physical, and aesthetic factors of Queen Creek. The unique character of Queen Creek will be preserved and enhanced by providing a well organized and orderly development pattern in accordance with Queen Creek's General Plan, while allowing the range of land uses and lifestyle consistent with the rural character, attempting to keep that which is desired by residents of the community. Following this course of action will truly implement the vision of "Keeping Queen Creek Unique."

The General Plan provides support of commuter rail throughout the document. The Plan states that the Town will encourage use of transit and other modes of circulation that support a variety of land uses. The Town will encourage use of creative solutions to the Union Pacific Railroad Line that exists in the community so that commuter rail stops are made available to residents in the community at large.

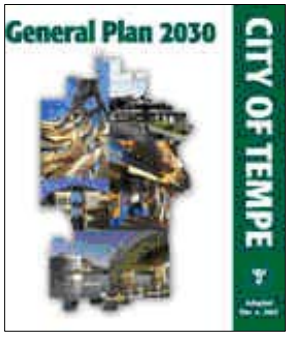
City of Surprise

According to the City of Surprise General Plan the city is at a crossroads; it is a community in transition. The city is experiencing tremendous physical growth and demographic change. As Surprise races into the 21st Century, effective management of growth and determining the community's future direction is of critical importance. Long Range Planning is achieved by following the city's General Plan, which is a blueprint for future development and its impact on future growth and quality of life.

The City of Surprise General Plan has indicated within the community development section of the General Plan that commuter rail transit should be encouraged in the BNSF corridor between Surprise and Downtown Phoenix to minimize congestion and support economic development.

City of Tempe

The goal of the City of Tempe General Plan is to provide the framework for development in Tempe that not only honors where Tempe has been, but looks to the future to improve the quality of life for all those who live, learn, work and play within the city's boundaries.

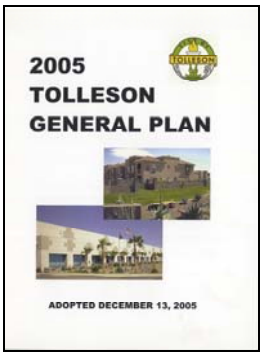


The City of Tempe General Plan discusses commuter rail within the Transportation element of the General Plan. The plan references the (MAG) *High Capacity Transit Study* in 2002 and mentioned that a north/south major investment study is being conducted jointly by the cities of Tempe and Scottsdale to determine transit options linking Scottsdale, Phoenix and Tempe.

Plans for transit improvements in Tempe included the design and construction of a downtown Transit Center, additional transfer facilities where needed and continued planning and implementation of light rail, commuter rail and bus rapid transit. A goal of the Transit Element is to coordinate Tempe's Transit Plan with the overall Tempe Transportation Plan to support increased ridership. A listed objective to help achieve this goal is to study the viability of commuter rail along the Union Pacific corridor.

City of Tolleson

The Tolleson General Plan was adopted in December 2005. The Plan indicates that the General Plan is an expression of the community's preferred future. The General Plan is a long-range planning tool for establishing and reaffirming the goals and development policies of the community.

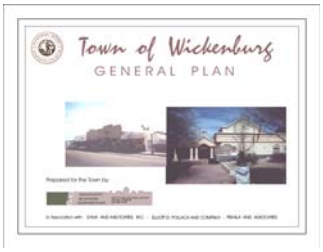


The City of Tolleson General Plan provides support for alternative transportation systems including commuter rail and references the MAG High Capacity Transit Plan. The Union Pacific-Southern Pacific Railroad currently offers freight service to Tolleson Business via its railway line in the City's south area. The Plan acknowledges the potential of existing railroad corridors for possible use as commuter rail.

The General Plan also provides a Growth Areas Element, which identifies areas that are particularly suitable for planned multimodal transportation and infrastructure expansion and improvements. Among these identified growth areas is the 99th Avenue Corridor Growth Area. With multiple access opportunities from I-10, 99th Avenue, Van Buren Street, and UPPR, the growth area is well suitable for multimodal development.

City of Wickenburg

The Wickenburg General Plan is the City's vision and long range plan for how the community would like to see Wickenburg evolve over time. It sets the framework for rational decision making and was adopted by Town Council on August 4, 2003.



The City of Wickenburg General Plan considers multi modal options including commuter rail. According to the general plan, City Planning and transit providers plan to explore commuter rail as a midterm action step.

Town of Youngtown

The Town of Youngtown does not currently have a comprehensive plan in place.

Table 5-3: Corridor Community and Land Use Descriptions

Corridor/Line	Limits	One-Way Miles	Major Activity Centers	Regional Thoroughfares	Community Acceptance
BNSF – Grand Avenue	Downtown Phoenix to Loop 303	26	• Downtown Phoenix (transfer to LRT) • Phoenix Community College • ASU Downtown Center • State Capitol • State Fairgrounds • Grand Canyon University • Concentra Medical Hospital • Veterans Memorial Coliseum • City of Glendale • City of Peoria • Sun City • Boswell Memorial Hospital • City of El Mirage • City of Surprise • Sun Health Del E. Webb Memorial Hospital • City of Wikenburg • Wikenburg Community College	• I-10 West • Hwy 17 • Loop 303	***Support*** **City of Wikenburg**- General Plan supports use of BNSF for commuter rail **City of Surprise-**General Plan supports use of BNSF for commuter rail **City of El Mirage-** General Plan supports use of BNSF for commuter rail **City of Glendale-**General Plan supports multimodal options (lists light rail and bus but not commuter rail **City of Peoria-**General Plan provides support for public transportation **City of Phoenix**-General Plan provides general support for commuter rail ***No General Plan*** **Youngtown-** Does not have a General Plan **Sun City-**Does not have a General Plan
UP Main/ Chandler Branch	Downtown Phoenix to Queen Creek Road	28	• Downtown Phoenix (transfer to LRT) • Chase Ballpark • US Airways Center • Civic Plaza Convention Center • Phoenix Sky Harbor International Airport • ASU Downtown Campus • Downtown Tempe (transfer to LRT) • Sun Devil Stadium • Wells Fargo Arena • Gammage Auditorium • Phoenix Stadium • City of Mesa • City of Chandler	• SR-51 • I-10 West • Loop 202 • LRT Starter Line	**City of Tempe-**General Plan supports commuter rail along existing corridors and new alignments from Scottsdale to Tempe and form Chandler to Tempe. **City of Mesa-**General Plan generally supports commuter rail **City of Phoenix**-General Plan provides general support for commuter rail

Corridor/Line	Limits	One-Way Miles	Major Activity Centers	Regional Thoroughfares	Community Acceptance
			• Packard Stadium • Arizona State University • Carraro Cactus Gardens • Rio Salado Park • Papago Park		
UP Main/ Southeast	Downtown Phoenix to Ellsworth Road	32	• Downtown Phoenix (transfer to LRT) • American West Arena • Sky Harbor International Airport • Wells Fargo Arena • Sun Devil Stadium • Chase Ballpark • Carraro Cactus Gardens • US Airways Center • Civic Plaza Convention Center • ASU Downtown Campus • St. Joseph's Hospital and Medical Center • Pueblo Grande Museum • Packard Stadium • Tri-City Area • Papago Park • Rio Salado Park • Carraro Cactus Gardens • Phoenix Stadium • Downtown Tempe (transfer to LRT) • Town of Gilbert • Town of Queen Creek • City of Mesa	• SR-51 • I-10 West • Loop 101 • US 60 • Loop 202 • LRT Starter Line	**City of Phoenix**-General Plan provides general support for commuter rail **City of Tempe-** General Plan supports commuter rail along existing corridors **Town of Gilbert**-General Plan supports commuter rail and a station along UP Southeast **Town of Queen Creek-**General Plan supports Commuter rail on UP through town center **Maricopa County**-General Plan provides support for commuter rail **City of Mesa-**General Plan generally supports commuter rail

Corridor/Line	Limits	One-Way Miles	Major Activity Centers	Regional Thoroughfares	Community Acceptance
UP Yuma/ West	Downtown Phoenix to Buckeye	31	• Downtown Phoenix (transfer to LRT) • American West Arena • Chase Ballpark • ASU Downtown • City of Avondale • City of Tolleson • City of Goodyear • Litchfield Airport, Goodyear Airport • City of Buckeye	Hwy 17 Loop 303	**City of Phoenix**-General Plan provides general support for commuter rail **City of Tolleson-** General Plan generally supports transit **City of Avondale-**General Plan supports commuter rail and wants to pursue funding to convert existing rail line into commuter rail system **City of Goodyear-**General Plan supports commuter rail. City's policy is to continue to work with START committee to identify and implement Union Pacific/Southern Pacific RR tracks as commuter rail **Town of Buckeye-** The General Plan generally supports public transportation
UP Main/ Tempe Branch	Downtown Phoenix to Chandler Boulevard	17	• Downtown Phoenix (transfer to LRT) • Civic Plaza Convention Center • Chase Ballpark • Phoenix Sky Harbor International Airport • US Airways Center • ASU Downtown Campus • St, Joseph's Hospital and Medical Center • Sun Devil Stadium • Wells Fargo Arena • Rio Salado Park • Downtown Tempe (Transfer to LRT) • Pueblo Grande Museum • Carraro Cactus Gardens • Papago Park • Phoenix Stadium • Tri- City Area	• SR-51 • I-10 West • Loop 101 • US 60 • Loop 202 • LRT Starter Line	**City of Phoenix**-General Plan provides general support for commuter rail **City of Tempe-** General Plan supports commuter rail along existing corridors **City of Chandler-**General Plan generally supports high capacity transit networks
Extensions			• City of Casa Grande • City of Coolidge	• US 85 • US 8	**Pinal County-** General Plan supports alternative modes of transit

Corridor/Line	Limits	One-Way Miles	Major Activity Centers	Regional Thoroughfares	Community Acceptance
			• City of Eloy • Town of Florence • City of Maricopa • City of Apache Junction	• I-10 • US 60	

Source: URS, 2007

6 STAKEHOLDER INVOLVEMENT PROGRAM

The intent of the stakeholder involvement program for the Commuter Rail Strategic Plan is to provide an interactive public process with multiple opportunities and forums to gather input, disseminate study information, and build support and consensus for commuter rail in the study area.

6.1. Commuter Rail Stakeholders Group

A Commuter Rail Stakeholders Group (CRSG) was established and met four times throughout the 12-month planning period for the project to comment on and help shape major policy recommendations for implementing commuter rail in the study area. The stakeholder team was provided all of the factual information provided in chapters 1-5 of this document and played a key role in working with the Project Management team to develop Project Goals and Objectives as described in Chapter 7 and the Implementation Plan for Commuter Rail detailed in Chapter 8 of this document. The objectives of the CRSG were to:

- Analyze Strengths, Weaknesses, Opportunities and Threats associated with implementing commuter rail in the study area
- Develop action plans related to project goals and objectives, and
- Build consensus and community linkages

Stakeholder Identification

The stakeholder involvement effort for the Commuter Rail Strategic Plan was built upon the extensive public involvement effort undertaken during the High Capacity Transit Study (MAG 2003) process. Stakeholders who had been identified and actively involved during the High Capacity Transit Study (HCT) served as a starting point for the Commuter Rail Strategic Plan stakeholder involvement process. The CRSG consists of public and private agencies and entities with interest in determining how to plan for implementation of commuter rail in the study area.

Stakeholder Meetings

The MAG Commuter Rail Strategic Plan consultant team supported outreach efforts of the CRSG in regularly scheduled meetings and workshops. The CRSG met four times throughout the planning process to assess information and provide input to shape major policy recommendations. The four meetings are summarized in the following sections.

Commuter Rail Stakeholders Group Workshop #1

The purposes of the first CRSG workshop were to provide an overview of the Commuter Rail Strategic Plan Project, MAG plans for commuter rail, discussion of project issues and purpose statement, discussion of commuter rail operating requirements and coordination, and a description of the sub-area planning for SWOT analysis.

Several key comments were provided during the workshop related to environmental benefits, operations, connections and funding. Stakeholders identified that the EPA has designated Maricopa County as a non-attainment area and identified the need to address environmental benefits within the strategic plan, such as reduction in pollutants and less usage of natural resources.

Operations associated with commuter rail were also mentioned and suggestions such as the consideration of making the rail lines attractive for both freight railroads and commuter rail were provided.

Increasing mobility within the study area was also addressed, specifically it was identified that Downtown Phoenix and ASU campus will provide multiple possibilities for mobility. It was also noted that commuter rail can help mold future centralized land use and therefore dispersed development can be positively guided by commuter rail.

Funding for the implementation of commuter rail was identified as a challenge. Suggestions included private and public funding, value capture, and to purchase existing railroad branch lines.

Commuter Rail Stakeholders Group Workshop #2

The second CRSG workshop began to analyze Strengths, Weaknesses, Opportunities and Threat (SWOT) issues by subarea, allowing stakeholders from every part of the area to begin examining connectivity, land use, capacity requirements, and other commuter rail related issues from a corridor or localized stand point.

The CRSG members were assigned to a focus group dependent on the subarea definition. The focus groups representing the five subareas of Southwest, Southeast, Northwest, Central, and South corridors, analyzed SWOT for their respective subarea. These SWOT's were documented on flip charts and the

participants were asked to prioritize their identified SWOT issues. Trends associated with the SWOT analysis were identified and include: regional growth, multimodal opportunities, Existing Land and ROW Cost and Affordability, Sustainability, and Public and Private Cooperation. The trends that were developed during this analysis provided a foundation for the project goals and objectives identified in Chapter 7.

Commuter Rail Stakeholders Group Workshop #3

At the third CRSG workshop, stakeholders developed action plans related to the identified commuter rail goals and objectives. These action plans helped to develop an implementation strategy for commuter rail in the study area.
The consultant team summarized the project purpose/need and presented the outcomes of the SWOT analysis developed at CRSG #2. Proposed Goals and Objectives, drafted from the SWOT analysis, were presented to the CRSG.

Stakeholders were asked to work in small focus groups to develop action plans for their assigned goal, identifying: action items, owners, partners, and timeframe/phases. Some of the high priority action plans include:

- Provide reliable and integrated transportation alternatives
- Identify and preserve future corridors. Including future freeway corridors to include passenger rail lines
- Further study about methodologies of taxing/fundraising
- Begin ROW discussions with railroads
- Examine all current ROW inventory
- Establish public private formal agreements that are consistent with other modes of transportation and land use plans with individual and interest groups

Commuter Rail Stakeholders Group Workshop #4

The final CRSG workshop presented issues and challenges of implementing commuter rail in the study area. A Commuter Rail panel, consisting of members from the project management team, answered questions raised by the stakeholders. There was a wide range of questions raised, however most questions focused on choosing a corridor, funding, railroad coordination, and next steps.

In addition, a CRSG survey was conducted which asked stakeholders to rank various issues/challenges related to commuter rail and the CRSG planning process. The results of the survey are provided in the Appendix C.

The workshop was an open house format, displaying various informational boards presenting issues and challenges associated with implementing commuter rail in the study area. Topics included: Project Vision, Stakeholder Involvement, Concept System Plan, Implementation Framework, Governance, Railroad Coordination, and Funding.

Refer to Appendix C- for more information on the CRSG workshops.

Key Stakeholder Issues

Several key issues were identified throughout the CRSG process. These key issues included:

- Continued regional growth of population and employment throughout the metropolitan area.
- Availability of existing railroad alignments in the primary travel corridors
- Increase in the cost of fuel and travel.
- Promote sustainability by reducing air pollutants and usage of natural resources.
- Promote cooperation between public and private entities.

Using the key issues as a base, the CRSG identified critical challenges that consisted of:

- Possible conflicts with current and planned freight railroad operations.
- Rapid development of land uses foreclosing opportunities for alignments and stations.
- Physical and geographic constraints limit locations for new alignments.
- Coordination with jurisdictional interests and policies.
- Availability and competition for regional, state and federal funding and resources.
- Cost of building and operating a commuter rail system within the context of other planned improvements.

6.2. Summary of the Commuter Rail Stakeholders Group Process

Two key components and outcomes of the CRSG process were the development of project goals and objectives as well as the development of action implementation plans.

Project goals, objectives and action plans for the Commuter Rail Strategic Plan were developed through an interdisciplinary and iterative process that included the project management team and stakeholders. The developed goals and objectives, listed in Chapter7, served as guiding principles for the MAG Commuter Rail Strategic Plan and that action plans were utilized to define steps for implementing commuter rail in the study area. The commuter rail implementation steps are outlined in Chapter 9.

7 PROJECT GOALS AND OBJECTIVES

As described in Chapter 6 project goals and objectives for the Commuter Rail Strategic Plan were developed through a process that included the project management team and stakeholders. Goal development and achievement of the goals are seen as on-going processes of regional improvement and serve to provide a framework for future implementation of commuter rail in the study area. The following goals and primary supporting objectives served as guiding principles for the MAG Commuter Rail Strategic Plan.

Goal 1- Employ Commuter Rail to Shape Regional Growth

- Objective 1: Reinforce multi-centered development
- Objective 2: Stimulate economic development
- Objective 3: Spur development in Urban Centers

Goal 2-Improve Transportation Mobility Opportunities by Implementing Commuter Rail

- Objective 1: Provide multimodal travel options in congested travel corridors
- Objective 2: Provide peak period alternative mode to help minimize future vehicular congestion
- Objective 3: Serve regional trips, as well as trips between and within major activity centers
- Objective 4: Maintain or improve travel times within existing and planned activity centers

Goal 3-Provide a Seamless and Cost Effective Commuter Rail Option

- Objective 1: Utilize existing land and railroad right-of-way
- Objective 2: Utilize available as well as new funding sources
- Objective 3: Minimize capital and operating costs
- Objective 4: Plan integrated corridors

Goal 4-Promote Sustainability through the Implementation of Commuter Rail

- Objective 1: Maintain or improve regional air quality
- Objective 2: Develop transportation projects that help focus developments near activity centers
- Objective 3: Provide a dependable long-term transportation solution in critical corridors

Goal 5-Increase Public/Private Cooperation to Implement Commuter Rail

Objective 1: Foster public/private partnerships

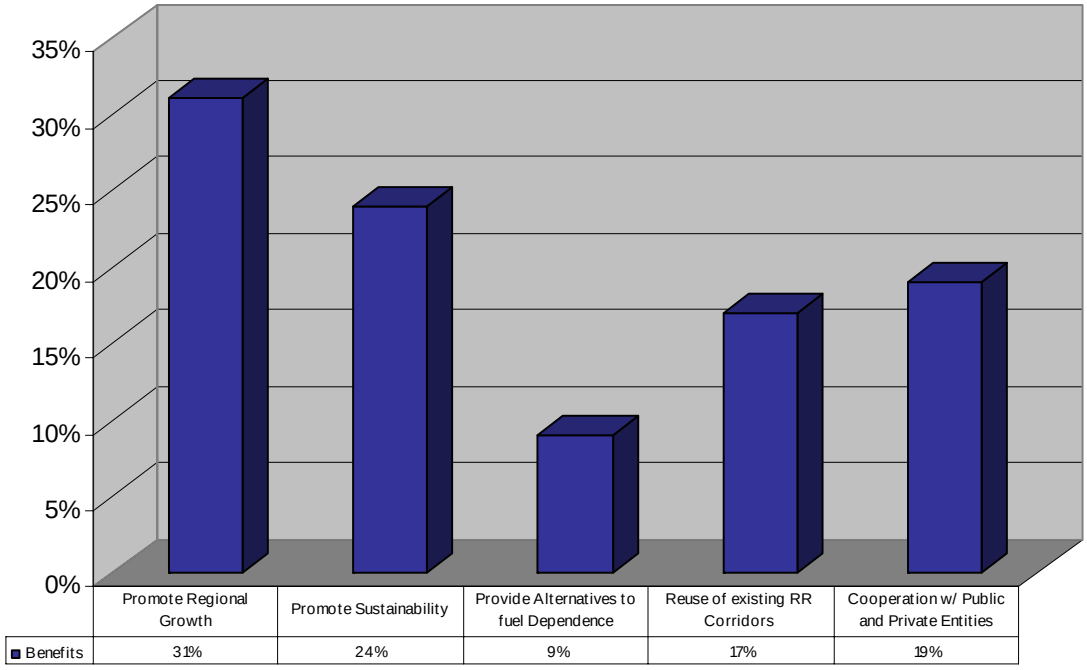
Objective 2: Educate and inform the public

Objective 3: Provide public and private sector funding options

Objective 4: Develop local and regional support for commuter rail

The CRSG were asked to rank the identified commuter rail goals/benefits listed above at the final CRSG workshop. Among the individuals surveyed, approximately one third indicated the greatest benefit for brining commuter rail in to the region would be to help shape continued regional growth of population and employment. The survey results indicate that sustainability is an important aspect to the benefits of commuter rail with 24% of respondents in support for this benefit. Figure 7-1 below demonstrates the commuter rail benefits that were identified by the CRSG as being the most beneficial aspect of employing commuter rail in the Maricopa and Pinal Region.

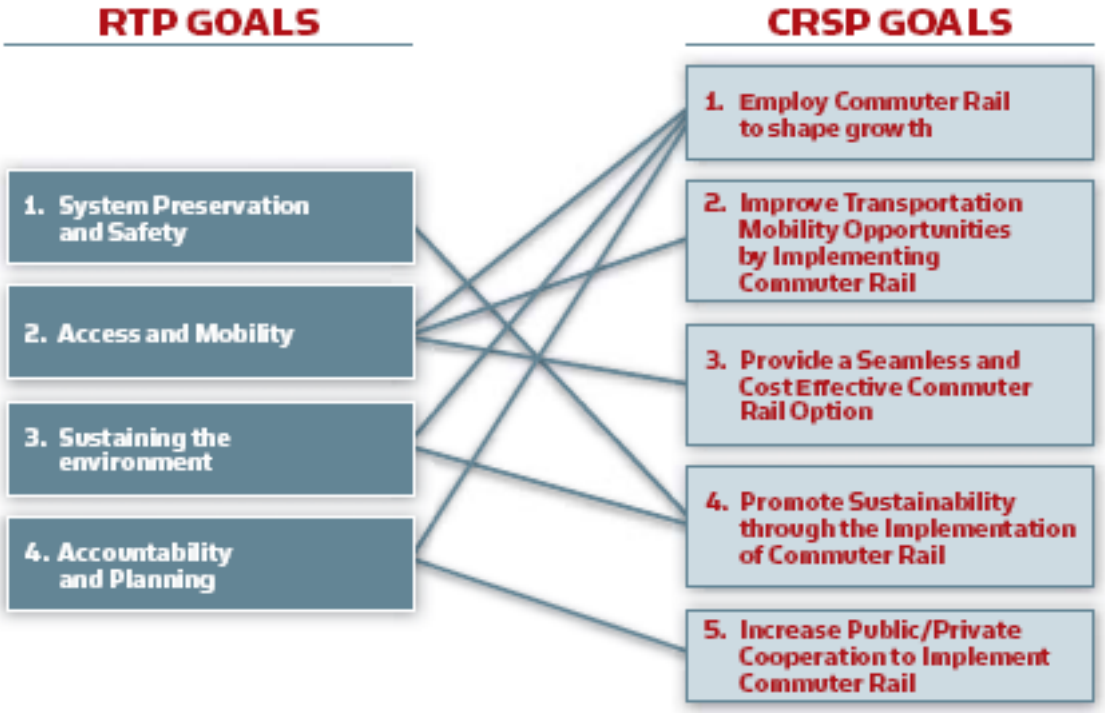
Figure 7-1: Summary of Survey Results-Commuter Rail Benefits



Source: CRSG, 2007

The Commuter Rail Strategic Plan (CRSP) goals were compared to the MAG Regional Transportation Plan (RTP) to assess consistency. Figure 7-2 illustrates the comparison and identifies the relationships between the two sets of goals.

Figure 7-2: Comparison of RTP and CRSP Goals



Source: URS, 2007

8 IMPLEMENTATION REQUIREMENTS

This chapter discusses commuter rail implementation scenarios for consideration in the study area. The implementation scenarios were developed to present a range of possible options for the region to move forward with a commuter rail system.

A review of other successful commuter rail systems was conducted to help define the commuter rail scenarios and develop implementation approach options. Conceptual, operating and cost characteristics are identified to further define the scenarios.

A successful commuter rail system is dependent on three critical elements including: Railroad Coordination, Governance, and Funding This section provides an overview of each of these and discusses potential issues related to the overall implementation plan.

8.1. Implementation Approach Options

Three commuter rail implementation scenarios were developed using examples from other commuter rail systems in the United States. The scenarios range from Get Started in a single corridor, to a Starter System in more than one corridor, to a full Regional System with multiple rail lines in operation. All scenarios assume use of existing rail lines and railroad coordination to share track.

Get Started Scenario

The Get Started scenario would focus on implementing commuter rail in a single congested corridor. This single corridor would provide a local commuter-oriented service and would have several benefits including: less complex coordination with freight railroad companies, potential low cost of entry, and a basic approach to governance, administration, and funding. Due to the peak period focus and lower volume of trains in a single corridor compared to a regional system, the Get Started scenario could be more attractive to the existing railroads. This is due to lower commuter train volumes throughout the day than broader implementation approach combined with railroad benefits from the improved facilities and/or new revenues.

An example of a system with a single corridor is the NorthStar Commuter Rail in Minneapolis. The line is currently expected to be completed in 2009, and will use existing track and right-of-way owned by BNSF Railway, which is significantly cheaper than building a new rail corridor. This 40 mile system extends from downtown Minneapolis to Big Lake, a distance of approximately 40 miles. The NorthStar system is estimated to cost approximately $309 million or roughly $8 million per mile.

Another example of single corridor system is the Trinity Railway Express. This system extends 40 miles connecting Dallas and Fort Worth and started operations in 1998. The implementation cost for this system was $260 million which covered

vehicles (used/rehabbed locomotives & bi-levels), track and signal upgrades, expansion of the maintenance facility, and six stations (1997). Average weekday ridership for 2007 was approximately 8,600 passenger trips.

Figure 8-1: NorthStar System Map, Minneapolis Minnesota

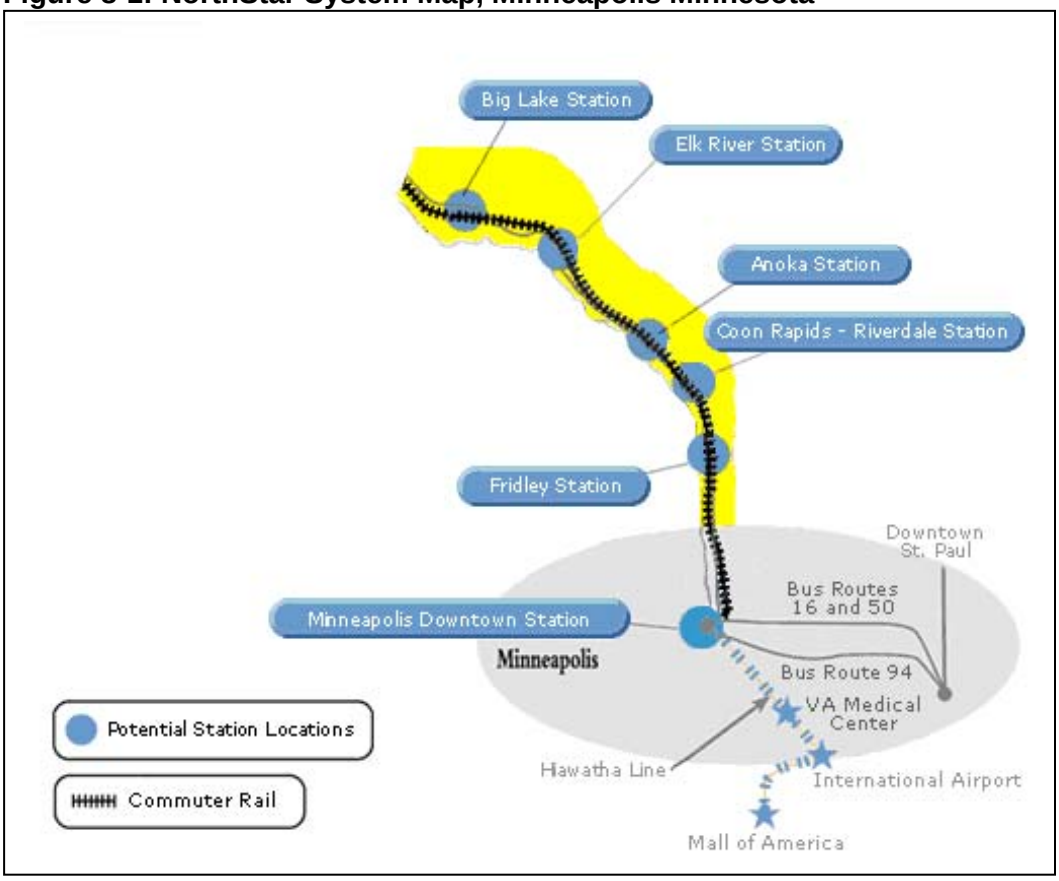
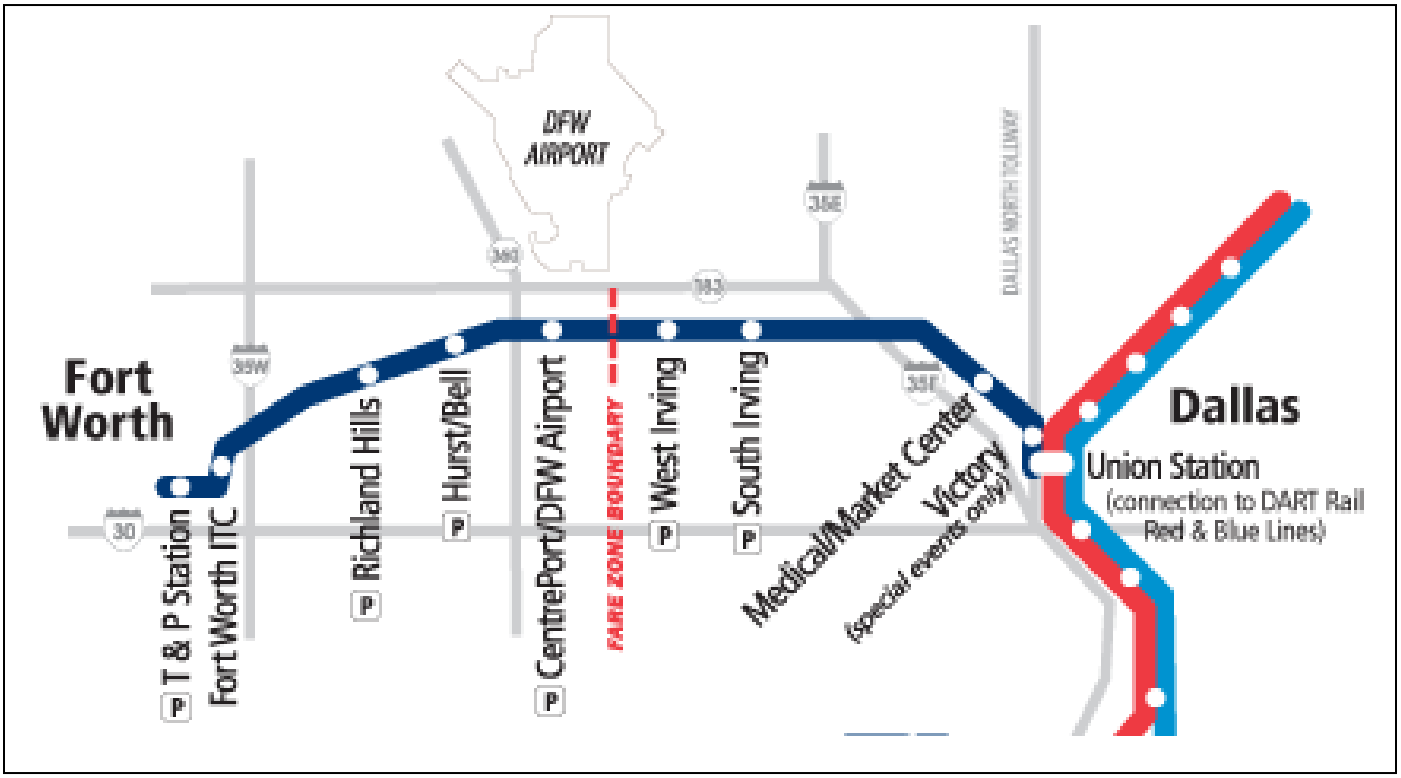


Figure 8-2: Trinity Railway Express (TRE) System Map



Starter System

The Starter System would include multiple corridors with implementation of commuter rail in more than one congested corridor, possibly serving outlying Maricopa County and Pinal County. The Starter System scenario benefits would include: relatively low cost of entry and the possibility to upgrade the system over time. This scenario could focus on shared or single tracks initially to minimize cost. As ridership increases the system could be upgraded to address increasing demand by adding trains and additional track. This scenario may have a more complex approach to governance, administration and funding with multiple jurisdictions participating compared to the Starter System which would be focused on a single corridor.

Examples of Starter Systems would include Salt Lake City Commuter Rail, which is under construction for 45 miles from Ogden/ Pleasant View with start of operations in April 2008 and a second line of 80 miles to Provo. The implementation costs for Salt Lake City to Ogden are $410 million. It should be noted that this system will operate primarily on its own track constructed in a parallel corridor to the existing UP line. This corridor was initially purchased by the Utah Transit Authority from UP to preserve the corridor.

Another example is the Virginia Railway Express (VRE) commuter rail service that connects northern Virginia with Washington, DC. The VRE operates on two lines consisting of, the Fredericksburg line, which starts from Fredericksburg, Virginia, and the Manassas line, which starts from Broad Run Airport in Bristow, Virginia. The implementation costs for this system were $10 to $20 million per mile for double track way (1992). Average weekday ridership in 2007 was about 14,100.

Figure 8-3: Salt Lake City Commuter Rail System Map

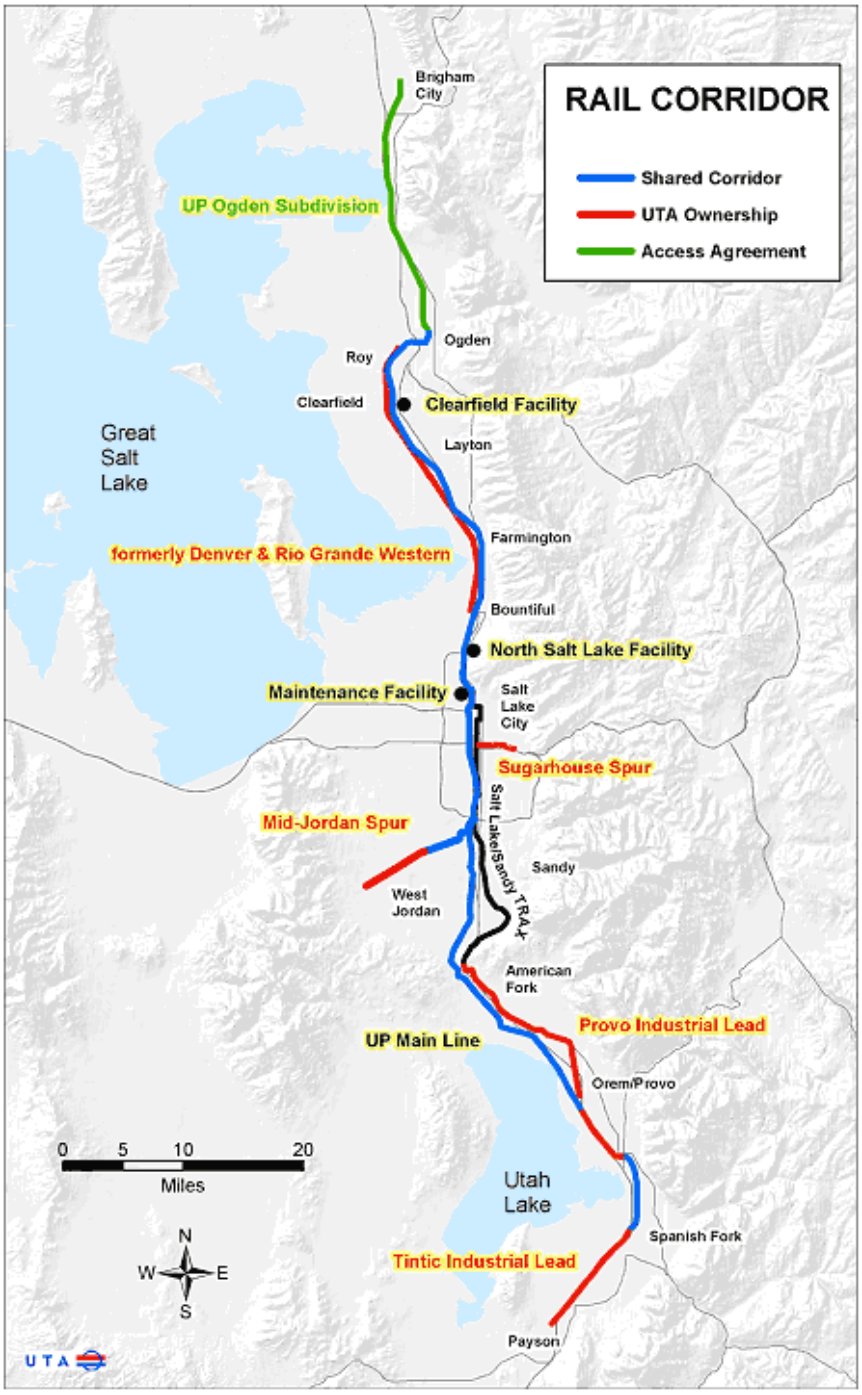


Figure 8-4: Virginia Railway Express (VRE) System Map

Regional System Scenario

The Regional System scenario would focus on implementing commuter rail on multiple corridors simultaneously and serve a larger portion of the study area. This scenario would provide the region with several social and environmental benefits including improving transportation mobility, promoting sustainability, and helping to shape regional growth. However due to a complex system with multiple corridors extending throughout the region, this scenario would require separate facilities from freight rail, would be more costly, and would be the most complex of the three scenarios in regards to governance, administration, and funding.

Examples of Regional Systems include the Metrolink commuter rail which serves southern California and includes seven lines, 54 stations and serves 40,000 passengers per day. The implementation costs for Metrolink was $10 to $20 million per mile in 1985 using leased or purchased right of way from Southern Pacific/Union Pacific Railroad.

Another example of a regional system is Denver FasTracks transit expansion program. This regional system includes five new rail corridors of which four will be commuter rail. The implementation cost for Denver FasTracks is projected to be approximately $20 million per mile.

Figure 8-5: Los Angeles Metrolink System Map

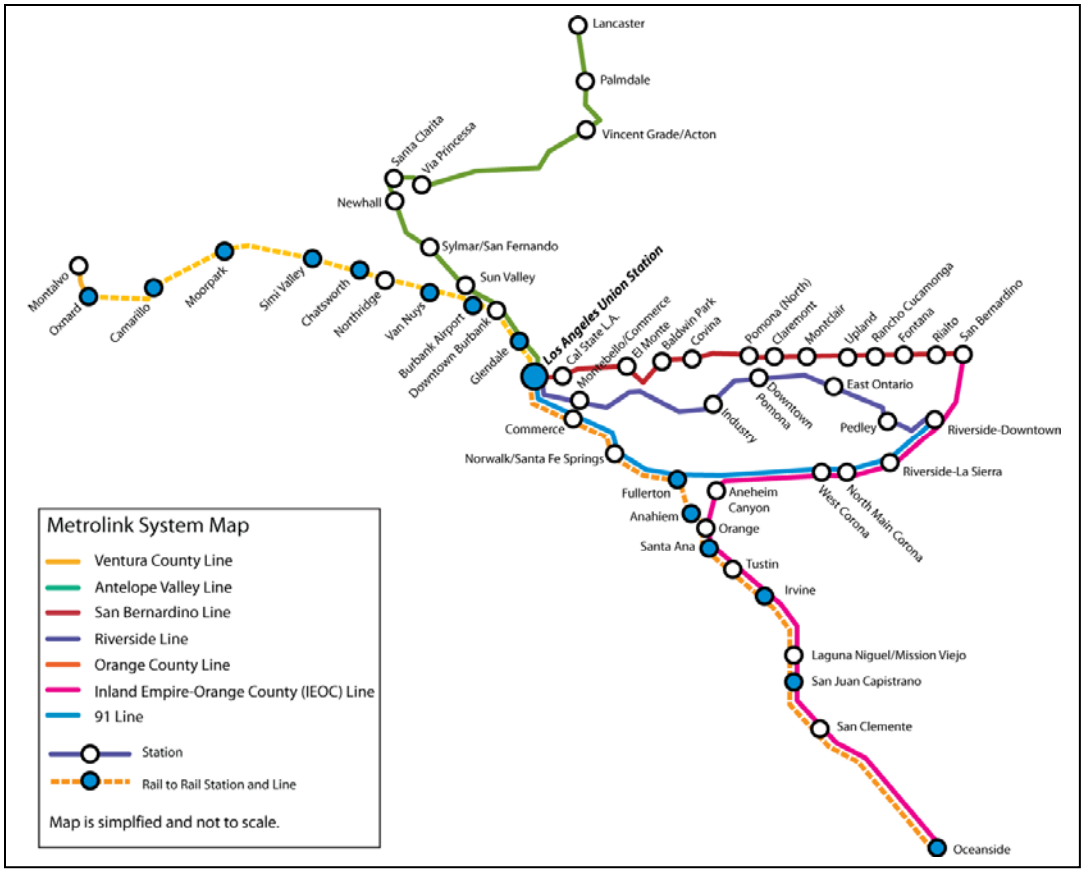
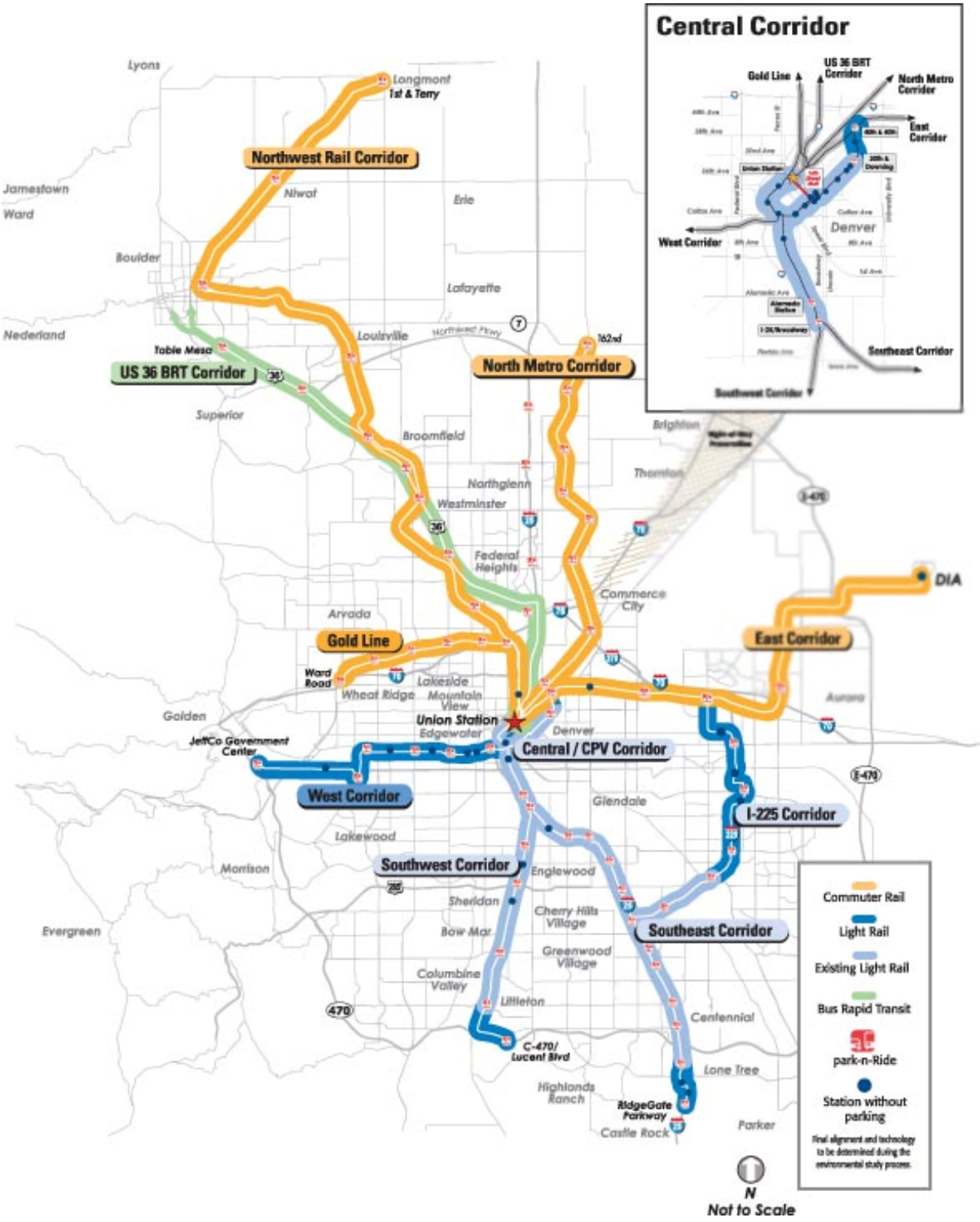


Figure 8-6: Denver FasTracks System Map



Commuter Rail Stakeholders Group Review Process

The three commuter rail scenarios were organized for review by the CRSG to provide a range of options for consideration. Table 8-1 summarizes the scenarios along with similar examples from peer cities.

Table 8-1: Commuter Rail Implementation Scenarios

Scenarios	Definition	Examples
1) Get Started (one corridor)	▪ Single Corridor ▪ Less complex railroad Coordination ▪ Lowest cost of entry ▪ More simple approach to Governance/Administration/Funding	▪ NorthStar Commuter Rail ▪ Trinity Railway Express *Summary-* Northstar is experiencing implementation costs of $309 million or about $8 million per mile (2007) Trinity Railway Express Implementation costs of $70M or $10M/mile (1995-1996) included vehicles, 3 stations, track and signal upgrade and a maintenance facility. Implementation cost of $190M or $7.9M/ mile included vehicles, track and signal upgrades, expansion of maintenance facility and six stations. (1997-2001) (1984)
2) Starter System (multiple corridors)	▪ Multiple Corridors ▪ Lower cost of entry. ▪ Upgrade System Over Time ▪ Moderate level of Governance/Administration/ Funding if multiple jurisdictions participating	▪ Salt Lake City Commuter Rail ▪ The Virginia Railway Express (VRE) *Summary-* Implementation costs for Salt Lake City to Ogden line of $410 million or $10 million per mile (2007) Implementation costs for VRE $10-$20 per mile for double track right of way (1992)
3) Regional System (entire system)	▪ Multiple corridors ▪ System operation would be more costly ▪ Complex in regards to Governance/Administration/ Funding.	▪ Metrolink-Southern California Commuter Rail ▪ Denver FasTracks transit expansion program *Summary-* Implementation costs for Metrolink $10-$20 million per mile for leased or purchased right of way (1992) Implementation costs for Denver FasTracks will be about $20 million per mile (2005)

Source: URS, 2007

The three commuter rail implementation scenarios were evaluated against the Commuter Rail Program Goals and Objectives that were developed by the CRSG to provide comparisons and guidance concerning acceptable implementation steps. The first scenario, Get Started, would help to shape growth locally in one corridor and would offer improved mobility options. This scenario would require the least investment of the three scenarios; however a seamless commuter rail option for larger trips throughout the region would not be achieved. Public/private cooperation with one railroad would be increased and some focused opportunities for joint development in the corridor would arise.

The second scenario, Starter System, would moderately help to shape growth locally and would improve mobility options during peak periods in two corridors with mobility improvement at a regional level. This scenario would require significant investment but would offer through-routing of trains and connections to other transportation modes. The Starter System would provide significant reductions in vehicles miles traveled and associated savings of energy and air pollutant emissions. Public/private cooperation would be required with two railroads and would offer some opportunities for joint development in corridors.

The Regional System scenario would have the most significant results in helping shape growth at a regional level and would provide significant congestion relief by improving overall mobility options throughout the region. This scenario would offer connections to other transportation modes in many different locations but would require substantial investment. Savings of energy and air pollutant emissions would help promote sustainability at a regional level. Public/private cooperation would be required with multiple railroads and would offer many opportunities for joint development of projects.

Table 8-2 provides a comparison of the three commuter rail scenarios and the identified MAG commuter rail goals.

Table 8-2: Example Scenarios Evaluated Against MAG Commuter Rail Goals

Scenario	Goals				
	Employ Commuter Rail to Shape Regional Growth	**Improve Transportation Mobility Opportunities by Implementing Commuter Rail**	**Provide a Seamless and Cost Effective Commuter Rail Option**	**Promote Sustainability Through the Implementation of Commuter Rail**	**Increase Public/Private Cooperation to Implement Commuter Rail**
1) Get Started	Limited; would help to shape growth locally in one corridor.	Would improve mobility options during peak periods in single corridor.	Requires least investment for single corridor, however a seamless commuter rail option would not be achieved; connections to other modes would be offered.	Provides some reduction in Vehicle Miles Traveled (VMT) indicating savings of energy and air pollutant emissions.	Would increase public/private cooperation with one railroad and would offer limited opportunities for joint development in corridor.
2) System Starter	Moderate; would help to shape growth locally within two corridors and would help provide increased access to central areas.	Would improve mobility options during peak periods in two corridors with some improvement at regional level.	Requires significant investment but offers through-routing of trains; connections to other modes would be offered.	Provides significant reduction in VMT and associated savings of energy and air pollutant emissions to promote sustainability in corridors..	Would require agreements with two railroads to increase public/private cooperation and would offer some opportunities for joint development in corridors.
3) Regional System	Significant; would help to shape growth at a regional level within multiple corridors and would help provide increased access to more development in central areas.	Would improve mobility options during peak periods and throughout the day and evening in multiple corridors for significant congestion relief at regional level.	Would provide the most seamless system offering connections to other modes in many locations; requires substantial investment.	Provides substantial reductions in VMT and associated savings of energy and air pollutant emissions to promote sustainability at regional level	Would require agreements with railroads, may require public participation in railroad operations to increase public/private cooperation and would offer many opportunities for joint development of projects.

Source: URS, 2007

The three commuter rail implementation scenarios, described previously, were presented to the Stakeholders at the final CRSG workshop. The Stakeholders were asked to choose an implementation scenario that would best suit the region. The results indicate that there were very little differences between the three scenarios with 31% in favor for a Single Corridor, 35% in favor for a Starter System and 33% in favor of a Regional System.

8.2. Conceptual Operating and Cost Characteristics

To help define the three scenarios further, conceptual operating and cost characteristics were identified and are explained in Table 8-3 below. The conceptual operating characteristics would range from five trains per peak period in peak direction along a single corridor for the Get Starter scenario to 20-minute service in each peak period in peak direction along three or more corridors for the Regional System scenario.

Ridership capacity is based on the capacity for a bi-level rail car and estimates riders per day. Daily ridership capacity could range from 10,100 riders per day in one corridor for the Get Started scenario to 47,000 riders per corridor and about 141,000 total daily riders for the Regional System scenario.

Potential annual vehicle miles of travel saved per year were also estimated to provide a level of impact that a commuter rail system may have on the region. Vehicle-miles of travel (VMT) saved per year could range from 60 to 65 million VMT saved per year for the Get Started scenario to about 800 to 900 million VMT saved per year for the Regional System implementation scenario.

Conceptual capital costs were also estimated for the three scenarios and could range from $50 million to $400 million for moderate facilities to $1 billion to $2 billion for moderate to substantial facilities. Using results from other systems, operating cost subsidy's would typically range from 50% to 65% of operating cost for the Get Started scenario to less than 50% of operating costs and additional capacity at low incremental cost for the Regional System scenario. A more detailed operating and cost characteristics that identify the investments in capital development, requirements for operating and maintenance costs, and more precise ridership estimates will need to be developed in future studies.

Table 8-3: Implementation Scenario Conceptual Operating and Cost Characteristics

Scenario	Operations	Daily Ridership Capacity (1)	Potential Annual VMT Saved	Conceptual Capital Costs	Operating Cost Subsidy
1) Get Started	Single Corridor with Minimum Service: ▪ 5 trains per peak period in peak direction ▪ 1 reverse commute trip each peak period ▪ 1 mid-day trip ▪ 1 evening trip ▪ 4-car trains	10,100 riders per day in one Corridor	Savings of 60 to 65 million vehicle-miles of travel saved per year.	Minimum Facilities: ▪ $50 M to $400 M ▪ Operating lease for railroad right-of-way	Typically 50 to 65% of operating cost
2) Starter Service	Two Corridors with Minimum Service: ▪ 5 trains per peak period in peak direction ▪ 1 reverse commute trip each peak period ▪ 1 mid-day trip ▪ 1 evening trip ▪ 4-car trains	10,100 riders per day per Corridor; 20,200 total daily riders	Savings of 125 to 130 million vehicle-miles of travel per year.	Moderate Facilities: ▪ $400 M to $800 M ▪ Limited purchase of some railroad right-of-way	Typically 50 to 65% of operating cost; will decline with more trains/ ridership
3) Regional System	Three Corridors with Moderate Service: ▪ 20-minute service in each peak period in peak direction; ▪ 40-minute reverse commute each peak period; ▪ Hourly service mid-day and weekends ▪ 5-car trains	47,000 riders per Corridor; 141,000 total daily riders	Savings of 800 to 900 million vehicle-miles of travel per year.	▪ Moderate to substantial facilities with double track ▪ $800 M- $2 billion ▪ Could include purchase of railroad right-of-way	Typically less than 50% of operating costs; additional capacity at low incremental cost

URS; 2007
Notes-(1) Ridership capacity is number of seats per typical bi-level rail car.

8.3. Railroad Coordination

Passenger Rail Authorities (PRA) are legal entities and similar to what would be needed in Arizona in order to implement commuter rail on existing railroad corridors. PRAs are in existence in many areas around the country and are essential in developing the agreements necessary with the railroad that owns the rail corridor where access or purchase is desired for another use such as commuter rail.

Light rail service that is planned in an active rail corridor is typically implemented on separate tracks constructed in the rail corridor with a minimum specified distance between the centerline of the freight and light rail tracks (typically 25-40 feet). Light rail systems share the corridor, not the track.

Commuter rail service normally utilizes vehicles that can safely operate on the same tracks and during the same time frames as freight. Therefore, commuter rail systems typically share track. Commuter service is the likely service mode that is being examined in the MAG Commuter Rail Strategic Plan Study for Phoenix area corridors, so a beneficial first step in railroad coordination efforts is an examination and understanding of commuter rail access agreements.

Railroad Access Agreements

Railroad access agreements between a PRA and a railroad fall into two broad categories: *Sale Agreements* and *Capacity Rights Agreements*. Sale Agreements involve outright sale of the corridor to the PRA. Capacity Agreements involve sale by the railroad to the PRA of a right to run a specified number of passenger trains, or commit the railroad to providing a specific window for commuter rail service.

This capacity right can be expressed as a real estate interest such as a lease or easement, or be expressed as a contractual, or license right. All railroad access agreements are lengthy documents covering hundreds of issues. Many provisions are similar to those found in any purchase agreement, e.g., deed form, title, closing conditions, etc. Issues especially noteworthy in railroad Sale Agreements and Capacity Rights Agreements, together with a brief exploration of the provisions in these agreements are outlined below.

Sale or Capacity Right?

The first step in negotiations with a railroad is to agree on what type of agreement is possible. A PRA and the railroad will likely enter into Sale Agreements only when the rail line involved is a light or moderate density (density refers to the number of trains operating on the corridor) branch line or a light density secondary main line that does not figure prominently in the railroad's current or future operations.

A branch line is a line that "branches" off a main line and serves only local freight customers on the line. Branch lines typically have no major rail yards. No through or overhead freight traffic moves on a branch line. Some branch lines have a very high level of traffic, based on the customers located on the line, or serve very important rail freight sites such as coal mines, coal fired power utilities, automotive plants, quarries, etc. Many branch lines are leased to a railroad short line and the short line railroad handles the local distribution of rail freight to customers located on the branch line under a contract with the main line railroad. There are hundreds of short line railroads in the US.

Main lines are the rail lines that handle a much greater volume of traffic, with both local freight service and overhead freight service utilizing the line. Major rail yards are located on main lines and main lines may be considered the Interstate Highways of a railroad's rail freight network. Where, mostly through mergers or other consolidations, roughly parallel lines or routes are available, one route may be referred to as a secondary main line. Secondary main lines handle a reduced volume of traffic, may be maintained to a lower operational standard and serve to provide alternative or relief routings to the nearby main line. Main lines are engineered and maintained to a higher standard than branch or secondary mains.

Because of the critical nature and strategic importance of main lines, railroads protect the control and capacity utilization of these critical assets, and never sell the rail line to a PRA (although adjacent right-of-way in a main line corridor has been sold). Branch lines may be sold to a PRA, depending on the individual requirements and needs of the PRA and the railroad. A railroad will not likely sell a branch line if a major rail facility or customer (e.g. coal mine) is located on the line. A secondary main line may also be sold, provided the line is not likely to increase dramatically in importance for the railroad in the future.

Sale Agreements

Compensation

The amount a corridor will sell for is a product of many factors, and is established by negotiation between the parties. The Federal Transit Administration (FTA) has acknowledged in the past that rail corridor value is often established by extended negotiation and real estate appraisals based on land values are not the sole determinative of the corridor value. A rail corridor scheduled for abandonment with no apparent public use may sell for a few thousand dollars per mile, or remain vacant for years. A similar corridor identified as a future passenger rail line may sell for millions of dollars per mile. Part or all of the compensation agreed to by the parties is often the expense the railroad must incur to free up the line for sale. This often includes new rail yard acquisition and construction, new or rebuilt rail connections to other rail lines, or even new or rebuilt bypass routes. Compensation discussions are typically held in the strictest confidence by all parties.

Level of Service

The level of planned passenger rail service, i.e., the number of trains that may operate during a given period of time, is usually a critical factor in the decision to purchase a rail line, rather than receive the right to operate a specified number of trains. With the purchase of the line, a PRA usually receives much more latitude to schedule and operate as many trains as the rail infrastructure can handle. With a purchase the PRA becomes the owner of the line and is therefore able to exercise much more control of the asset.

Rail Freight Rights

One aspect of ownership that normally does not transfer to the PRA is the rail freight rights. The railroad will normally retain the right and obligation to serve rail freight customers on the corridor. The right and obligation to provide freight service is regulated by the Surface Transportation Board (STB), formerly the Interstate Commerce Commission (ICC). This retained right is usually styled as a "common carrier easement", and gives the railroad a real estate, contractual, and regulatory right and obligation to continue providing rail freight service. This common carrier obligation could transfer to the PRA, but few, if any, public entities want to be burdened with the obligations and regulatory entanglements of freight rail responsibilities. The common carrier responsibilities may however, be transferred at closing, or soon thereafter to a short line railroad.

Capacity Improvements

Unless no local customers are located on the rail line to be sold and no overhead rail traffic moves on the line, the railroad always has the continuing need to provide freight rail service. In these circumstances, before agreeing to the sale, the railroad will insure, through the sale agreement, that the PRA is obligated to either design and construct specified track and signal improvements to increase capacity (such as double tracking or building additional passing sidings) or the PRA guarantees specified freight service standards (such as limited passenger windows,). In rare instances when the level of freight service is minimal and is not projected to ever significantly increase, the railroad may agree to a specified night time freight window. The railroad and PRA can also agree to both specified improvements and freight service standards. The amount of capacity of improvements and standards depend on: (1) the existing condition of the track and signal system; (2) the current and anticipated future level of freight service; and (3) the initial and future level of passenger service. In a sale agreement, however, the PRA does have more control over the capacity improvements that are necessary. The capacity improvements are also normally designed and built by the PRA, most typically by contractors working for the PRA. The PRA is expected to bear the full cost of all capacity improvements. It is important to remember that sale agreements typically only occur when the level of freight service is low or minimal.

Indemnification and Insurance

The railroads insist that, as a result of the sale and initiation of rail service, no additional risk or liability exposure is assumed by the railroad, even if the railroad is the negligent party. The railroad position is that there was no passenger rail liability exposure before service started, and there should be no exposure to the railroad in the future. In addition to strict liability provisions, multi $100 million dollar insurance coverages are required to be carried by the PRA, naming the railroad as an additional insured and covering the indemnity language in the agreement. Both major western carriers usually insist on at least a $200 million policy. These large insurance limits are required even in states with much lower governmental immunity and governmental tax cap provisions. In some recent access agreements state law has had to be changed to allow these liability, indemnification and insurance provisions to be enforceable. The indemnification and insurance issues have always been critical for the railroads, but in light of recent accidents and liability exposure, these issues are even more important. For a small commuter rail start up operation, insurance costs can therefore be a sizable (over 25%) component of the cost of operations.

Maintenance and Dispatch

The sale agreement may provide that maintenance responsibility for the corridor also transfers to the PRA. If maintenance does transfer, standards or requirements for track condition (including minimum FRA classification) that must be met by the PRA are negotiated. Once passenger rail operations begin, the minimum track conditions for passenger service will normally be more than sufficient for freight operations, but service will not likely start immediately, and passenger service may not operate on the entire length of the rail corridor purchased. After passenger service is operating, the railroad's contribution for maintenance is usually a small percentage of the overall maintenance cost.

If maintenance remains with the railroad, then the standards the railroads must meet are included, along with the compensation the PRA must pay the railroad for the work done. Because maintenance standards are higher for passenger service, the PRA bears a very high percentage of the maintenance cost.

Dispatch of the line is often handled separately from maintenance, and, more often than maintenance, may remain with the railroad. In either case, dispatch protocol (what train has priority) is negotiated, as well as compensation for dispatch services is negotiated.

Environmental Conditions

As with any transfer of property, the condition of the property and responsibility for environmental clean-up is a critical issue in the purchase of railroad property. Rail corridors and rail yards have typically been in heavy, nineteenth century industrial use for 100 years or longer. This rail use predates most all environmental monitoring and other current practices that mitigate impact to the environment. Just as in liability issues, railroads seek to avoid as much

responsibility as possible for environment clean-up after a sale to a PRA. As part of the sale agreement the railroads and PRA usually agree to a due diligence period prior to closing on a rail line sale and the PRA may conduct a Phase I and often Phase II environmental assessments. Because a rail corridor is long, narrow and often difficult to gain easy access to, environmental assessments can be challenging. The sale agreement often just allows the PRA to not consummate the transaction if severe environmental conditions are encountered. Rail yards, because of the intensity of industrial activity, may be an especially environmentally sensitive area, and much attention is given these areas in the purchase of railroad property. It may be possible to negotiate agreements with the railroads, the PRA, and the applicable environmental monitoring agency to limit environmental clean up requirements if the corridor continues to stay in only railroad use.

The PRA must obtain any environmental clearance necessary to construct and operate the passenger service. Noise and vibration issues are frequently raised, and with the recent FRA regulations on train whistles and quite zones, implementation of quite zones become the responsibility of the PRA.

Train Operation

In sale agreements, the selling railroad does not contract to operate the passenger trains. The PRA normally issues a Request for Proposals (RFP) for a third party to operate and maintain the trains.

Capacity Rights Agreements

Compensation

Because the PRA is not acquiring the line, but rather is only acquiring the right to operate a specified number of trains, the compensation discussions with the railroad are actually much more complicated than in a Sale Agreement. Determining an appropriate “value” to assign to the right to operate the first, second, third, etc. round trip passenger rail train is difficult at best. The reference here to the cost for the “right” to operate a train is separate from the actual operating cost (fuel, engineers, conductors, etc.) to run the train. A PRA usually asserts that much of the compensation that flows to the railroad is associated with the publicly funded infrastructure improvements (track, signals, etc) that are required to operate passenger rail service. These infrastructure improvements are also utilized by the railroad in its operations. Although a significant part of the compensation to the railroad is the value of the track and signal improvements, railroads frequently contend, with justification, that the improvements, albeit useful, would not be necessary but for the introduction of passenger rail service.

Level of Passenger Service

The level of planned passenger rail service in a Capacity Rights Agreement is much more scrutinized by the railroad than in a Sale Agreement. Recall, Capacity Rights Agreements usually occur on rail lines that handle significant or important rail freight service. The number of trains operating and the time of days

those trains operate is the determining factor in the track and signal improvements necessary to implement passenger service. Typically the railroad is not content to surrender the corridor to exclusive passenger service during the peak rush hour period. The planned passenger schedule is combined with the existing level and timing of freight use to test the capacity of the existing infrastructure to handle all the trains, with the peak period obviously being the crucial period. To this initial service, reasonable expansion of both freight and passenger service if further added to determine what additional facilities will be necessary in the foreseeable future. It is this expanded service level and track capacity that railroads insist the PRA fund and build at the outset.

These factors compel all parties to devote much time, money and resources into clearly identifying the level of anticipated passenger and freight service likely or possible on the corridor, and designing improvements to handle that level of service. Railroad capacity modeling is a technique frequently used by PRAs and the railroads to help determine the appropriate track and signal improvements. This issue, together with the capacity improvements necessary to support the service, are the battleground of most capacity right access negotiations.

Capacity Improvements

This issue is closely linked to the previous issue. Based on the level of passenger and freight use, track, signal and other improvements are negotiated and agreed upon. More so than in a Sale Agreement, the capacity improvements the railroad requires in a rights agreement are critical. This is because a sale only occurs when the freight use of the line is at a low level (either because the line is in a light or moderate density branch line or is a secondary main line) and is being utilized at much less than capacity. When the PRA is acquiring rights to operate a specified number of trains, the rail line has significant use already and the improvements necessary to operate the trains are therefore of utmost importance.

Railroads are extremely cautious about allowing passenger service to commence without all the facility improvements agreed to as necessary to handle increased passenger and freight volumes completed. Three factors lead the railroads to take this position. First, assuming the existing rail infrastructure could accommodate some initial level of freight and passenger service, if the railroad allows service to begin and freight needs increase, the railroad understandably does not want to be in the position of having to fund itself the cost of the additional capacity needed- capacity that was previously available, but was consumed by the introduction of passenger service. Second, if the existing infrastructure needs expansion and/or improvement prior to the start of passenger service, and those improvements are made, the least costly capacity improvements will naturally be constructed first. If freight needs subsequently increase, the railroad does not want to be in the position of building the more costly second round of capacity improvements at the railroad's expense. Third, railroads do not accept a RPA's agreement or pledge to fund future

improvements if needed, or to limit its request for passenger service to only the initial service levels. Experience has shown that, once service is introduced and is successful, the public has an insatiable desire for more commuter rail service. Any PRA has a difficult task in absolutely committing future governing bodies to expend funds. After all, those funds may need voter approval (e.g., bonds, new taxes) or outside approval (e.g., Federal FTA funds). From the railroad perspective, all improvements for the foreseeable future, if not in place, must at least be funded and irrevocably committed to be built.

Because the railroad still owns the line, most capacity improvements will be designed and constructed by the railroad, or by contractors working for the railroad. In most instances, existing railroad labor agreements require that railroad employees actually construct the improvements that tie into an existing railroad facility. Normally the agreement with the railroad contains cost estimates for all the capacity improvements, with the PRA responsible for any increases over the estimate.

Indemnification and Insurance

Regardless of the type of access agreement, railroads insist on the same provisions on insurance and indemnification.

Environmental Conditions

In capacity right agreements, the PRA does not take on all the risk of the environmental condition of the property. The railroad will insist, however, that any environmental clean up required as part of the construction of the capacity improvements be the financial responsibility of the PRA. Again, the railroad position is that “but for’ the passenger project, the clean up would not be undertaken.

The PRA must typically also obtain any environmental clearance for the capacity improvements necessary for the additional passenger service.

Maintenance and Dispatch

If the PRA purchases capacity rights, then the railroad will continue to maintain and dispatch the rail line. The standard of maintenance required for the speed and ride quality necessary for good passenger rail service is higher than that required for freight service. Accordingly, the agreement will detail the standard of maintenance required and set the cost paid for maintenance, or establish the method, or formula for allocating ongoing maintenance costs. Because the railroad use of the rail line is still significant, these allocation formulas more evenly split maintenance costs than in sale agreements, where railroad use is less significant.

The agreement will also establish the process to be followed for identifying future capital projects. These future capital projects include capacity improvements requested by either the railroad or PRA, as well as capital maintenance projects

such as major tie replacement and rail relay programs. The allocation formula or method of allocating these capital replacement costs is weighted to emphasize the more demanding operating requirements of passenger rail systems.

Dispatch of the line will remain with the railroad. Dispatch protocol (what train has priority) is negotiated, as well as compensation for dispatch services is negotiated.

Train Operation

In Sale Agreements, the selling railroad does not contract to operate the passenger trains. In Capacity Rights Agreements, the PRA may elect to contract with the owning railroad to provide train and engine crews for operation of the passenger rail service. Sometimes the owning railroad may insist that its crews operate any passenger trains that move on the railroad. If the railroad does provide crews, the agreement will detail the service needs of the passenger operations and establish the compensation for the PRA to pay the railroad for the train operations. Maintenance of the equipment is handled by a third party contractor procured by the PRA.

Commuter Rail Proposals to Railroads

The UP's and BNSF's standard response to inquires about passenger rail service, in the Phoenix area or elsewhere, is that any proposal that satisfies the railroad's core business needs and improves the railroad will be considered seriously. Those core business needs are defined as:

- Safety;
- Protection of current freight rail customers;
- Protection for through or overhead rail movements;
- Protection against any and all increase in liability exposure; and
- Guaranteed protection for capacity improvements for future freight rail business expansion.

Both railroads are, generally, aware of the desire of Phoenix area officials to utilize existing rail infrastructure for commuter rail service. The number of trains, origin and destination of trains, station locations, and other details are not known to any degree of specificity. Railroads always assume there ultimately will be a desire for a relatively high level of bidirectional passenger service, thus curtailing the railroad's current ability to operate the existing freight service. Railroad officials typically believe that the existing rail infrastructure could not support any meaningful level of rail passenger service and would therefore require upgrading at the expense of the PRA.

Next Steps

In the immediate future, it is recommended that the Phoenix area commuter rail advocates focus rail coordination efforts in three general areas:

(1) unify all the individual rail efforts, so the region can speak with one voice to the railroads;
(2) identify the likely passenger train service needs and the continuing freight service needs on the corridors and develop the infrastructure requirements to serve those needs; and
(3) prioritize those corridors that appear to be most likely to combine good ridership, reasonable capital costs, and low to moderate impact on the railroads.

The prioritization process would be very similar to the process used in the MAG High Capacity Transit Study, 2003, where identified corridors were evaluated using a measure of ridership and project cost effectiveness. The Benefit Cost analysis, like the cost effectiveness calculation, reflects the relationship between ridership and costs. However, the results of the Benefit Cost are in inverse relation to those of the cost effectiveness calculation. The Benefit Cost figures are designed to act as a check against the cost effectiveness ratings received by each of the potential corridors and to assist in recommendations for phasing and prioritization. It is important to recognize that the key additional factor at work in the Benefit Cost analysis is the level of roadway congestion forecast for the competing arterial or freeway segment.

Unify Efforts

In interacting with the railroads most regions suffer from a lack of focus and common understanding or agreement on needs, goals, and methods to achieve the desired outcome. At the minimum, a railroad is asked to respond to multiple entities or groups on any given issue, questions or suggestion. Often the railroad is responding to multiple individuals from the same organization, from high level policy makers to technical staff. Most successful projects and certainly the best agreements are negotiated with the public represented by a core group empowered to negotiate on behalf of the project. Coordination should be addressed at both the higher policy and elected official level and the staff level.

Identify Corridor Capacity Improvements

Negotiation of an agreement with any railroad requires that the improvements necessary for passenger and freight be identified. A key element will be the number of passenger trains needed to address the anticipated ridership requirements on the corridor. Early estimation of these service levels, combined with the demonstrated local freight requirements, are necessary to determine generally the capacity improvements necessary. This issue may be an early threshold factor that identifies any fatal flaw in utilization of the corridor, such as the physical constraints in a corridor or high or critical levels of rail freight usage.

There are several areas local jurisdictions can consider when coordinating with capacity improvements including:

- Adjustments to land uses at station areas;
- Adjustments at sensitive areas;
- Coordination of grade crossing protection;

- Preservation of freight access to commercial/industrial users; and
- Right-of-way preservation to reserve areas for stations, facilities; and alignment.

Prioritization

Selecting a corridor or corridors to first implement commuter rail service is important to gain focus. Most successful projects either have only one corridor in play to start with, or when forced to choose, identify a corridor that combines three key elements: ridership, cost, and the ability to actually implement. The first two factors (ridership and cost) are typical in any transit project. The MAG High Capacity Transit Study outlined capital and operating and management costs in great detail. Ridership forecasts can be updated by MAG for current projections. The last factor, ability to implement, focuses on the likely impact to the railroad and the real world chances of obtaining a railroad access agreement. Many communities fixate on only the best transit option (ridership & cost) and ignore this third leg of the implementation stool. Although focusing on the best transit solution is understandable, the practical result is an impasse with an intractable railroad. In the final analysis, consideration of the railroad's position is absolutely critical and necessary in any commuter rail project, and the earlier those concerns are identified, acknowledged, and addressed the greater the likelihood and ease of success in obtaining a railroad access agreement. In order to negotiate an access agreement, the railroads will require the regional/local agencies to demonstrate the viability of the project through several features such as:

- Regional/local political agreement on commuter rail service
- Designations of funding for implementation
- Action toward resolution of legal issues including possible new legislations

The overall objective is to establish a comprehensive regional transportation system that is truly multimodal. Integration of different transit and roadway elements must improve travel time and efficiency to relieve congestion. Commuter rail would fulfill one role in the overall system and would ne integrated with other modes through studies, plans, and projects.

8.4. Governance and Administrative Options

One of the recurring challenges or issues that must be resolved to implement commuter rail in the study area is the question of who will be the responsible party in advancing the concept beyond the Strategic Plan phase. A critical element is the administration of the system when the corridor passes through several jurisdictions.

It was clear in the responses from the stakeholders who participated in the Workshops that the commuter rail network should be completely coordinated with local and regional transportation systems. Stakeholders supported the

development of a “seamless” transit system to address growth patterns and emerging regional trip patterns.

Examples from Other Regions

As described in Chapter 4 and listed in Table 4-1, there are several new commuter rail systems currently in operation or being considered across the country. From these networks there is a wealth of information and experience on which to draw for the analysis of possible governance structures. Table 8-4 provides an overview of the existing governance models that are in use in the New York, Boston, and Chicago commuter systems and now includes California, Florida, Washington, Virginia, Texas and New Mexico examples. The more mature systems are significantly larger in size than the newer ones, primarily because they have built ridership as the region has grown around them. Each has been a catalyst for successful service in corridors or in the region. Ridership has followed, growing steadily as the train became a preferred commuter option for new residents.

In many of these locations, commuter rail has been added after the regional urban form and transportation network has been established. This has required close coordination among regional and local jurisdictions, the railroads, private businesses, and residents in order to be successful. Regional agencies such as the Metropolitan Planning Organization (MPO) or the transit agency have often taken the lead in initiating this coordination.

Table 8-4: Existing Governance Models

SYSTEM	AGENCY	GOVERNANCE	TRACK MILES LENGTH	ANNUAL PASSENGERS
Anchorage	Alaska Railroad Corporation	State	46	96,000
Baltimore	Maryland Transit Admin	State	471	6.7 m.
Boston	MBTA	State	648	39.9 m.
Chicago	Northern Illinois Regional Commuter	Region	1144	67.7 m.
Chicago	Northern Indiana Commuter Transit District	Region	130	3.5 m.
Dallas	DART	Transit Agency	20	1.3 m.
Dallas	Fort Worth Transit Authority	Transit Agency	22	823,000
Hartford	Conn. Dept. of Trans.	State	106	399,000
Los Angeles	SCRRA	Single Purpose Agency	631	9.7 m.
Miami	Tri-Tail	Single Purpose Agency (JT Powers)	104	2.8 m.
New York	Metro-North	Region	802	72.3 m.
New York	Long Island RR	Region	701	96.2 m
New Jersey	NJT	State	1016	68.7 m.
Philadelphia	Penn DOT	State	144	235,000
Philadelphia	SEPTA	Regional Transit Agency	695	30.2 m.
San Diego	NCTD	Local Transit Agency	83	1.4 m.
San Francisco	JT Powers Board	Single Purpose Agency (JT Powers)	136	6.7 m.
Seattle	Sound Transit	Regional Transit Agency	146	955,000
Stockton	Altamont Commuter Exp.	Single Purpose	90	616,000
Washington D.C.	Virginia RR Express	State	190	3.4 m.

Source: Gannett Fleming, 2007

Potential Governance Structures

The new / proposed systems have many different governance structures, just as do the established systems. The conclusion is that there is no one appropriate structure for governing a commuter rail system. Based on the decisions regarding governance, made in the most recent commuter rail projects, a set of responsibilities for the agency that manages the system has been developed. These responsibilities, set out in Table 8-5, illustrate the close working relationship with existing transit operators and the cities served by the network (for land use planning at stations).

Table 8-5: Typical Responsibilities of Commuter Rail Authority

▪ Provide a seamless transportation service;
▪ Coordinate with other transit providers regarding schedules, public information and integrated fare systems;
▪ Participate in priority setting in RTP process;
▪ Raise funds from a variety of sources including: fares, local/state/federal transit programs, private developers, etc.;
▪ Facilitate growth of the network and provide Transit options in off-peak periods;
▪ Develop long-range plans for system development;
▪ Coordinate with the private freight railways;
▪ Manage operations (often through contracts with private operators);
▪ Build ridership by encouraging development at stations.

Source: Gannett Fleming, 2007

Generally, the institutional arrangements throughout the country range from state-run regional rail operations to large single-purpose regional rail authorities that extend service into multiple political jurisdictions, to regional transit authorities that are responsible for multimodal services, to sub-regional agreements between cities to contribute to the management of a rail service in a common corridor.

Existing Governance Structures

The existing structure of transit service providers in the Phoenix Metropolitan region is a complex mix of operations such as the City of Phoenix Transit System, and METRO who is currently building the light rail project. In summary the institutional framework for transit consists of the following:

- **ADOT:** The Public Transportation Division has responsibility for planning major intercity rail initiatives and distributing federal funds to rural transit providers.
- **MAG:** The Regional Council is comprised primarily of elected representatives from local governments within Maricopa County and has responsibility for the Regional Transportation Plan (RTP) that would have to be amended to include commuter rail. MAG is the designated Metropolitan Planning Organization for the region to serve as the principal planning agency for region programming transportation funds.

- **RPTA/ Valley Metro:** This organization was created in 1986 to manage transit investments on a regional basis. With the approval of Prop 400, Valley Metro has increased the bus fleet and the service area substantially, including bus service to areas outside Maricopa County.
- **METRO:** This agency is charged with the design, construction and operation of rail transit services within the County. METRO is currently completing the first phase of the light rail project and planning for future extensions.
- **City Transit Systems:** Phoenix, Tempe, Scottsdale, and Glendale have local bus systems that are managed by City staff.
- **Pinal County:** This County is separate from the MAG region and has major influence on travel demand-based on population growth. Pinal County is currently developing transit plans and has actively participated in the development of the Commuter Rail Strategic Plan.

Possible Governance Structures

The options for an appropriate institutional structure for regional commuter rail, based on both the national experience and the local situation, are summarized below.

- **ADOT:** possibly in conjunction with a state-sponsored high-speed rail connection between Tucson and Phoenix; and positioning for passenger rail service between Arizona and adjoining states, such as California and Nevada.
- **MAG:** expanding the charter of this agency to include the operation of commuter rail. This expansion would likely require a change in state law and the creation of an operational division of MAG.
- **A new Regional Commuter Rail Agency:** involving membership from both Maricopa and Pinal counties focused on commuter rail; most likely would require participation.
- **Valley Metro:** expanding the mandate of this agency to include commuter rail with Board representation from Pinal County for example.
- **METRO:** building on the existing staff resources that are focused on rail services, METRO could expand the Board to include representation from cities on the corridors.
- **City Partnerships:** in order to move quickly in one corridor the Cities in the corridor could work together (through a joint powers agreement) to start a commuter rail line.
- **Joint Powers Agency-** A combination of two or more of the above entities to jointly plan, construct, operate and maintain a commuter rail service.

Defining appropriate governance structures would depend upon opportunities that arise for cooperation and use of railroad right-of-way. This could be for

one commuter rail project or a series of projects. Each agency would have to participate in the process to define the appropriate structure.

8.5. Funding Options

The initial step to develop a funding implementation strategy is to gauge possible or probable funding options for governments at local, state, and federal levels. The policy positions of the involved agencies and possible implementation responsibilities should be thoroughly considered, as should those of other local entities included in the project area. Ultimately, the critical financial issue at the local level is the annual requirement for local funds to meet capital, operating, and maintenance costs.

The critical decisions that will determine the MAG Commuter Rail Strategic Plan's funding implementation strategy include:

- Government / Agency Roles and Responsibilities
- Definition of System Plan
  - Facilities
  - Operations
  - Phasing
- Funding
  - Federal
  - State
  - Local
- Public Commitment
- Railroad Coordination

Proposition 400 Enabling Legislation

Local transportation funding mechanisms can include any tax or fee presently authorized for local use (e.g., sales tax, property tax, service fees, fines and forfeitures, etc.). In practice, only the sales tax is employed as an exclusive transportation funding vehicle, such as the existing Maricopa County's half-cent sales tax program authorized by Proposition 400.

Proposition 400 was enabled by House Bill 2292 (2003) and House Bill 2456 (2004). These two pieces of legislation were enacted to guide the process leading up to the Proposition 400 election and establish the features of the half-cent tax sales extension. In addition to establishing guidelines for the MAG Regional Transportation Plan (RTP), such as evaluating the impact of growth on transportation systems and the use of a performance-based planning approach, House Bill 2292 identifies key features required in the final Plan, including a

twenty-year planning horizon, allocation of funds between highways and transit, and priorities for expenditures.

Revenue Distribution and Firewalls

House Bill 2456 addresses the allocation of revenues from the collection of sales tax monies from January 1, 2006 to December 31, 2025, among the eligible transportation modes. In accordance with the legislation, the net revenues collected are distributed as follows:

- 56.2 percent to the regional area road fund for freeways and other routes in the State Highway System, including capital expense and maintenance.
- 10.5 percent to the regional area road fund for major arterial street and intersection improvements, including capital expense and implementation studies.
- 33.3 percent to the public transportation fund for capital construction, maintenance and operation of public transportation classifications, and capital costs and utility relocation costs associated with a light rail public transit system.

The legislation creates three “firewalls”, which prohibit the transfer of half-cent funding allocations from one transportation mode to another. These firewall divisions correspond to the categories established for the distribution of revenues and include:

- Freeways and highways (including sub-accounts for capital and maintenance).
- Arterial streets.
- Public transportation (with sub-accounts for capital, maintenance and operations, and light rail).

Life Cycle Programs

The legislation required that the agencies implementing the regional freeway, arterial, and transit programs are to adopt a budget process ensuring that the estimated cost of the program of improvements does not exceed the total amount of revenues available. These “life cycle programs” are the management tools used by the implementing agencies to ensure that transportation program costs and revenues are in balance, and that project schedules can be met. Responsibilities for maintaining these programs are as follows:

- Freeway/Highway Life Cycle Program: Arizona Department of Transportation (ADOT)
- Arterial Life Cycle Program: MAG
- Transit Life Cycle Program: RPTA

The life cycle programs develop a schedule of projects through the life of the half-cent sales tax, monitor progress on project implementation, and balance annual and total program costs with estimated revenues. The MAG Annual Report on the status of the implementation of Proposition 400 draws heavily on life cycle program data and other life-cycle progress documentation in order to assemble the key information.

The Transit Life Cycle Program is maintained by the RPTA and implements transit projects in the MAG RTP. The Program meets the requirements of state legislation calling on the RPTA to conduct a budget process that ensures the estimated cost of the Regional Public Transportation System does not exceed the total amount of revenues expected to be available. This includes expenses such as bus purchases and operating costs, passenger facilities, maintenance facilities, park-and-ride lot construction, light rail construction and other transit projects.

Although the RPTA maintains responsibility for the distribution of half-cent funds for light rail projects, METRO, a public nonprofit corporation, was created to form a partnership among the cities of Phoenix, Tempe, Mesa and Glendale to implement the light rail transit starter system. The cities of Chandler and Peoria joined METRO in 2007. METRO is responsible for overseeing the design, construction and operation of the light rail starter segment, as well as future corridor extensions to the system.

RTP Enhancements and Material Changes

House Bill 2456 requires that any change in the RTP and the projects funded that affect the MAG Transportation Improvement Program, including priorities, be approved by the MAG Regional Council. Requests for changes to projects funded in the RTP that would materially increase costs are also required to be submitted to the MAG Regional Council for approval. If a local authority requests an enhancement to a project funded in the RTP, the local authority is required to pay all costs associated with the enhancement.

Regional Revenues for Transportation

The major funding source for the RTP is the half-cent sales tax for transportation that was approved through Proposition 400 as described in Section 2.0. In addition to the half-cent sales tax, other RTP sources are available which are primarily from State and Federal agencies. These revenue sources are described in this section, as well as their applicability and availability for funding of transit.

Half-Cent Sales Tax (Maricopa County Transportation Excise Tax):

On November 2, 2004, the voters of Maricopa County passed Proposition 400, which authorized the continuation of the existing half-cent sales tax for transportation in the region (also known as the Maricopa County Transportation Excise Tax). This action provides a 20-year extension of the half-cent sales tax

through calendar year 2025 to implement projects and programs identified in the MAG RTP. The results of the Proposition 400 vote in Maricopa County dedicated approximately one-third of the half-cent sales tax at the regional level to mass transit. The current MAG RTP reflects this significant increase in transportation funding, with expanded transit plans and programs. The revenues collected from the half-cent sales tax extension are deposited into the Regional Area Road Fund (RARF), and allocated between freeway/highway and arterial street projects; and into the Public Transportation Fund (PTF) for public transit programs and projects. As described in Section 2.1, 56.2 percent of all sales tax collections are distributed to freeways and highways through the RARF; 10.5 percent are distributed to arterial street improvements through the RARF; and 33.3 percent are distributed to transit through the PTF. The use of PTF monies must be separately accounted for based on allocations to: (1) light rail transit, (2) capital costs for other transit, and (3) operation and maintenance costs for other transit.

The Commuter Rail Strategic Plan would be a reason for possible adjustment and expansion of the RTP, as well as part of future updates. Any changes to the RTP would be subject to the requirements of House Bill 2456 as described in the Bill under Section 14 Regional Transportation Plan and Project Enhancements and Changes. New funds such as a sales tax extension or expansion would be required for regional commuter rail projects because all funds through 2025 have been planned for dedicated use on other transit projects.

As described in the MAG 2007 Annual Report on the status of the implementation of Proposition 400 (MAG, 2007), future half-cent revenues for the period Fiscal Year (FY) 2008 through FY 2026 are forecasted to total $14.4 billion. Of the $14.4 billion total included in the current forecast, $8.1 billion will be allocated to freeway/highway projects; $1.5 billion to arterial street improvements; and $4.8 billion to transit projects and programs. ADOT will update the half-cent forecasts in the latter part of calendar 2007, taking into account recent slowing in revenue growth as appropriate.

Arizona Highway Users Revenue Fund (HURF)

The Arizona Department of Transportation is funded through two primary sources including the Highway Users Revenue Fund (HURF) and Federal transportation funds. The HURF is an allocation and programming accounting framework funded with motor fuel excise taxes, truck fees, vehicle registration fees and taxes, and other miscellaneous charges and fees. These funds represent the primary source of revenues available to the ADOT for highway construction and improvements and other expenses. HURF funds are allocated through a number of statewide, regional, and local programs. The MAG Region receives annual funding from ADOT in the form of ADOT 15 percent funds, which are allocated from the HURF. In addition, a 37 percent share of ADOT Discretionary Funds is targeted to the MAG Region. According to the Arizona

constitution, HURF funds can only be used on highways and streets, therefore HURF funds cannot presently be used for transit purposes.

MAG Area Federal Transportation Funds

MAG fully complies with the requirements of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) as a metropolitan planning organization. SAFETEA-LU authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009.

Funding authorized by SAFETEA-LU includes both formula and grant monies to be used at the discretion of states and metropolitan planning organizations, and earmarked funds for particular projects. SAFETEA-LU did not include a specific earmark for commuter rail in Maricopa County. Beyond earmarked funds, there are formula funds for highways, transit, and "flexible funds" which can be spent on a variety of transportation-related projects, including public roads and sidewalks, transit capital projects, and transportation enhancements, which encompass a broad range of environmentally related activities. The funds available through the programs were anticipated and have been committed to specific projects. However, higher federal allocations than anticipated in the RTP may provide opportunities to utilize federal funds for commuter rail. Since the passage of the Intermodal Surface Transportation Efficiency Act of 1991, the US Department of Transportation has permitted wide state discretion in assigning portions of "conventional" highway funds to the flexible funding pool, thus widening the funds potentially available for transit projects.

As described in the MAG Draft 2007 Annual Report on the status of the implementation of Proposition 400 (MAG, 2007), actual receipts from Federal sources totaled $55 million in FY 2006 and $73 million in FY 2007. The forecasted revenues for the period FY 2008 through FY 2026 total $5.5 billion. Federal fund sources described in the following sections are applied in part, to transit projects through 2025 as described in the RTP and the Transportation Improvement Program. Use of these funds for purposes of commuter rail would decrease funding for future light rail transit and bus projects, as well as street and highway projects.

Federal Transit (5307) Funds

These Federal transit formula grants are available to large urban areas to fund bus purchases and other transit capital projects. Purchases made under this program must include a 20 percent local match. This funding source is expected to generate $1.5 billion for transit development in the MAG Region from FY 2008 through FY 2026.

Federal Transit (5309) Funds

Transit 5309 funds are available through discretionary grants from the FTA and applications are on a competitive basis. They include grants for bus transit

development and "new starts" of light rail transit and other high capacity systems. Bus transit development requires a 20 percent local match, while new starts are expected to require a 50 percent local match. These funds are granted at the discretion of the FTA, following a very thorough evaluation process. Over the planning horizon, it is estimated that $1.6 billion in 5309 funds for bus and rail transit projects will be made available to the MAG Region from the FTA, during FY 2008 through FY 2026. The total does not include the $587 million in 5309 funds for the 20-mile light rail starter segment, which has already been committed to the region. A new provision in the Section 5309 program known as "Small Starts" allows for streamlined criteria and funding process. In order to quality for Small Starts, total projects costs must not exceed $250 million with a maximum of $75 million requested from FTA under the program.

Federal Highway (MAG STP) Funds

MAG Surface Transportation Funds (STP) are the most flexible Federal transportation funds and may be used for highways, transit or streets. The RTP currently allocates all of these funds to street and highway projects. During the period from FY 2008 through FY 2026, it is estimated that $936 million will be available from STP funds. In addition to this amount, approximately $34 million per year has been allocated through FY 2015 to retire debt related to the Proposition 300 program.

Federal Highway (MAG CMAQ) Funds

MAG Congestion Mitigation and Air Quality (CMAQ) funds are available for projects that improve air quality in areas that do not meet clean air standards ("non-attainment" areas). Projects may include a wide variety of highway, transit and alternate mode projects that contribute to improved air quality. While they are allocated to the State, Arizona's funds have been dedicated entirely to the MAG Region, due to the high congestion levels and major air quality issues in the region. MAG CMAQ funds are projected to generate $1.1 billion from FY 2008 through FY 2026. Approximately $405 million has been allocated to transit projects in the RTP.

Statewide Transportation Acceleration Needs (STAN) Account

The STAN account is a new State program providing a new vehicle for directed funding of key transportation improvements. In its first year (FY 2007), $307 million was transferred to the STAN account from the State general fund. In FY 2008, $62 million was transferred to the STAN account from the State Highway Fund. Current legislation includes two new STAN subaccounts: Roads of Regional Significance Congestion Mitigation (RRSCM) and the Interest Reimbursement Account.

STAN monies may only be used for (1) material and labor, (2) acquisition of rights-of-way for highway needs, (3) design and other engineering services, and (4) other directly related costs approved by the State Transportation Board for projects on the State Highway System. The STAN account would not be

considered as a source of revenue for future commuter rail except in conjunction with highway improvements that may be directly related to the project (s).

Comparison of Commuter Rail Funding for Existing Systems

This Section provides an overview of transit funding as it is applied to commuter rail services in five separate state examples. It is important to note that in these examples, commuter rail may be one of several transit services provided by a particular operating authority and other sources of federal and state funding may contribute that are not outlined in these examples. For the purposes of this Commuter Rail Strategic Planning effort, it is important to consider both the future operating authorities for commuter rail as well as the dedicated funding source.

Dedicated funding is described by the FTA as a specific revenue source such as a sales or gas tax specifically for transit use and not subject to appropriations. According to data that is reported to the FTA, 23 of the 25 largest transit agencies in the United States have dedicated funding sources coming from multiple sources (GAO, 2006). Nationwide, dedicated local transit revenues are generated through a variety of sources, the most common being sales tax revenues. This is in contrast to overall state funding (not described in these examples) sources which typically include the general fund, gas taxes, and other sources. Table 8-6 provides an overview comparison of dedicated local transit funding and commuter rail facilities in five states.

Table 8-6: Sample Comparison of Commuter Rail Facilities and Dedicated Local Transit Funding

State/County	Operating Authority	Commuter Rail Facility	Dedicated Local Transit Funding (inclusive of all transit services provided by operating authority)
Colorado, Denver	Regional Transportation District (RTD)	FasTracks	Dedicated Regional Sales Tax; Federal Funding; Private Contributions
Utah: Weber, Davis, and Salt Lake	Utah Transit Authority	FrontRunner	Dedicated Local Sales Tax
Texas: Tarrant and Dallas	The Fort Worth Transportation Authority (The T)/Dallas Area Rapid Transit	Trinity Railway Express	Dedicated Local Sales Tax
California: San Diego	San Diego Metropolitan Transit System	The San Diego Coast Express Rail (COASTER)	Dedicated Local Sales Tax
New Mexico: Valencia, Bernalillo, and Sandoval	Rail Runner Express	Rail Runner	None (funded by the State of New Mexico)
Minnesota: Anoka, Benton, Hennepin, and Sherburne	Minnesota Department of Transportation (MnDOT) and the Northstar Corridor Development Authority	Northstar	Various dedicated funding for counties in Minnesota. Only 17% of Northstar construction costs from local governments/transit agencies.
Arizona: Maricopa and Pinal	MAG could be the lead agency similar to the structure in New Mexico	None	Dedicated Local Sales Tax

Source: URS, 2007

Denver FasTracks

Overview

Denver FasTracks expansion program is a public transportation plan for the Denver-Aurora and Boulder Metropolitan Areas. The regional system includes five new rail corridors of which four will be commuter rail. The plan calls for the build-out of the system by 2017 and includes 119 miles of rail transit. The project was funded through a combination of federal funding sources, private contributions, and a region wide sales tax. The region wide sales tax increase of 0.4 percent (4 pennies on every $10) was approved by Denver metro voters in 2004.

Applicability

Federal appropriations, private contributions, and a region-wide sales tax increase are all potential funding sources for future commuter rail service in Maricopa and northern Pinal Counties.

Utah: FrontRunner

Overview

The Utah FrontRunner is a 44 mile commuter rail system with eight stations that will operate between Salt Lake City and Pleasant View, Utah. The line is projected to open in April, 2008. The project was funded through a combination of local, state, and federal funding sources, including revenues from a dedicated local sales tax. The federal portion is provided through the Section 5309 New Starts program. The majority of the commuter rail line will operate on exclusive right-of-way with 38 miles of new track built and operated by UTA. Six miles of track from Ogden to Pleasant View is shared with Union Pacific. Future plans for expansion of this commuter rail line include an additional 45 miles of track and eight stations from Salt Lake City south to Provo. Operations for this future extension are expected to begin in 2012.

Applicability

Dedicated sales tax revenues are a likely funding source for potential future commuter rail service in Arizona. Both shared use of railroad track and purchase of railroad right-of-way are options for future commuter rail service in Maricopa and northern Pinal counties.

Texas: The Trinity Railway Express

Overview

The Trinity Railway Express (TRE) is a commuter rail service that is provided jointly by the Fort Worth Transportation Authority (the T) and Dallas Area Rapid Transit (DART). These two transit agencies are jointly funded through a combination of sales tax revenues generated in Tarrant and Dallas counties. The TRE currently operates along a 34-mile route with nine stations between Fort Worth and Dallas, Texas. The T is locally funded through half cent sales tax revenues that were approved in 1984. DART's local funding is generated through a one-cent sales tax revenue approved in 1983. Overall sales tax in the State of Texas is currently capped at eight and one-quarter percent. Initial planning and construction of the TRE was through a combination of local sales tax revenues from counties, CMAQ Funds, and use of the railroad corridor. The ex-Rock Island line that is currently used by the TRE was part of a joint purchase agreement by the cities of Dallas and Fort Worth in 1983 for $34 million. The Burlington Northern Santa Fe Railway and Union Pacific have rights to operate freight trains on the line with track maintenance provided under contract by BNSF Railway. Ridership on the TRE exceeds two million per year.

Applicability

Dedicated sales tax revenues are a similar funding source for potential future commuter rail service in Arizona. Both shared use of railroad track and purchase of railroad right-of-way are options for future commuter rail service in Maricopa and northern Pinal counties.

California: The San Diego Coast Express Rail (COASTER)

Overview

The San Diego Coast Express Rail, or COASTER is a regional commuter rail service that is administrated by the San Diego Northern Railway, a subsidiary of the North County Transit District. The COASTER operates service in the central and northern coastal region of San Diego County, California with eight station stops. Revenue service began in February 1995 with money for right-of-way acquisition and construction costs generated through TransNet, or Proposition A, the half cent sales tax in San Diego County for transportation projects. Dedicated transit funding is currently one-third of all revenues generated through TransNet. The original tracks for COASTER were purchased by the San Diego Northern Railway from the Atchison, Topeka and Santa Fe Railway in 1984.

Applicability

Dedicated sales tax revenues are a similar funding source for potential future commuter rail service in Arizona. Both shared use of railroad track and purchase of railroad right-of-way are options for future commuter rail service in Maricopa and northern Pinal counties.

New Mexico: Rail Runner Express

Overview

The New Mexico Rail Runner Express is a 48 mile commuter rail system with 5 stations operating between Belen and Sandoval, New Mexico. A Phase I, three-station segment was opened in July 2006 with the entire initial segment opened in February 2007. An additional 50 mile segment to Santa Fe is scheduled to open December 2008. The project was funded through a single source with $400 million of state funds allocated as part of a $1.6 billion transportation package passed by the New Mexico State Legislature in August 2003. There is currently no local dedicated source of revenue for the Rail Runner Express service.

Applicability

Allocation of state funds for commuter rail in Maricopa and northern Pinal counties should be considered as a potential future funding source. Traffic congestion and limitations on mobility options in this area are statewide issues of concern. State funding of commuter rail could be part of an overall future plan for mobility that combines considerations of the movement of both people and goods through this critical region.

Minneapolis, Minnesota: Northstar

Overview

Phase I of the Northstar Commuter Rail is a 40-mile service on existing rail tracks with six stations from Big Lake to downtown Minneapolis, Minnesota that is planned for start of revenue operation in 2009. The Northstar Corridor is an 82-mile transportation corridor that runs along Highway 10 from the St. Cloud/Rice area to downtown Minneapolis. Although initial service is planned in the Phase I 40 mile initial segment, there are currently considerations to extend the line to the full corridor in the future. The total construction cost for Phase I is estimated to be $309 million. The costs are shared through a share of 17 percent local, 33 percent state, and 50 percent federal funds. The federal funds were awarded as part of the Section 5309 New Starts program.

Applicability

As discussed in relation to the New Mexico Rail Runner Express, a higher share of state funds should be considered as part of the financial strategy for future commuter rail in Maricopa and northern Pinal counties. In addition, Northstar is currently seeking funding through private interests for this rail corridor which should also be considered as part of an overall strategy to find alternatives to use of the congested highway corridors in Arizona.

Alternative Funding Options for regional Commuter Rail

Early identification and assembly of involved project sponsors is a critical factor in evaluating funding options for the Commuter Rail Plan project. Early discussion with key Congressional, State, and local legislators and officials would also be helpful to gain support for the project.

ADOT should also continue to play an important part in rail implementation throughout the process, both because of its expertise and interest in innovative transit strategies and because of the possibility of state funding for both capital, and operations and maintenance. As a major employer in Maricopa County and Pinal County, the State will also gain the benefits of a multimodal transportation system. The State can also play a crucial role in preserving railroad rights-of-way, which may be threatened with abandonment or sale.

Like many other state DOTs around the nation, ADOT could express interest in acquiring lines from private railroad companies such as BSNF and UPRR as ‘vital state intermodal corridors’, but funds for this acquisition would need to be identified and negotiated as well as feasibility of using such lines in conjunction

with railroads. Local funds may assist in using underutilized freight lines for passenger purposes.

It will be necessary for local funding options to take into account prior funding commitments of capital and "O&M" (operating and maintenance) costs for both the “start-up” and the "full build" for all future projects. This would include a detailed evaluation of potential ridership.

For example, if the State of Arizona enacted a policy to fund two-thirds of the deficit remaining after fares and federal operating assistance were deducted for costs, this would leave one-third for local support. The State would also need to determine how much of O&M costs would be provided for transit systems.

The Concept of Public Value Capture

Current Federal, state and local funds that have traditionally been used for transportation projects in Maricopa County have been dedicated to the implementation of the 20 year transit program identified in the RTP and future defined through the Transportation Improvement Program. Due to the considerable cost involved in implementing a regional commuter rail system, the region will need to look at other funding mechanisms such as value capture. Primary considerations for public value capture are described in the following paragraphs.

Transit-oriented development increases property values. Building near a transit stop is not only good for the transit system; it is good for property owners and interested developers. Residential and commercial projects near transit typically appreciate in value more rapidly than other projects. As demand for scarce properties near transit stops increases, this trend will continue.

Development near transit stops increases tax revenues. As the value of property near transit appreciates, property taxes collected by local governments also increase. In fact, some cities in other states take advantage of this by using tax increment financing to help fund area capital improvements.

Transit-oriented development provides retail opportunities and increases sales tax revenues. Pedestrian activity around transit stops can support retail activity. Not only does this improve the viability of small businesses, but it also translates into increased sales tax revenues for local governments.

Transit-oriented development provides local special purpose development organizations (redevelopment agencies, economic development groups, etc.) with an opportunity to directly participate in the ongoing price appreciation of properties affected by station development. Joint development, special connection fees, cost sharing agreements and other mechanisms available to local governments can provide direct non-tax revenues to local governments.

Transit-oriented development can help revitalize downtown and neighborhood areas. By attracting new development, transit can be a catalyst for revitalizing deteriorating and economically blighted areas. Transit-oriented development by itself is unlikely to cause the turnaround of an area bypassed by the local market, but used in concert with other economic development tools, transit-oriented development can provide a catalytic effect promoting new life in previously bypassed sections of the community.

Value Capture mechanisms are used to indirectly capture some of the economic benefits derived by the private sector from the development and operation of a transit corridor. Value capture techniques used throughout the United States include:

Benefits Assessment Districts - assessment charges imposed on property owners in a designated area, based on the specific benefits to those properties, as generated by the transit facilities. An example of this technique is Portland, Oregon's Transit Revitalization Investment District (TRID). The TRID model is able to calculate job creation, housing development and income results for each district. The revenues above a certain amount from property taxes, business license fees, system development charges and other revenues within the boundaries of a TRID district are used to pay for bonds that fund transit improvements, subsidize operating costs and other public benefits such as housing within the TRID district. The revenue sources and amounts from each can vary from TRID district to district. TRID has been used by Portland, Oregon to fund their streetcar system.

Tax Increment Financing - incremental property tax receipts (above a pre-determined base) which can be attributed to infrastructure improvements, such as transit facilities. These incremental receipts will typically be captured through a redevelopment agency (which could dedicate some of its own tax increment funds for transit facilities in a designated redevelopment area), or through the establishment of infrastructure financing districts. Tax Increment Financing is currently not allowed in Arizona.

Development Exactions - additional requirements placed on the developer during the discretionary approval process to assist in funding improvements.

Density Bonuses - permitted increases in density at transit sites in order to create additional value on those properties. A development agency could then capture some of this incremental value by negotiating for additional financial support by the property owner or by placing other requirements on the developer of the site.

Development Impact Fees - established fees places on new development which has been shown to have a direct relationship (nexus) to the impact of that development on local infrastructure, including the transportation system. These

revenues could be used to fund station or park & ride development costs of a rail transit facility that serves the development.

Summary of Other Potential Revenue Sources

Other potential revenue sources for commuter rail include:

- **Use of HURF Funds**: This might require a change in the Arizona Constitution to allow use of these funds for transit projects. Gas taxes, which are included in the HURF fund in Arizona, are used to completely fund transit systems in other states such as Rhode Island, South Carolina, and Tennessee.

- **Dedicated Property Taxes**: Dedicated property taxes are a consideration for funding of future commuter rail to balance the need for mobility choices in an area that will continue to experience high levels of congestion on the roadways.

- **Public Private Partnerships**: Public-private partnerships refer to the contractual agreements that are formed between a public agency and private sector entity that can allow for greater private sector participation in the delivery of transportation projects. These types of partnerships are increasingly becoming part of the overall considerations for future funding of the highway and transit systems in the United States. SAFETEA-LU has authorized the US Secretary of Transportation to establish a Public-Private Partnership pilot program.

    - FHWA has outlined some of the key benefits in using public-private partnerships to deliver transportation projects including:
        - Expedited completion compared to conventional project delivery methods;
        - Project cost savings;
        - Improved quality and system performance from the use of innovative materials and management techniques;
        - Substitution of private resources and personnel for constrained public resources; and,
        - Access to new sources of private capital.

Using the aforementioned principles, it is recommended that the MAG Commuter Rail project sponsors begin assembly of one or more funding strategies that encompass the potential funding sources described in this working paper. Initial efforts should focus on broad, high revenue yield approaches including, but not limited to: federal earmarking, fuel taxes, user fees, local development-based mechanisms, and public private partnerships.

9 IMPLEMENTATION STEPS

Developing a commuter rail system would provide an alternative transportation mode to meet travel demands resulting from expected growth in Maricopa County and northern Pinal County. Between 2005 and 2030 the combined population of the two counties is projected to increase by 82% from 3.8 million to 7.0 million residents. Growth will put additional strain on an already congested transportation system, cause additional air quality concerns, and further challenge transportation funding sources of the region.

A coordinated effort by jurisdictions in the region will be needed to implement commuter rail services. Working closely together, jurisdictions will need to carefully develop approaches to partnering with freight railroad companies, establishing a sustainable funding source and designing a governance and administrative mechanism.

The CRSG has determined that implementing a regional commuter rail system would significantly help to improve overall mobility and provide transportation choices in the region as population and related congestion continues to grow. A strategic planning process utilized by the CRSG developed a series of goals, objectives and actions that were then used to define the following twelve steps for implementing commuter rail in the study area.

Table 9-1: Steps for Implementation of Commuter Rail

Item	Responsible Party	Partners	Timeframe
1) On-going coordination • Coordination with freight railroads for improved facilities and freight movement. • Coordination with ADOT for intercity passenger service between Phoenix and Tucson. • On-going stakeholder involvement as projects are developed.	MAG CAAG ADOT PAG	BNSF UP METRO RPTA Local Jurisdictions	On-going
2) Union Pacific Passenger Rail Coordination and Planning • Continue coordination between ADOT and Union Pacific regarding opportunities for passenger rail service in Arizona. • Develop corridor specific recommendations for intercity passenger rail service between Phoenix and Tucson and provide necessary details for implementation. • After ADOT selects a preferred route for Phoenix/Tucson passenger rail service, identify opportunities for additional regional commuter rail service along Union Pacific corridors in Maricopa County and northern Pinal County.	ADOT	UP MAG CAAG PAG METRO RPTA Local Jurisdictions	2008-2009

Item	Responsible Party	Partners	Timeframe
3) Burlington Northern/Santa Fe Railway Passenger Rail Coordination and Planning • Continue coordination between ADOT and BNSF Railway regarding opportunities for passenger rail service in Arizona. • Develop corridor specific recommendations for the BNSF/Grand Avenue Corridor and provide necessary details for implementation.	MAG	BNSF ADOT METRO RPTA Local Jurisdictions	2008-2009
4) Regional Transit Planning • Develop regional recommendations and provide details for implementation through regional transit studies (e.g., MAG Transit Framework Plan, Pinal County Transit Feasibility Review, High Speed Rail Strategic Plan).	MAG ADOT Pinal County	RTPA UP Local Jurisdictions	2008-2009
5) Future Corridor Development Plans • Applicable to the following corridors: UP Sunset Corridor, UP Phoenix Subdivision, Chandler Branch, Tempe Industrial Lead, UP-Yuma/West, Copper Basin Railway, Magma Arizona Railroad, and possible extensions • Pending recommendations from current planning studies (e.g., ADOT High Speed Passenger Rail Strategic Plan, METRO Tempe South Alternatives Analysis, etc.), develop corridor specific recommendations and provide necessary details for implementation.	MAG CAAG	BNSF UP ADOT METRO RPTA Copper Basin Railway Magma Arizona Railroad	2009-2012
6) Identify Funding Source Commitment • Define new revenue streams that would be dedicated to development and ongoing operation of the commuter rail system. An assured funding commitment will be required to negotiate for trackage rights or right-of-way from the railroads. At the same time it is important to recognize the strong preference to avoid disrupting current programmed projects and funding among the agencies.	MAG CAAG ADOT Legislature	Local Jurisdictions	2008-2010
7) Develop Governance Plan • The number of agencies involved in developing a governance plan may be determined by the geographic area for the proposed service. Agencies within the defined service area should work together to plan and implement a regional commuter rail system. The agencies would maintain their current responsibilities and funding for their current programs but would be jointly charged with implementation of commuter	MAG CAAG ADOT RPTA METRO	Local Jurisdictions	2009-2011

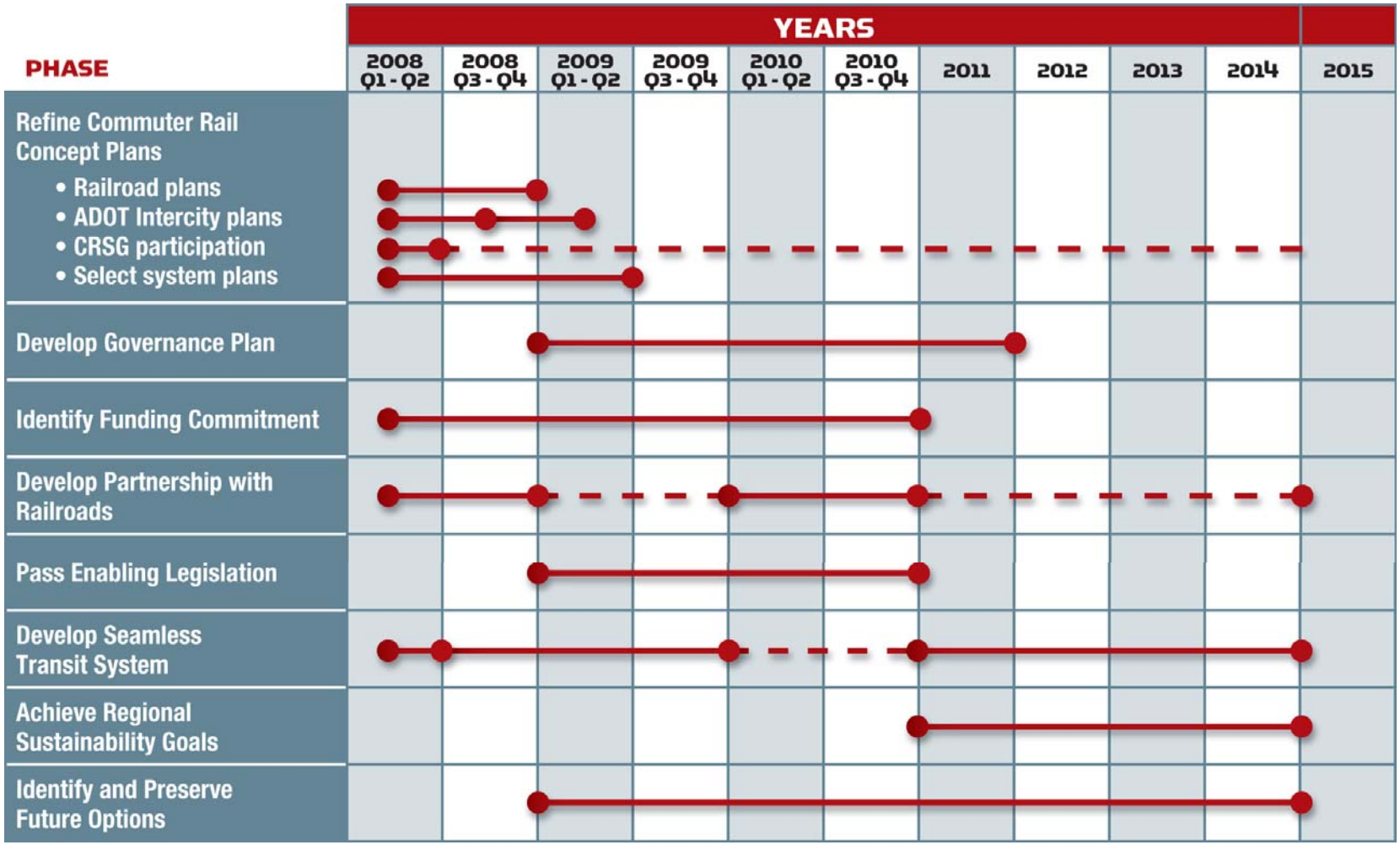
Item	Responsible Party	Partners	Timeframe
rail in the region. The transportation agencies should agree to implement and administer the commuter rail system by one of a variety of means including: ▪ A new Passenger Rail Authority (PRA); ▪ Designation of one of the agencies as the Passenger Rail Authority; or ▪ Establishment of a new Joint Powers Authority (JPA) with a provision for representation appropriate to the corridor or system to be implemented. One potential example of a regional Joint Powers Authority would be through the formation of a multi-county Megapolitan Planning Council.			
8) Develop Partnerships with Railroads • Develop a public/ private Memorandum of Understanding followed by detailed agreements with freight railroad companies to define funding and to implement commuter rail facilities and services that will mutually benefit the public and private sector interests.	Passenger Rail Authority or Joint Powers Authority	BNSF UP Rail Authority Elected officials Tribal Communities	2009-2011
9) Pass Enabling Legislation • Work to pass enabling legislation relative to liability and indemnification to facilitate commuter rail operations in freight rail corridors similar to legislation recently passed in Minnesota, Virginia, New Mexico, and Colorado.	Passenger Rail Authority or Joint Powers Authority	RPTA METRO ADOT	2010-2011
10) Develop Seamless Transit System • Coordinate joint planning and operations to develop a seamless system of transit services throughout the Maricopa/northern Pinal region.	Passenger Rail Authority or Joint Powers Authority	RPTA METRO ADOT Existing Transit Providers County Governments Tribal Communities Railroads Major Landowners Business Community	2010-2015
11) Achieve Regional Sustainability Goals • Develop the commuter rail system to reinforce and achieve regional sustainability goals and plans relative to energy and the environment. This will include attention to environmental requirements, land use plans and	Passenger Rail Authority or Joint Powers Authority	MAG CAAG ADOT Railroad Maricopa County Pinal County Local	2010-2015

Item	Responsible Party	Partners	Timeframe
opportunities, and joint project development.		Jurisdictions	
12) Identify and Preserve Future Options • Use planning studies to identify and preserve rights-of-way in developing and underdeveloped areas for multimodal transportation corridors to include roadway and rail transit.	Passenger Rail Authority or Joint Powers Authority	MAG CAAG ADOT Railroad Maricopa County Pinal County Local Jurisdictions	2010-2015

Source: URS, 2008

A conceptual timeline was developed to provide the order of implementation steps and demonstrate which steps could occur simultaneously. The timeframe for each commuter rail implementation step is depicted in Figure 9-1.

Figure 9-1: Implementation Steps-Schedule



Source: URS, 2007

Note: Based on similar projects in peer cities, the time from funding approval to completion of construction and operation can be within 3 to 4 years. If a project intends to use Section 5309 New Starts funding an additional 1 to 3 years may be required for planning work.

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