City of Mesa
2040 Transportation Plan

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Mesa's Shared Vision for Transportation

MESA WILL DEVELOP A TRANSPORTATION SYSTEM THAT SUPPORTS SHORTER TRIPS, SUSTAINABLE MODE CHOICES, A HIGH QUALITY OF LIFE, ECONOMIC DEVELOPMENT AND THE CREATION OF HIGH-QUALITY JOBS.

EXECUTIVE SUMMARY

The City of Mesa Transportation Department was fortunate to begin the update of this Plan at the same time that the City's Planning Department was updating the General Plan. This timing allowed coordination between the two plans, not only for schedule, but also for philosophy and intent. Planning moved away from quantitative technical analysis and instead "kept the General Plan, general." It was a move meant to allow the plan to be more approachable for residents, rather than for academia. Much of this method was possible due to the maturity of the City of Mesa. For example, the road network is largely established. Therefore, new concerns must be addressed as the City moves into the future that rely less on Level of Service analysis and more on a sense of place.

Both Planning and Transportation discovered the same opinions expressed by residents during public meetings and surveys – citizens want more focus on livability, neighborhoods, and finer connectivity and mobility. The goals and objectives found in Part I of the Transportation Plan reflect an intention to work more on square-mile neighborhoods, complete streets, and multi-modal transportation opportunities. Additionally, the results and implementation of this plan are meant to be flexible without fixed yearly project lists. Rather, a sense of what the Mesa transportation system should be at build-out is provided. This vision can then be used on a periodic basis to develop projects that coincide with the plan as needed, and when funding is available.

Part III of this plan presents some samples for possible future projects. Again, these projects are meant to align with what was heard from the public, as well as fill gaps in a finer fashion for all street users. These sample projects culminate the concepts presented throughout Part II of this plan, which is devoted to the elements that make up the transportation system. The ultimate goal for future projects is to bridge activity centers and neighborhoods with infrastructure usable by all modes.

PART 1.0

Introduction, Goals and Objectives

Mesa will continue to grow and change over time providing the City with new challenges. Therefore, the City needs a framework to provide direction for the future.

Four specific components were used to develop possible goals and objectives:

1) The existing goals and objectives found in the 2025 Transportation Plan.

2) A classic approach found throughout history in various cities.

3) Results from public outreach.

4) The goals, objectives and visions being developed concurrently as part of the City's General Plan update.

Each of these components was boiled down to find large themes and patterns which were then organized into a preliminary set of goals and objectives for each component. All of the respective lists of goals and objectives were then compiled and analyzed as a whole.

Public input was received through several means such as public meetings and an online survey. Some of the common themes found in the public input included:

- An overwhelming demand for more paths and trails, including lighting and amenities for those trails

- There was a strong focus on improving signal timing
- Detached sidewalks along streets with shade and seating
- More bicycle and pedestrian safety education and awareness programs
- More roadway connections in the southeast area of Mesa

The update to the General Plan emphasizes the relationship between land use and transportation. Therefore, the goals and objectives of the Transportation Plan update should be aligned with those of the General Plan.

The General Plan is built around a framework consisting of:

- Community character
- Creating and maintaining a variety of great neighborhoods
- Growing and maintaining diverse and stable jobs
- Providing rich public spaces and cultural amenities

On top of this framework, the overall vision is made up of five key elements:

1. High-quality development
2. Changing demographics
3. Public health
4. Urban design and place-making
5. Responding to a desert environment

The initial Transportation Plan Update goals and objectives resulted from a merging of these four component sets. Similar ideas were grouped together, resulting in statements that were clearly overall goals, while supporting statements were objectives underneath each goal. Numerous statements were similar or overlapped in some way, and were included in this final list. Other statements were outliers found only in one of the components, or some were just too detailed for an objective. Those were not carried forward. Through this process a final set of goals were created and are listed below:

GOAL ONE: Develop a safe and efficient transportation system that provides access to all public places by multiple modes of travel and by various users.

GOAL TWO: Develop inviting streets that identify with the context of the surrounding neighborhood and help to create a sense of community and vibrant public space.

GOAL THREE: Develop a transportation network concentrated around activity centers that encourages dense, diverse public places and fosters economic growth.

Numerous objectives that correspond to each goal are listed in Part 1.0.

Finally, from the collection of various statements, a vision was defined:

MESA WILL DEVELOP A TRANSPORTATION SYSTEM THAT SUPPORTS SHORTER TRIPS, SUSTAINABLE MODE CHOICES, A HIGH QUALITY OF LIFE, ECONOMIC DEVELOPMENT AND THE CREATION OF HIGH-QUALITY JOBS.

PART 2.0

This section of the Mesa 2040 Transportation Plan focuses on each element of the transportation network.The following elements

are defined in the 2040 Mesa Transportation Plan:

- Complete Streets**
- Roadway
- Transit
- Pedestrian
- Bicycle
- Aviation**
- Travel Demand Management (TDM)
- Intelligent Transportation Systems (ITS)**

Complete Streets, Aviation and ITS are new elements to this plan update

Existing conditions for each element were examined, and then compared to the Plan's Goals and Objectives. This analysis and comparison helped to develop a list of needs that should be addressed as the City moves towards the projected build out and planning horizon of 2040.

The established needs are meant to be general and fluid. The needs should be addressed strategically in small, short-term segments in order to remain relevant to the changing desires of Mesa's residents and economic climate.

Complete Streets Element

The development of this Complete Streets Element in the Mesa 2040 Transportation Plan is intended to further the implementation of a Complete Streets process for the City of Mesa. An overall Complete Street process ultimately requires a design guide for future reconstruction projects and new street construction projects in Mesa.

There are a number of features that could be incorporated into a street design when developing as a Complete Street in the City of Mesa, either through retrofitting or new construction. and construction. The construction of Complete Street features is specific to the context of the surrounding area.

Roadway Element

The City of Mesa owns, operates and maintains all public roads, which includes principal arterials, minor arterials, collectors and local roadways located within City boundaries.

The arterial street system forms the backbone of the City's multi-modal transportation system. The street right of way is often shared by several different transportation modes including automobiles, trucks, buses, bicycles and pedestrians. Improvements to the street system must balance the needs of all modes.

The street system provides access to activity centers, supports new development, and provides for recreational travel. While widening streets adds capacity to the system, it cannot eliminate congestion. The modern street system provides a combination of integrated components that can work together to manage congestion.

Transit Element

The Transit Element of the Mesa 2040 Transportation Plan is an executive summary of the stand-alone Transit Master Plan that was writing concurrently with this plan update.

The Transit Element identifies the types of services, facilities, and features that are needed to support a multi-modal transportation system in Mesa. The Transit Plan is activity center-based and identifies transit priority corridors and multi modal connections. The plan also identifies various travel markets and transit technologies, including light rail, bus

rapid transit, local and express services as well as future intercity and commuter rail services.

The Transit Element looks at the changing transit profile that has occurred in Mesa as well as in the region, existing transit service, transit supportive policies, and modal connections.

From the information compiled through the analysis of those factors, the Transit Plan identifies short term, two mid-term, and two long-term scenarios that will be used to plan future network opportunities in the City of Mesa.

Pedestrian Element

The Pedestrian Element provides a better understanding of the needs of pedestrians in the transportation system. This element discusses why and where people are walking, existing conditions, mobility issues, and sidewalk gaps and safety issues in Mesa .

The Pedestrian Element introduces the Mesa Pedestrian Toolbox concept and describes how the toolbox can be used to address common pedestrian issues, with six specific toolboxes that focus on:

- Engineering
- Education
- Enforcement
- Encouragement
- Evaluation
- Funding

The element also looks at the implementation of those needs through the foundation of Walk Friendly Communities' designation.

Bicycle Element

The Bicycle Element in the Mesa 2040 Transportation Plan is an executive summary of the stand-alone 2012 Bicycle Master Plan that was adopted by Council in January of 2013.

The 2012 Bicycle Master Plan constructed a framework for the City's bicycle network, as well as defining supporting facilities and programs necessary to make bicycling a viable choice for the residents of Mesa. The plan was designed to increase social connectivity and interaction, offer alternative mode choices to driving, and promote education and awareness programs that would advance Mesa towards the targeted Bicycle Friendly Community Platinum status through the League of American Bicyclists.

The Bicycle element strives to provide a well-connected and intelligent transportation network that weaves all modes together in the transportation network of the 21st century.

Aviation

The Aviation Element within the Mesa 2040 Transportation Plan provides an overview of Mesa's two airports—Falcon Field and Phoenix-Mesa Gateway— including their current status and the future role of aviation in the City of Mesa and the State of Arizona.

Integration of all modes of transportation, both on the ground and in the air, is the focus of this Plan. Being mindful of the importance of proper circulation in and around airport facilities is integral to all modes. This circulation not only provides internal connections to and from businesses, neighborhoods and services, but also provides connections to the surrounding area, the region and wherever residents may live, work or fly.

Travel Demand Management (TDM)

Transportation Demand Management (TDM) is a general term for various strategies that increase transportation system efficiency. The

Transportation Demand Management Element within this plan was designed to be utilized as a reference guide to possible programs that the City of Mesa can offer to increase incentives and disincentives to promote alternatives to single occupant vehicle use.

These programs include:

- Ridesharing including
  - Carpooling
  - Vanpooling
- HOV Lanes
- Telecommuting
- Alternative Work Weeks
- Parking Management
- Bike Share
- Car Share
- Guaranteed Ride Home

These programs can be offered to employees as alternatives to single occupant vehicle travel. Alternative transportation helps the City, and businesses, to remain in compliance with the Maricopa County Trip Reduction program. This program is a mandatory compliance program instituted as a result of a 1980s State of Arizona court ruling requiring greater efforts to reduce air pollution.

Intelligent Transportation Systems (ITS)

The Intelligent Transportation System Element reviews previous ITS planning efforts and provides an overview of the ITS communication system. This element also looks at the existing ITS infrastructure, which consists of the Mesa Transportation Management Center (TMC) and field devices such as traffic signals, closed-circuit television cameras (CCTV), dynamic message signs, video image detection, in-ground detection loops, and driver speed feedback signs. Information is provided regarding Mesa's recent efforts with real time adaptive control systems. This element also addresses the future ITS network through 2040, including future ITS needs, upgrades to Mesa's TMC, the communication network, and future field devices.

PART 3.0

Part 3.0 of the Mesa 2040 Transportation Plan looks at the overall circulation plan for the City of Mesa. This section considered all available materials, budgetary issues, identified infrastructure and facility needs, and public input that have been gathered.

These considerations helped to achieve the goals and objectives that have been outlined in the Mesa 2040 Transportation Plan for implementation through the planning horizon year. Although it is not the intent of this planning document to identify and prioritize specific projects to be built, it will be necessary to establish an implementation strategy for programming projects and taking advantage of any future grant funding opportunities.

Part 3.0 looks at Integrating transportation and land use planning, which is essential to meet the ever growing needs of Mesa. It discusses integration of all planning documents and how this is a critical part of the success of Mesa's effort to ensure that a balance of travel mode decisions is available to people when deciding how they will travel throughout the City.

Part 3.0 also looks at the issues a maturing city faces and its pursuit to become a city that is more recognizable. The Plan describes what the future will offer residents of Mesa, offering a community where residents can age in place, where they can work, live, and relax without having to leave their neighborhoods or travel long distances to do so.

Part 3.0 summarizes the vision for the future as defined in the General Plan and describes the coordinated between the General and the Transportation Plan. Part 3.0 explains how the Transportation Plan will continue to work alongside the General Plan to achieve the "Sense of Place" that Mesa residents are seeking. A place where they will experience:

- Recognizable Neighborhoods
- Innovative Jobs
- Memorable Public Spaces

Returning to the Goals and Objectives identified in the Transportation Plan, Part 3.0 shows how this Plan directly assists and supports the three guiding principles of the General Plan.

Part 3.0 ties all of the Plan's concepts, goals, objectives, and vision for the future of Mesa together through a cumulative illustration demonstrating how these concepts could transform a typical Mesa arterial street within today's network into a multi-modal integrated Complete Street.

Finally Part 3.0 widens that prospective shown in the illustration to show how street corridor treatments can provide connectivity with a 15 minute walk from any activity center to surrounding Neighborhood Village Centers, Specialty Districts, and Employment Centers. So, Part 3.0 attempts to unite the General Plan and Transportation Plan. Providing a transportation network as conceptualized in Part 2.0, in the framework of Part 1.0's Goals and Objectives, neighborhoods can become more livable with easy bicycle and pedestrian access to activity centers and public transit.

PART 1.0

1.1.0 Introduction

There has been a major paradigm shift in Mesa and throughout the United States since the turn of the century. The 21st century has brought new thought and perceptions to old ideas.

Somewhere around the fourth decade of the 20th century a pattern arose that began to erode the American urban city core. During this period city dwellers began to move away from city cores and look to the suburbs as the quintessential place to raise their families and chase their dreams. Two of the major influences that contributed to this shift in settlement patterns were the development of paved roadways and the delivery of electricity and utilities to areas outside of the cities where they were previously unavailable.

Becoming a homeowner was a prototypical ambition across classes, but was particularly the ideal of the middle class. The greatest rates of sprawl were during the boom years after World War I, during the New Deal, and again after World War II and into the 1950s (Hornstein 2005).

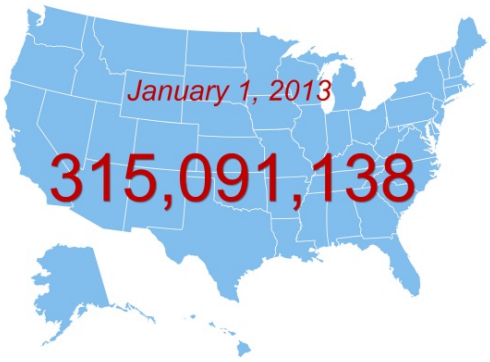
With the current population of the United States approaching 320 million people and a net gain of one person in the United States every 13 seconds according to the U.S. Census Bureau, people have started to realize that the dreams of Post-World War II Americans and Baby Boomers may not be the best housing model.

Iconic western U.S. Cities such as Denver, Portland and Seattle began to experience significant blight within their downtown cores, which left utilities and roadways in disrepair due to emphasis being put on new areas of annexation and population increase that ventured farther away.

Children from Generation X and the Millennials growing up often as latch-key kids in the outer suburbs of cities found themselves a product of their parents' extensive daily commutes, left to fend for themselves and their younger siblings. As these children began to enter adulthood and the workforce themselves they started to see a benefit, or advantage to living, working, and playing in the same general location.

The fabric of the urban city core provides services that are more readily available, which frees up time that could be spent doing things other than journeying for hours to and from work.

Current U.S. Population



1.1.0 Mesa's Transportation Network through the Years

In the years following WWII, Mesa experienced a major transformation, including the modernization of farming, the arrival of air conditioning units, and the arrival of Major League Baseball that made the economy begin to change from agriculture to one based on technology, tourism, and service industries. With this evolution of Mesa into a destination location for visitors from all across the country came the need for increased infrastructure, including roads to enable transport of goods and people and provision of services. Today Mesa is thriving with a community population third only to Phoenix and Tucson in Arizona. It is the 38th largest city in the nation with nearly a half a million people calling Mesa home.

Mesa residents have evolved as the original farm settlers have given way to young professionals and families who are striving to live in a community that will serve as a center for working, playing, and living. Today's Mesa resident doesn't want to travel outside the City to go to work or run errands; they want to walk out of their house and have the latitude to walk, bicycle, or drive a short distance to a neighborhood commercial center that will offer many goods and services that are needed, when they are needed.

Today's Mesa residents and visitors are asserting their voices for amenities along City streets that offer seating, shade, and an inviting atmosphere where they can mingle and visit with neighbors and family. Mesa residents still like and want their cars, but they are not requiring the wide auto-centric thoroughfares of the sprawling 1970s and 80s.

Mesa residents have challenged their public officials with developing a sense of place, including a new and multi-faceted approach to street planning and design, and the management of public right-of-way. Put simply, it involves looking at, listening to, and asking questions of the people who live, work and play in a particular space, to discover their needs and aspirations. Placemaking capitalizes on local community assets, inspiration, and potential, ultimately creating high-quality public spaces that promote people's health, happiness, and well-being.

Mesa's Street Character

The prevalence of streets delineates the personality of Mesa's neighborhoods more than any other single public element. From landscape materials that influence temperature, street furnishings and hardscape treatments that reflect the southwestern heritage and style, to the quality of design and maintenance, which expresses Mesa's never-ending commitment to excellence, these all contribute to the character of the Mesa street fabric.

In addition, these elements of design, influenced through public input, project the neighborhood's identity and create that sense of place that is context sensitive to that particular area of the City. Key elements of streetscape include paving, hardscapes, public art, landscaping, lighting, benches, and bike racks.

Streetscape along major corridors is critical for maintaining the unique identity of the different areas and neighborhoods. Connecting these streets and corridors to the deep-rooted neighborhoods, employment centers, and other parts of the City through context sensitive design helps eliminate islands that create a sense of a fragmented community.

The needs of Mesa have evolved over time, and our streets should also, reconfiguring our streets to better serve the people who use them, whether commuters, walkers, bicyclists, young, or old it is important that all users are accommodated equally. It is the focus of Mesa to rethink our streets to better accommodate safety and mobility of all modes and users. Let us picture a six-lane arterial like Country Club Drive or Dobson Road that was built 20 or 30 years ago. How different was the surrounding area? The community surrounding those areas has changed over those two or three decades. What was historically industrial and underdeveloped areas such as Dobson Road are now housing and shops, schools and gathering areas for the community. What now is an arterial thoroughfare is in need of updated enhanced pedestrian facilities, maybe on-street parking, or other measures that are sensitive to the area's context and the City's vision.

Health Benefits of Walking

Concern Overview

- According to a United States Census Bureau report published in March of 2005, the average American spends more than 100 hours commuting to work each year.[1]

- Each hour spent in a car per day is associated with a 6% increase in the likelihood of obesity.[2]

- In 1974, 66% of all children in the U.S. walked or rode a bike to school, but by 2000, that number had dropped to 13%, more than an 80% decrease.[3]

- 17% of children and adolescents age 2 to 19 years are obese, according to the 2009-2010 National Health and Nutrition Examination Survey.[4]

- Physical inactivity costs an estimated $117 billion per year in medical costs (American Public Health Association, 2010), and accounts for 16% of all deaths in both men and women.[5]

Concern Solutions

- Each 0.62 mile walked per day is associated with a 5% decrease in likelihood of obesity.[6]

[1] United States Census Bureau. (2005). *American Community Survey.* Washington D.C.: United Census Bureau.
[2] Lawrence D. Frank, PhD, Martin A. Andresen, MA, Thomas L. Schmid, PhD (2004). Obesity Relationships with Community Design. *American Journal of Preventative Medicine*, 27(2) 87-96.
[3] American Psychology Association. (2009). Sedentary Lives Can Be Deadly. *Science Daily*.
[4] Ogden, C. L. (2011). Prevalence of Obesity in the United States.
[5] American Psychology Association. (2009). Sedentary Lives Can Be Deadly. *Science Daily*.
[6] Lawrence D. Frank, PhD, Martin A. Andresen, MA, Thomas L. Schmid, PhD (2004). Obesity Relationships with Community Design. *American Journal of Preventative Medicine*, 27(2) 87-96.

- Walking and cycling as a part of everyday travel is as effective as structured workouts for improving health.[7]

- In 2005, the Centers for Disease Control and Prevention (CDC) found that the annual per capita cost of building and maintaining multiuse trails was $209 per person, whereas annual per capital medical benefit of using the trail was $564 per person. This equated to a 270% return on investment.[8]

- Walking to school is good for children's cognitive health and learning ability. It improves children's concentration, boosts moods and alertness, and enhances memory, creativity, and overall learning.[9]

Just as our existing motorized transportation networks connect destinations via an interconnected system of roadways that enable people to get from A to B, active transportation networks allow people to do the same thing by walking and bicycling. The addition of these modes provides an overall healthy transportation network that allows for all users to equally share safer and more appealing streets while traveling to and from their destinations.

Table 1.1

	Improved Walking Conditions	Increased Walking
Potential Benefits	Improved user convenience Improved accessibility Option value Increased local property values	User enjoyment Improved public health Increased community cohesion
	Reduced Car Use	More Walkable Communities
	Reduced traffic congestion Reduced road and parking costs Consumer savings Fewer traffic crashes Energy conservation Reduced air and noise pollution	Improved accessibility Lower transportation costs Reduced sprawl costs More livable communities

Non-motorized Transportation Benefits: Todd Litman

Active and healthy transportation options offer and promote:

- Healthy people
- Healthy environment
- Healthy economy, and
- Mobility for all

Our current transportation model depends on near-universal reliance on the automobile for transportation leaves many people out of the equation, stuck with no way to get around. Children, the elderly, people with mobility issues such as visual impairments or physical disabilities, and those who have no access to a car, are among the groups that benefit the most from active transportation options. Table 1.1 lists benefits associated with active transportation options.

In addition to the mobility provided, streets, sidewalks, pathways, and landscaping along a street in a neighborhood create the first impression people get of that neighborhood. The street network not only transports people from one place to another, but also conveys pride in community and commitment to neighborhoods and public spaces. This neighborhood pride helps encourage the creation of a sense of place that fosters new development and redevelopment.

[7] Dunn, A. E. (2008). Comparisons of Lifestyle and structured intervention to increase physical activity. JAMA.
[8] Wang, M. S. S. (2005). A Cost Benefit Analysis of Physical Activity Using Bicycle/Pedestrian Trails. Health Promotion Proactive, 6(2), 174-79.
[9] Jackson, D. R., & Sinclair, S. (2012). Designing Healthy Communities, USA. John Wiley and Sons.

2025 Mesa Transportation Plan Goals and Objectives

The Mesa 2025 Transportation Plan's "Shared Vision" not only focused on street widths, number of lanes, traffic volumes, and congestion levels, it also provided groundwork and justification for a multi-modal network that the Mesa 2040 Transportation Master Plan (TMP40) will build upon. The Mesa TMP40 will also include further discussion addressing the qualitative needs of Mesa's residents. The existing plan's goals and objectives addressing a multi-modal balanced framework, maintaining compliance with Federal and State regulations, and responsible use of public funds continue to be critical, and the new plan is written to continue to carry out these ideas and goals and enhance them as Mesa approaches build out of its transportation network. While it is important to provide goals with a broad brushstroke of concepts and achievements that the City wants to accomplish, it is also critical that the goals remain measurable and relevant to the direction of the vision.

Mesa TMP40 Goals and the Evolution of a City

The next section of Part One lays out the methodology used to create a new set of goals and objectives for this plan update. During the life of the existing plan there has been an increase in population. Between 2000 and 2012 there were minor fluctuations in the distribution of mode share, and virtually no change in the percentage of work trips made by single occupant vehicles as shown in Figure 1.1. This data comes from the United States Census Fact Finder website, which was adjusted to compile data specific to the City of Mesa.

Sustainable transportation targets need to be set and performance measures put into place that will ensure an increase in those modes that are creating change in transportation practices and a decrease in single occupant vehicle trips. These changes will increase mobility equality and create that sense of place that Mesa is looking to create.

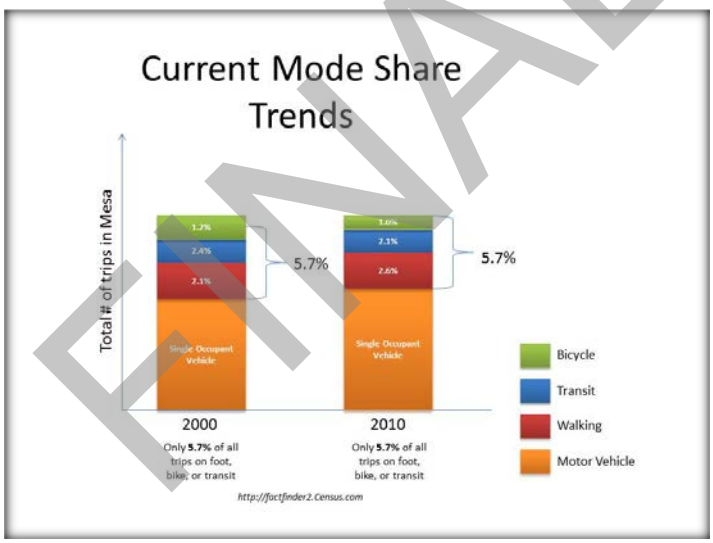


Figure 1.1

1.2.0 Goals and Objectives for the 2040 Mesa Transportation Plan Update

Goal #1 – Develop a safe and efficient transportation system that provides access to all public places by multiple modes of travel and by various users.

Objective 1 – Build the future transportation network to fill gaps and address needs as outlined in this plan while coordinating with adjacent communities and regional agencies.

Objective 2 – In addition to complying with the Americans with Disabilities Act (ADA), provide facilities that allow all users, including disabled, children and elderly, to access community places with ease and comfort.

Objective 3 – Develop a set of comprehensive design standards and guidelines that promote vibrant and interesting streets and public places using best national and international practices.

Objective 4 – Allow access and easy integration between all modes of transportation at activity centers.

Objective 5 – Develop a comprehensive pedestrian plan that provides a network of pedestrian paths and sidewalks with access to all of Mesa's destinations and transportation facilities.

Objective 6 – Continue developing bicycle facilities and programs as recommended in the City of Mesa Bicycle Master plan.

Goal #2 – Develop inviting streets that identify with the context of the surrounding neighborhood and help to create a sense of community and vibrant public space.

Objective 1 – Promote streets that are inviting and comfortable for people to gather and interact within.

Objective 2 – Make walking safe, convenient and enjoyable while encouraging social interaction in public places.

Objective 3 – Seek opportunities to apply complete streets principles to new and existing areas.

Objective 4 – Use specific urban design elements and principles for Special Character and Planning areas as defined in this plan and the City of Mesa General Plan.

Objective 5 – Use the square mile neighborhood as the fundamental building block for the transportation system.
Objective 6 – Make downtown Mesa the most special of all the square mile neighborhoods.

Goal #3 - Develop a transportation network concentrated around activity centers that encourages dense, diverse public places and fosters economic growth.

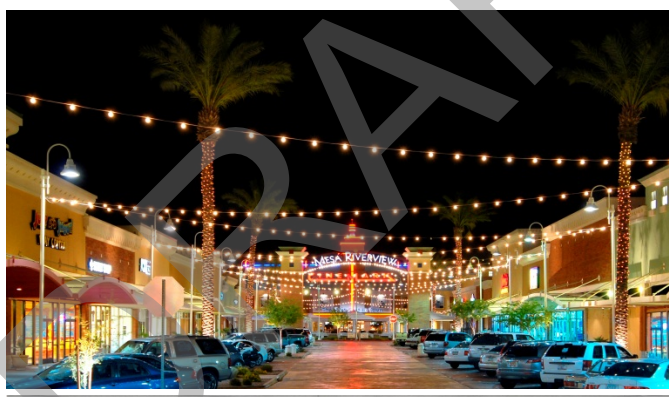
Objective 1 – Develop a methodology to locate and prioritize activity centers, such as near freeways, schools, and large employers. Objective 2 – Connect activity centers to mixed-use and high density land-use areas.

Objective 3 – Build the future transportation network to fill gaps between activity centers and square mile neighborhoods.

Objective 4 – Connect all modes to each activity center throughout the transportation network.

Objective 5 – Make each square mile neighborhood connect to an activity center by multiple modes of transportation.

Objective 6 – Coordinate public right-of-way and private land to create places where people want to congregate and spend time socializing.



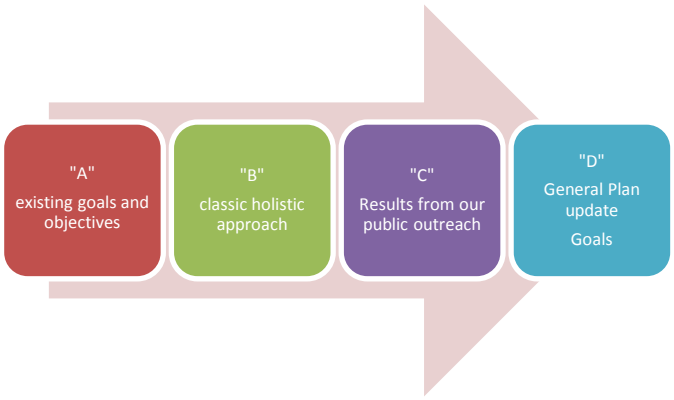
1.2.1 Goals, Objectives and Other Daydreams

The City of Mesa is moving through a very interesting period in its evolution. Unlike a toddler stumbling through basic coordination, the City has grown into a filled-out adolescent or young adult. And like young students, the City must discover its path into the future. Therefore, although we must examine the past things that have shaped the City, the Goals and Objectives must reflect current philosophies. The City was a different place, both physically and philosophically, in 2002 when the Mesa 2025 Transportation Plan was developed. Freeways only encircled parts of the City, and much more land was being developed. Lofty dreams of unending suburbs filled our souls. We were a transient crowd, ever buying up and refinancing into bigger and "better" neighborhoods. Our neighborhoods were mere backdrops to a long trip alone in our personal vehicles to places far away.

Then, 2008 hit. Rampant housing development went out of fashion. Easy mortgages to buy property mismatched to real income dried up. Foreclosures reset our sense of where we needed to live, and where we could afford to live and motivated us to stay there. The homeowners flocking to outlying reaches of the City slowed down. With this settling came a renewed awakening of where we are living and what makes our neighborhoods.

So our sensibilities of what we desire in our transportation system changed along with this larger trend. Surveys point to a desire for walkability and livability. Therefore, the vision from the 2025 Transportation Plan needs to be updated to address the input from the community today.

Developing a new set of goals and objectives should not be a simple exercise. Therefore, several sources for goals, objectives and a vision for the City's transportation system were used as described below.



Four specific components were used to develop possible goals and objectives:

5) The existing goals and objectives found in the 2025 Transportation Plan.

6) A classic approach found throughout history in various cities as described in "A Pattern Language."

7) Results from our public outreach.

8) The goals, objectives and visions being developed concurrently as part of the City's General Plan update.

Each of these components was boiled down to find large themes and patterns which were then organized into a preliminary set of goals and objectives for each component. All of the respective lists of goals and objectives were then compiled and analyzed as a whole. Common reoccurrences and overlapping concepts were pulled out to end up with a concise final proposal for updated goals and objectives. Additionally, this process helped shape an overall vision for the plan.

The goals and objectives found in the existing Mesa 2025 Transportation Plan begin this process below.

1.2.2 Component A: 2025 Existing Goals and Objectives

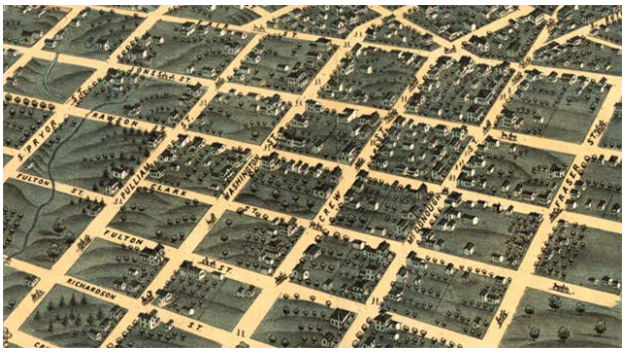
The Mesa 2025 Transportation Plan developed five goals with corresponding objectives and policies. Transportation staff decided early on to simplify the plan. The recommendation for this plan was to focus on goals and objectives and not list detailed eliminating the policies. By focusing on goals and objectives this serves to simplify the new plan, and recognizes that policies may need to change from time to time, or new policies need to be created throughout the life of the plan to accomplish the goals, objectives, and current needs.

1.2.3 Component B: Classic City Design Patterns

Scholars have noticed that throughout history cities have followed certain patterns of development. Typically those patterns that repeat over and over demonstrate a successful way to plan and build a city. These patterns and their interconnections were compiled in "*A Pattern Language: Towns, Buildings, Construction*" (Christopher Alexander, et. al., Oxford University Press, 1977). Therefore, transportation elements were examined from this historical, pattern driven method to develop a second set of preliminary goals and objectives.

Classic city transportation networks were typically built around transportation activity centers. Beyond transportation, these activity centers can also be considered social meeting places. Activity centers should be accessible by all modes and all users. The activity

centers need to be located very carefully so as to meet the greatest connectivity for paths, bike facilities, local roads, freeways and airports. And they should be surrounded by activity and density. The goal would be to attract the surrounding community to these activity centers, or use dense, active places that already exist.



The second major aspect to classic transportation pattern language is building to the local neighborhood area. This idea is actually easy to consider for the City of Mesa due to the mile grid pattern of local streets.

Each square mile can be considered a "building block" for the transportation network. This approach focuses on what needs to be done within that square mile as a whole when any improvements or development occurs. From a connectivity perspective, ideally each square mile would have access to an activity center by multiple modes of travel. Additionally, these square miles should consist of smaller, local roads within and multi-use paths throughout. This internal design needs to be detailed in specific guidelines and standards.

Some square miles can be considered special places, such as Downtown Mesa. The internal area of the downtown square mile should be built more for the pedestrian scale as detailed in the Central Main Plan. Most of the Special Character Areas defined in the General Plan update can be treated in this way as unique places.

The final overarching idea for a classic concept for transportation systems is that of the "web of travel." This is a complex network wherein all modes have a means to travel to the nearest activity center. Additionally, all modes and all users should be able to access all public facilities and great places, such as rivers, canals, and worship centers. Therefore, one can imagine the network overlaying the City of Mesa with lines representing connections between all activity centers and neighborhood square miles.

Obviously, not all of these concepts can be applied to the City of Mesa. But some can, and a summary of those possibilities are listed in a set of preliminary goals and objectives based on these classic patterns.

1.2.4 Component C: Public Comments

Public input was received through several means such as public meetings and an online survey. Some of the public input reflected current conditions in residents' neighborhoods. However, there were plenty of constructive ideas, and a general consensus of what the

residents of Mesa were interested in for the future was determined.

Some of the common themes found in the public input include:

- An overwhelming demand for more paths and trails, including lighting and amenities for those trails. It should be noted that this trend was also dominant in the General Plan public input, as well as in the City of Mesa iMesa program. These comments also included a desire for more "short-cuts" and direct access to public places for pedestrians in addition to the larger shared use path systems.
- There was a strong focus on improving signal timing. Mostly this referred to providing more flow along major arterials where residents felt they were being stopped at every signal. This highlights some of the interest in current issues noted above.
- Referring mostly to current conditions, typical complaints on road maintenance and temporary traffic control were submitted.
- Residents preferred detached sidewalks along streets with shade and seating.
- Residents supported more bicycle and pedestrian safety education and awareness programs.
- Finally, there were comments asking for more roadway connections in the southeast area of Mesa, including more roads to access Queen Creek.

1.2.5 Component D: The General Plan Update

Transportation is an element within the General Plan. The update to the General Plan emphasizes the relationship between land use and transportation. Therefore, the goals and objectives of the Transportation Plan update should be aligned with those of the General Plan.

The General Plan is built around a framework consisting of:

1. Community character
2. Creating and maintaining a variety of great neighborhoods
3. Growing and maintaining diverse and stable jobs
4. Providing rich public spaces and cultural amenities

On top of this framework, the overall vision is made up of five key elements:

1. High-quality development
2. Changing demographics
3. Public health
4. Urban design and place-making
5. Responding to a desert environment

1.2.6 Transportation Elements within the General Plan

In addition to an entire section dedicated to transportation (largely based on this transportation plan update), the General Plan proposes various concepts and uses of transportation elements to carry out the vision

of the General Plan. Some of these larger ideas are listed below:

- Reduce auto-dominant travel by improving connections on the neighborhood level with a greater sense of place.
- Similar to Transportation's public input, the General Plan input stressed shared-use trails and off-street paths, connectivity between neighborhoods and activity centers, more travel mode options, and an improved sense of place through enhanced urban design.
- Street design sensitive to a neighborhood's context or culture.
- Improved walkability between homes and parks, shopping, schools and transit.
- Lots of trees and shade along sidewalks and paths.
- Interconnectivity of all travel modes for better walkability, safety, comfort, health and social interaction through specific urban design and place-making standards and guidelines.
- In general, improve the City's largest public space, street right-of-way, to be useful for all modes and various purposes, but mostly to create a sense of community.

1.3.0 Putting It All Together

So now we have four sets of goals and objectives derived through four methods. A final overall set of goals and objectives for this Transportation Plan Update results from a merging of these four sets. Similar goals and objectives were grouped together, resulting in statements that were clearly overall goals, and statements that were supporting objectives underneath each goal. Numerous statements were similar or overlapped in some way, and were included in this final list. Other statements were outliers found only in one of the components, or some were just too detailed for an objective. Those were not carried forward. Through this process a final set of goals and objectives were created and are listed at the beginning of this section.

The Future Vision of Mesa's Transportation System

The above discussion and final set of goals and objectives paints a picture of how the transportation system of the City of Mesa should develop into the future. Mostly the system will be one of ubiquitous and convenient interconnectivity, for all modes, and all users. The vision is one in which residents can travel from their immediate neighborhood to nearby activity centers by any mode they choose on a network of infrastructure for all modes. So called "alternative" modes will have the same capabilities to get around town as motorized vehicles. Major streets will be "complete" by being useful for all modes and all users. All public places will be accessible by those on foot, bike, bus, car or wheelchair.

The future transportation system will have connecting nodes at activity centers where all modes can transfer to each other. These activity centers become large public gathering spaces, thereby attracting the surrounding neighborhoods. The activity centers attract dense land development, jobs and entertainment. In some ways, the activity centers become mini-cities. The transportation network must then be cast across the city as a web, touching each activity center and touching some part of each and every square mile neighborhood. A system of shared-use paths will crisscross each square mile, and connect to the larger path systems.

Most important though, is returning the public right-of-way back to the entire public for more uses than automobile driving. Streets need to be designed not only for motor vehicles, but for livability at a human scale as well. An important part of bringing streets back to life is understanding the context surrounding each particular street segment, and building streets to improve the livability of the adjacent neighborhoods. Sidewalks are just as important as the adjacent road and they will be treated as such. They will be well-lit, shaded and accessible for all. Sidewalks will deliver users to the footsteps of all public places and can be used to enhance the experience of fronting businesses, and can open up into gathering places. At the same time, those streets required for large volumes of vehicle and freight traffic will be so designated, reasonably separating high-speed motor vehicles from low speed bicycles and pedestrians.

Ultimately this vision creates not just a transportation system that moves people and goods from place to place, but a city people want to live in. Creating livable places attracts the people wishing to live in a livable place.

Business is now also attracted to these livable places because these are where the people the business wishes to employee live. These are places where customers and workers can get about in a timely, low-stress, comfortable manner by whatever travel mode they desire.

Therefore, the vision statement for this Transportation Plan Update is proposed as follows:

VISION
MESA WILL DEVELOP A TRANSPORTATION SYSTEM THAT SUPPORTS SHORTER TRIPS, SUSTAINABLE MODE CHOICES, A HIGH QUALITY OF LIFE, ECONOMIC DEVELOPMENT AND THE CREATION OF HIGH-QUALITY JOBS.

In Part II these goals, objectives and vision will be applied to the elements which make up the transportation system. Details within the elements will provide some indications as to how this vision can be realized.

PART 2.0

2.1.0 COMPLETE STREETS ELEMENT

This chapter will provide an overview of Complete Streets, and will assess the planning processes that are associated with the current Complete Streets Policy.

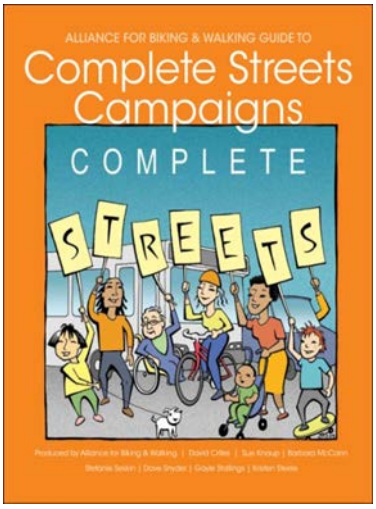
2.1.1 AN OVERVIEW OF COMPLETE STREETS

What are Complete Streets?

Complete Streets are designed for people of all abilities and ages, such as pedestrians, bicyclists, and individuals utilizing transit, and include all modes of travel such as motorized vehicles, bicycles, buses, and light rail. The term “Complete Streets” was first used professionally during 2003, and encompasses comprehensive design features that incorporate innovative approaches to an entire streetscape.

Although an explanation of Complete Streets has not been universally defined, common features, include innovative designs along a standard roadway. A functional Complete Street may include an array of elements, such as:

- Crosswalks and safe crossing opportunities
- Pedestrian lighting
- Sidewalks
- Curb ramps and accessible routes
- Accessible pedestrian traffic signals
- Medians and pedestrian refuges
- Transit stop facilities
- Bicycle lanes and facilities
- Landscaping
- Curb extensions and on-street parking
- Benches and street furniture
- Public art
- Roundabouts, chicanes and other forms of traffic calming
- Pedestrian shading opportunities



The concept of implementing a "Complete Streets" project involves selecting an existing street and transforming it into a functional Complete Street that enhances safety, efficiency, comfort, and accessibility for users of all ages, abilities, and for all modes of transportation.

Implementing a Complete Streets Program in the City of Mesa will consist of retrofitting existing arterials throughout the community and applying Complete Streets design principles in the design of new streets. It will include a number of actions:

- Adopting a Complete Streets Policy
- Developing and training staff on design guidelines
- Modifying existing and developing new standards incorporating Complete Streets principles
- Developing potential Complete Streets retrofit projects for existing streets as funding is available

Complete Streets benefit children, the elderly, persons with disabilities, and collectively, individuals of all ability levels.

NATIONAL COMPLETE STREETS COALITION

National Complete Streets Coalition

The National Complete Streets Coalition was founded in 2005 and exists for the sole purpose of promoting Complete Streets throughout the United States, and assisting governments at the state, regional, county and local levels in the adoption and implementation of Complete Streets policies. The Coalition's primary ambition is to change how most roads are designed and constructed through the implementation of Complete Streets elements.

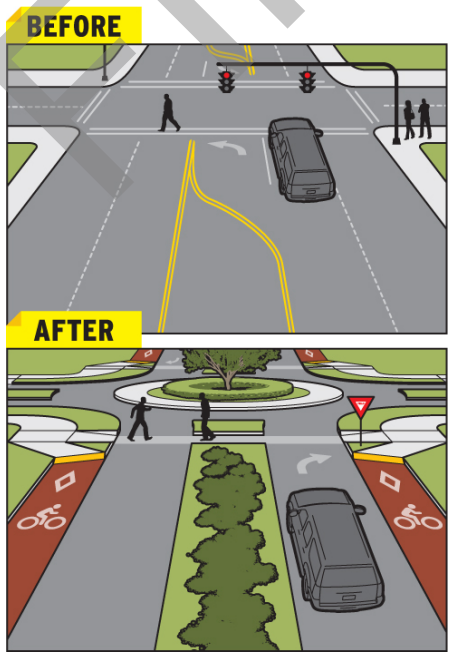


Figure 2.1.1 – Example of a complete Street Conversion.

The Complete Streets Coalition has been the leading national advocate in assisting jurisdictions throughout the country in the implementation of Complete Streets policies. During late 2010, the Coalition initiated an aggressive three-year plan to establish measures that would have a lasting impact by

establishing effective policies at the state and national levels.

Over 200 local jurisdictions including some in Arizona, and Maricopa County, as well as other communities across the nation, have adopted comprehensive master and general plans, and transportation plans that call for the implementation of Complete Streets initiatives and the construction of Complete Streets in their communities. The suggested principles, suggested policies, and Complete Streets elements as endorsed and supported by the National Complete Streets Coalition are in alignment with the City of Mesa Complete Streets Element.

The Benefits of Complete Streets

Complete Streets are designed, maintained and operated in a manner to accommodate people of all abilities and ages. Complete Streets offer accessibility, convenience, mobility, comfort, connectivity and safety for all users. Some of the primary benefits of Complete Streets for Mesa are described in further detail below.

Supports Local Economic Development – Designing a roadway that is easily accessible and attractive to all customers alike ultimately improves the shopping conditions for existing retail establishments by attracting customers and providing easy accessibility to businesses. These improvements also help attract new development and create connections between neighborhoods, transit, schools, businesses and retail areas.

Enhances Air Quality and the Environment – Complete Streets can benefit the environment through a reduction in vehicle emissions, providing effective green infrastructure that can enhance conditions associated with the urban heat island effect, such as:

- Native Plant Vegetation
- Porous pavement
- Storm water management basins
- Trees

At times, excessive amounts of pollution, high ozone, and higher levels of particulate matter throughout the region can create poor air quality conditions, which can affect individuals with asthma or other respiratory illnesses.

Reducing vehicle trips on the roadway network through increasing opportunities for walking, bicycling and transit, can have a positive impact on reductions in carbon dioxide (CO_2) emissions, ozone (O_3), and particulate matter (PM^{10}).

Aside from promoting lower emissions, Complete Streets can also lead to the development of green infrastructure, which can be added to a roadway in an effort to improve water quality through naturally filtered storm water runoff. The development of tree lined streets with effective canopies also provides shade for walkable spaces and creates an environmentally friendly corridor. This also helps to reduce the urban heat island effect.

Benefits Children, Older Adults and People with Disabilities - The development of Complete Streets offers a safer walking environment for older individuals, and helps them to retain their independence by providing access to walkways and public transit throughout the community. Children are provided with easy navigation via bicycle facilities and walkways, and Complete Streets provide children with safer routes to school, safer mobility, and create environments that encourage children to be more physically active. Individuals with disabilities are better served through Complete Streets designs, as

they are allowed to travel free of barriers along ADA-compliant roadways. The nature of Complete Streets accommodates individuals with disabilities and ensures that they are able to move freely along the public right of way. Many Complete Street designs also incorporate street furniture to allow individuals to rest while promoting activities like people watching, reading, picnicking, and enjoying the built environment within the community.

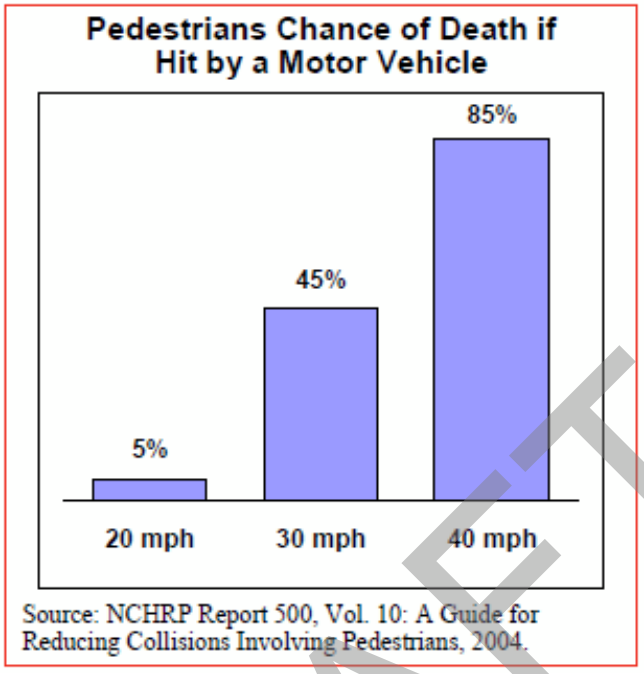


Figure 2.1.2 Vehicle Speed

Encourages Active and Healthy Life Styles - The development of Complete Streets throughout the City is beneficial to the public health of the community, and creates an environment of roadway corridors and public walkways that encourage an active lifestyle. In general, walking and bicycling promote active living and are a deterrent to being overweight. By encouraging walking and bicycling to nearby areas to run errands, visit friends, go out to eat, or where applicable, walk to work, the development of Complete Streets will facilitate opportunities for physical activity, thus encouraging an active and healthy lifestyle for Citizens of Mesa.

Improves Safety - Complete Streets are designed to provide safer, efficient, and convenient travel for motor vehicle travelers, bicyclists, pedestrians, and users of transit. Numerous studies supported by the *National Complete Streets Coalition* have indicated that when pedestrians have appropriate conditions for walking, crossing roadways, riding a bicycle, or waiting for transit within a city, there is an increase in safety and less chance of an incident or fatality.

Supports an Efficient Transportation System - By creating streets that provide choices for all modes there is an assurance of moving toward transportation equity, which also works to alleviate congestion by offering multiple forms of travel. If more individuals walk, use transit, or bicycle to their destinations, it in turn reduces traffic congestion and increases the overall capacity of the City's transportation network.

Creates Stronger Public Places and Neighborhoods - The development of Complete Streets often brings people to specific areas, and with the increase in people there is increased synergy. Also, areas that incorporate green infrastructure, such as plantings and tree canopies become desirable destinations that bring added foot traffic to local shops and businesses. Often, such areas undergo an economic transformation, and become vibrant public places and neighborhoods that take on the characteristics of a "transformed" or "active" corridor. Through the development of Complete Streets, the City will ultimately offer a better quality of life for residents, increase social interaction, and create vibrant areas that are suitable for increased economic development.

Improves Project Cost Effectiveness - Developing Complete Streets normally improves long-term cost effectiveness over traditional roadway projects that only consider automobile travel. By designing the space of the street realm and integrating up-front features such as bicycle lanes, transit stops and amenities, sidewalks, green infrastructure, safer street crossings and an array of other chosen amenities, it avoids an expensive retrofit of the street in the future.

PEDS

The Importance of Complete Streets
Many roadways are dominated by the automobile, and do not include elements that allow for bicycle, transit and pedestrian mobility. Oftentimes, roadways that are dominated by higher speed automobile traffic are often referred to as "incomplete streets" because they are missing critical infrastructure for some users while providing infrastructure for others.

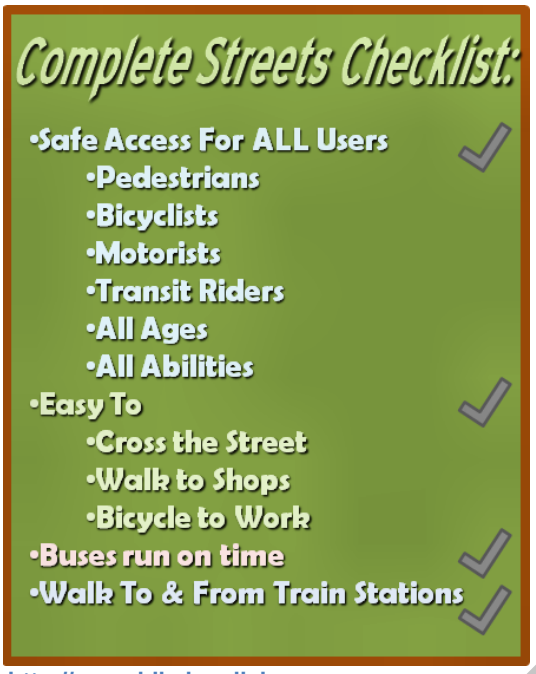
Although Mesa has initiated a process of providing adequate infrastructure for pedestrians, bicyclists and transit users, the implementation of a Complete Streets Program guide will provide options for retrofits, and add Complete Streets applications to new roadways being constructed in the City.

Complete Streets are an important component of the transportation system because they provide multi-modal mobility and offer a selection of transportation options, improve the transportation environment, increase physical activity, and build stronger neighborhoods and communities. Complete Streets ultimately create a "sense of place," and bring a certain comfort level into a particular location, which allows users to travel along the roadway corridor in a low stress manner.

2.1.2 What does a Complete Street Look Like?

When assessing future Complete Streets throughout the City of Mesa, it is important to note that not every type of street needs every kind of improvement or application to be considered a Complete Street. As addressed in the following sections of this chapter, one street may look very different from another street, depending upon the functional classification and purpose of the specific roadway. Throughout Mesa, there are principal arterials, minor arterials, collectors and local roadways. From a Complete Streets perspective, these roadways will have different categorizations and needs. Some streets will be more oriented for bicyclists and pedestrians, while other streets will be predominately used for motor vehicle and freight drivers. City roadways and rights-of-way will be evaluated in order to determine what is needed for the users of a particular corridor. How a Complete Street fits into the

overall transportation network and how it compliments area land uses are also very important considerations.



http://www.bikelaneliving.com

The implementation of a Complete Street must also be sensitive to the community context, using what is commonly referred to as Context Sensitive Design. The Context Sensitive Design of a particular location is concerned with meeting the needs of the environment, the users of the facility, ensuring that a transportation project complements the nearby neighborhoods and land uses, and integrates into the physical setting in general.

The keys of Context Sensitive Design are to balance efficiency and mobility, and ensure that the development of a Complete Street is consistent with the social, economic and natural environment of a particular setting. In some cases, this also involves particular sensitivity to the cultural environment of a specific location. Context Sensitive Design should apply flexible design options, incorporate aesthetic enhancements, address local community concerns and needs, consider input from local agencies and groups, and specifically address all modes of travel.

When developing a Complete Street within the City of Mesa, whether it is through retrofitting an existing street, or developing a new roadway, there are a number of features that could be incorporated into its design and construction. The construction of Complete Street features is specific to the function and location of a particular roadway.

This Transportation Plan has incorporated the concept of the "Activity Node" based approach to defining how the City will work to achieve a balanced transportation network. Activity Nodes are defined by the City of Mesa as:

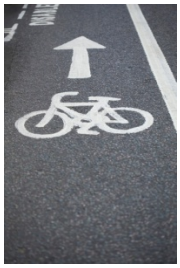
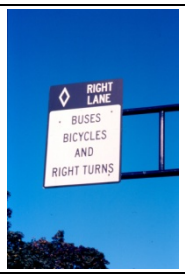
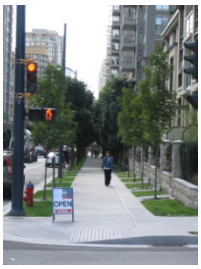
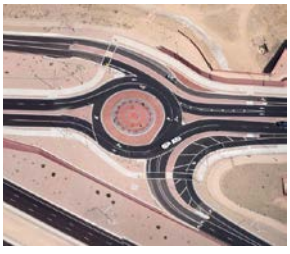
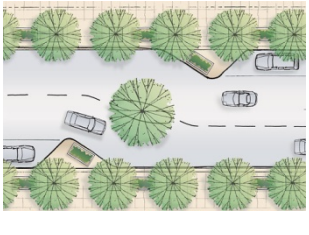
> Focal points of community life, providing employment, shopping, services, education, culture, entertainment, recreation and places of worship. Activity centers include housing and mixed use environments. Activity centers have a range of sizes, functions and character. They include neighborhood centers, community centers, regional centers and employment centers

A balanced transportation network is defined by the City of Mesa as:

> A system comprised of rapid transit, such as light rail complemented by enhanced bus service, sidewalks, and bikeways that contains a hierarchy of streets that will be integrated into an efficient, people oriented transportation system that supports the desired land use pattern.

Features that may be incorporated into Complete Streets to achieve this balanced transportation approach are displayed in Figure 2.1.3. It is important to note that these are examples of what could be incorporated into such a design, and are not necessarily exhaustive, as it is important to allow for flexibility in design.

FIGURE 2.1.3

			
Sidewalks	Bike Lanes	Curb Ramps	Traffic Circle
			
Pedestrian Crossings	Special Traffic Signs	Parklets	Aesthetic Bus Stops
			
Street Furniture	Bicycle Racks	Bicycle Lockers	Tree Canopies for Shade
			
Landscaping	Street Parking	Ample Pedestrian Space	Curb Extensions or Bulb Outs
			
Median Islands and Pedestrian Refuges	Narrow Travel Lanes	Roundabouts	Chicanes

2.1.3 AN OVERVIEW OF THE MAG COMPLETE STREETS PLANNING PROCESS

In 2009, the Maricopa Association of Governments (MAG) initiated an analysis of Complete Streets throughout Maricopa County. This study took almost two years to complete, and culminated in the MAG *Complete Streets Guide*, which was adopted by the Regional Council on April 19, 2011. The MAG Complete Streets Guide is a resource containing strategies and goals, and presenting a planning process which can be used to implement Compete Streets within a community. The MAG *Complete Streets Guide* is a move toward implementing the March 11, 2010, policy statement by the U.S. Department of Transportation on bicycle and pedestrian accommodation. This policy states that bicycling and walking should be considered equal to other transportation modes, and encourages local governments and other public agencies to adopt similar policy statements for the accommodation of bicyclists and pedestrians.

Since completing the *Complete Streets Guide*, MAG has used the document to reach out to communities in an effort to assist with implementing Complete Streets measures. MAG has also established specific Complete Streets related criteria for evaluating transportation projects for the three-year regional Transportation Improvement Program (TIP), for assessing Safe Routes to School projects, for reviewing transportation projects and initiatives related to senior citizen mobility, and for consideration of annually submitted transportation alternatives projects.

The suggested planning process within the MAG *Complete Streets Guide* serves as a template that communities can follow to adopt Complete Streets policies, to implement strategies, achieve goals, and to use in an effort to develop Complete Streets.

MAG also serves as a liaison between the Federal Government and cities and towns in the identification of federal funding sources for designing and constructing Complete Streets. It is imperative that local governments use the guide to establish a process for implementing Complete Streets, and to maintain a partnership with MAG for Complete Streets initiatives and potential funding opportunities.

The City of Mesa will use the planning process in the *MAG Complete Streets Guide*. It is the intent of the City of Mesa to closely adhere to the strategies, goals, and principles as developed and adopted by MAG. This process is outlined below.

Determine the Transportation Context

The first step in the MAG six-step planning process has to do with determining the "Transportation Context" of an existing or future roadway, and identifying how it relates to Complete Streets. The Transportation Context of a roadway has to do with an array of developments, whether they are residential, commercial, retail, or industrial, in addition to a variety of transportation capacities along certain corridors, and the functionality of a roadway. The Transportation Context of a roadway is directly related to traffic volumes and the number of lanes. MAG identifies a total of six types of transportation contexts that represent roadway corridors throughout the region. These MAG Transportation Contexts are:

- High Density/High Intensity-Suburban
- High Density/High Intensity-Urban
- Low Density/Low to Medium Intensity-Suburban
- Low Density/Low Intensity-Residential Subdivisions
- Low Density/Low Intensity-Internal Neighborhood
- Low Density/Low Intensity-Warehouse

Examples are provided on Figure 2.1.4, and further understanding of each definition can be found in the MAG Complete Streets Design Guide document itself. The Roadway element of this plan provides more insight into the use of these contexts for City of Mesa street.

FIGURE 2.1.4
MAG TRANSPORTATION CONTEXTS

High Density/High Intensity - Suburban

High Density/High Intensity - Urban

Low Density/Low to Median Intensity – Suburban

Low Density/Low Intensity - Residential Subdivisions

Low Density/Low Intensity – Internal Neighborhood

Low Density/Low Intensity - Warehouse

Identify Current Transportation Modes and Facilities

This step involves providing an inventory of existing travel facilities and determining their adequacy. This involves collecting data on the number of lanes, width of each lane, and travel speeds.

Identify the Complete Streets Gaps

This involves identifying and selecting the facilities that are necessary but do not exist for a Complete Street based on its transportation context.

Determine Other Priorities

Other priorities should be considered when designing and selecting facilities to be incorporated into a Complete Street. Such priorities include green infrastructure elements, economic development, neighborhood beautification, historic preservation, healthy communities where people come together to make their community better for everyone through collaboration, community ownership, inclusive approaches and long term, positive commitment.

Typical Complete Street Cross Section

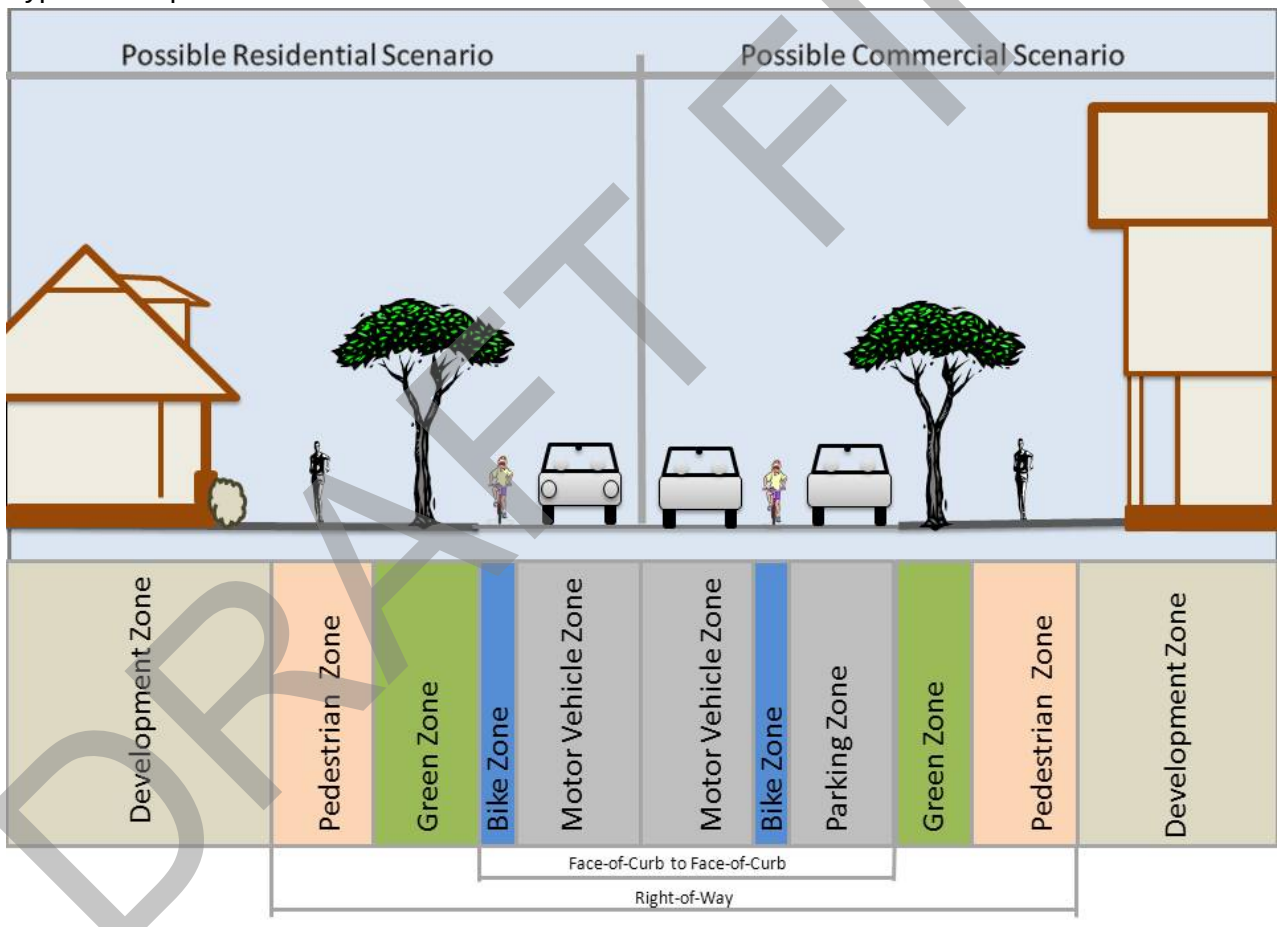


Figure 2.1.5

Determine the Right of Way and Components

The fifth step in the process is to determine right of way and the number and types of lanes it should have as a Complete Street. Vehicle traffic lanes, parking, bicycle lanes and pedestrian walkways are all possible components of a Complete Streets corridor.

Select Other Complete Streets Elements

The final step is selection of other Complete Streets elements such as lighting, shade, signing, public art, street furniture, bicycle racks and storage.

2.1.4 CITY OF MESA COMPLETE STREETS PLANNING PROCESS

With the development of this Complete Streets Element within the Transportation Plan, it is the intent of the City of Mesa to work toward the implementation of a Complete Streets planning process. The development of an overall process will ultimately lead to Complete Street Standards and Guidelines being considered in all future reconstruction projects and new street construction projects that occur in Mesa. Figure 4 illustrates the recommended planning process for Complete Streets, which consists of five primary elements that are identified in further detail below.

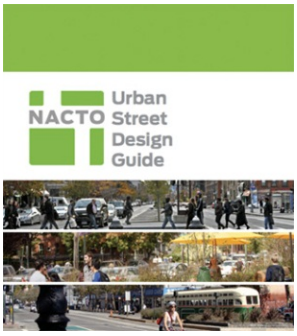
City of Mesa Complete Streets Policy

The City of Mesa Complete Streets Policy adopted by Council envisions a well-connected, integrated roadway network of Complete Streets throughout the City. The policy calls for development of a Mesa Urban and Complete Streets design guide and the application of Complete Streets design principles to arterial, collector and local roadways.

2.1.6 Complete Streets Planning Process

Developing an Urban Streets Design Guide

In a general sense, most street projects in the City of Mesa are developed in a two stage process – first there is planning and design, then there is construction. In order for a Complete Streets approach to be implemented within the design process of the City, appropriate guidelines will be needed. Currently, design complies with several sources. There is City Code and Subdivision Guidelines at the top level, and then Engineering and Design Standards, and Standard Details and Specifications following next. Most of the engineering guidance is based on national guidelines and codes such as the American Association of State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets*, commonly called the AASHTO Green Book, and the *Manual on Uniform Traffic Control Devices*, MUTCD, as well as



documents developed at the state and regional level.

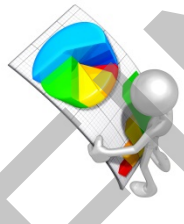
Although this approach provides appropriate information and details to design projects, they tend to be separated for application. Designs are made in pieces rather than considering the whole roadway, and they are for "standard" conditions. Therefore, many communities have been adopting an "urban street design guide" approach. A design guide pulls all the appropriate pieces together from the sources so a designer has tools to build a design considering context and all of the impacts on the surrounding built environment. A design guide also helps to suggest alternate ways to design in unique situations.

The City proposes to adopt the National Association of Transportation Officials (NACTO) *Urban Streets Design Guidelines* as a basis for a Mesa street design guide. The NACTO guide will be amended as appropriate for City of Mesa conditions that may differ. This comprehensive guideline then will help with designs that balance the needs of all users of the transportation network. The design guidelines will consider street and intersection design, retrofitting existing roadways, accommodating people with disabilities, pedestrian access and crossings, transit accommodations, bikeway design and bicycle facilities, street furnishings, sidewalks and pedestrian walkways, striping, streetscapes and streetscape ecosystems, lighting, and landscaping and the placement of trees that create street canopies. The guidelines will also consider traffic calming measures, connectivity between adjacent land uses, street networks, classifications and contexts, the interaction among different travel modes, and Context Sensitive Design as it pertains to Complete Streets.

Development of Performance Measures

As Complete Streets corridors develop throughout Mesa, they should be evaluated to determine how well they serve users of the transportation network. Performance measures will be developed to determine the overall effectiveness and success of Complete Streets improvements.

Complete Streets Performance Review



Conducting a periodic review of Complete Streets will assist in evaluating the ongoing effectiveness of policies, recommendations, project development, design guidelines and planning activities. The review will help determine what changes are needed to ensure the planning process is relevant and continues to meet the needs of the City.

2.1.5 CITY OF MESA COMPLETE STREETS PLAN FOR ARTERIAL ROADWAYS

An additional use of the Urban Streets Design Guide will be to analyze and apply the MAG contexts to City of Mesa streets as appropriate. Over the years, the City of Mesa has provided facilities for bicycles and pedestrians on the majority of arterials, and has provided bicycle and pedestrian facilities on collector roadways, and in some cases, local roadways. Also, the City has worked with developers to provide bus pullouts for future shelters in numerous locations along designated future routes that have been identified in the Regional Transit Plan (RTP). As a result of these improvements, many existing roadways already include aspects or elements of Complete Streets. Mesa Standard Details for roadway design include bicycle, pedestrian and transit facilities. The eventual adoption of the NACTO *Urban Streets Design Guide* as customized for Mesa will help staff and developers collectively determine the types of improvements that are needed to effectively develop Complete Streets that will accommodate all modes of travel in a safe, comfortable, accessible and efficient manner.

2.2.0 Roadway Element

The arterial street system forms the backbone of the City's multi-modal transportation system. As illustrated in the Complete Streets element, a street is more than curb, gutter, and pavement built to serve the private automobile. The street right of way is often shared by several different transportation modes including automobiles, trucks, buses, bicycles and pedestrians. Improvements to the street system must balance the needs of all modes. The street system provides access to activity centers, supports new development, and provides for recreational travel. While widening streets adds capacity to the system, it cannot eliminate congestion. The modern street system provides a combination of integrated components that can work together to manage congestion.

Also, as discussed in the Complete Streets element, a street is a fundamental part of what makes up a neighborhood's culture. Streets can simply act as a conduit for vehicles in some contexts, or take on aspects of the surrounding place in others. The street cross-section includes the sidewalk and store frontage areas of the road edge as well. How this zone is developed impacts the feel of a community greatly. Therefore, the plan for future improvements of Mesa roadways must take the context of the adjacent area, and the prime use of the road, into consideration. Conversely, land development proposals must be integrated with the street.

The City's arterial street system has generally developed from west to east. The street system west of Gilbert Road is typically constrained by limited right of way and minimal building setbacks. It is much more difficult to accommodate street widening improvements in this area. There are more opportunities to widen streets, where needed, east of Gilbert Road. Most new street construction is done by developers as part of their projects where improvements are required along the project frontage. These development requirements are outlined in City Code. In remaining undeveloped areas, standard arterial right of way should be obtained.

The improvement of the street system will continue to be a priority. As streets are improved and new streets are built, the principles of the Complete Streets element must be considered. Cross sections will include provisions for bicycles. Bus pullouts will be provided at major intersections, layover points, and other high activity locations. Additional landscaping will be

provided to enhance the pedestrian environment and to create an aesthetically pleasing street system. Easy intermodal transfer will be incorporated at activity centers.

Maintaining the integrity of the City's street system is vitally important. Street maintenance cannot be overlooked when establishing street system funding priorities and, in fact, it may be more important to fund the maintenance and operation of the current system before additional new miles are constructed via City projects.

The remainder of this chapter describes the basis for the recommended improvements, defines each type of improvement, presents a functional class map and median location map, and shows the preferred street system.

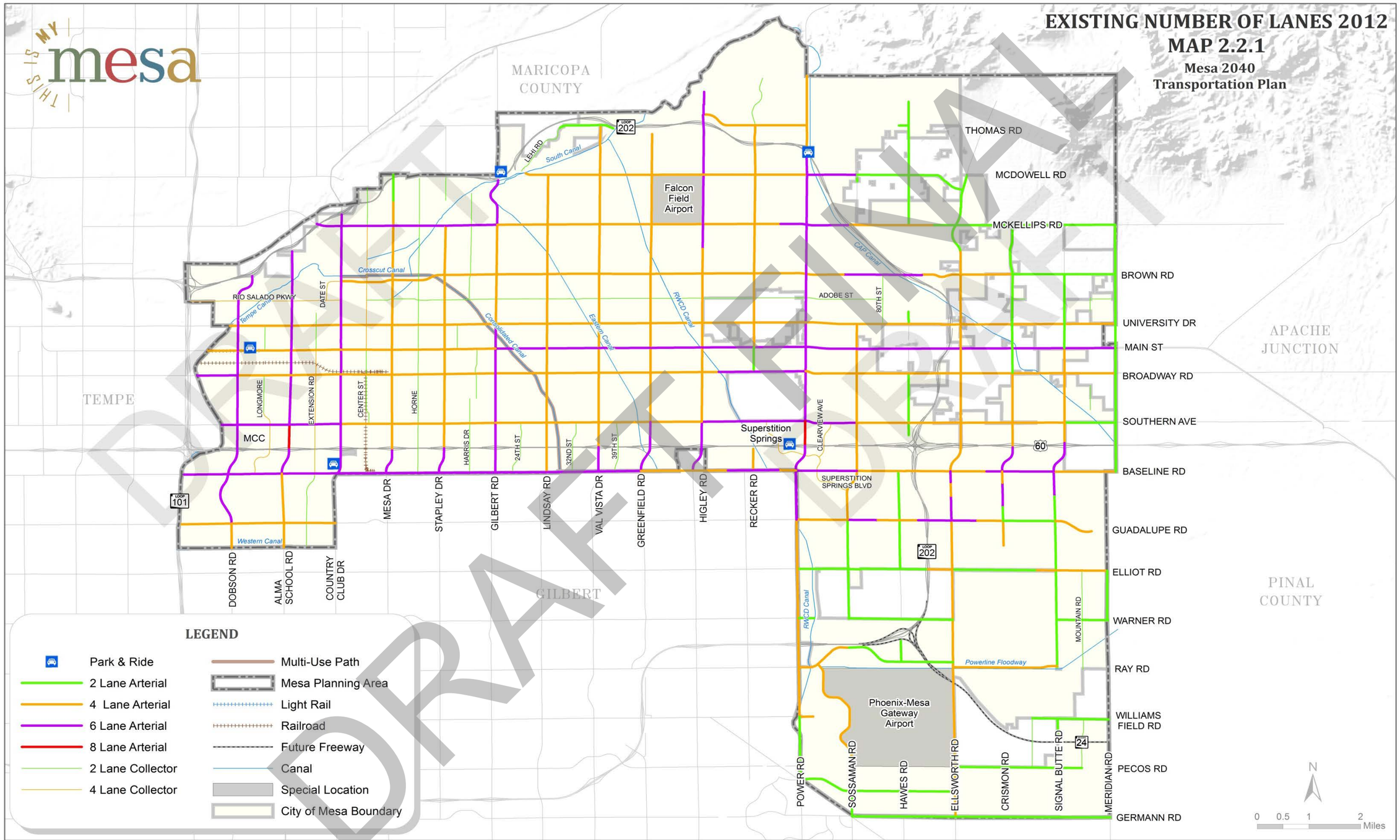
2.2.1 Existing Roadway System

The City of Mesa has a street system comprised of section line and mid-section line streets that form a grid network that is the backbone of the transportation system. As mentioned throughout this plan, the grid system provides convenient square-mile units when considering design options. The square-mile area enclosed by arterial section lines should be taken as a whole whenever improvements are being made to a part.

The network includes streets that have two, four, six or eight through lanes, a striped center two-way left turn lane, or raised medians, and various configurations at the major intersections. A four-lane street with a middle turn lane can be considered a five-lane street, while a six-lane street with a middle turn lane can be called a seven-lane street. Map 2.2.1 is simplified to show the existing number of through lanes without considering middle turn lanes. The majority of the existing collector and arterial streets have four or six through lanes. Table 2.2.1 shows the numbers of centerline miles of various street configurations by functional class existing within City of Mesa jurisdictional boundaries. Functional class will be discussed later in this chapter. Local neighborhood streets are mostly two-lane roads and have not been included on Map 2.2.1 for clarity.

Functional Class	No. of Lanes	Total Length (mi.)
Collector	4	8.4
Collector	5	10.3
Arterial	4	27.1
Arterial	5	95.0
Arterial	6	53.2
Arterial	7	16.2
Arterial	8	1.0

Table 2.2.1 – Centerline Miles of Existing Street by Functional Class and Number of Lanes


EXISTING NUMBER OF LANES 2012
MAP 2.2.1
Mesa 2040
Transportation Plan
MARICOPA COUNTY
PINAL COUNTY
TEMPE
MESA
GILBERT
APACHE JUNCTION
Falcon Field Airport
Superstition Springs
Phoenix-Mesa Gateway Airport
MCC
LOOP 202
LOOP 101
60
24
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
RIO SALADO PKWY
ADOBE ST
80TH ST
SUPERSTITION SPRINGS BLVD
DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
MESA DR
STAPLEY DR
GILBERT RD
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
MOUNTAIN RD
LEHI RD
DATE ST
LONGMORE
EXTENSION RD
CENTER ST
HORNE
HARRIS DR
24TH ST
32ND ST
39TH ST
CLEARVIEW AVE
South Canal
Crosscut Canal
Tempe Canal
Consolidated Canal
Eastern Canal
RWCD Canal
CAP Canal
Western Canal
Powerline Floodway
LEGEND
Park & Ride
2 Lane Arterial
4 Lane Arterial
6 Lane Arterial
8 Lane Arterial
2 Lane Collector
4 Lane Collector
Multi-Use Path
Mesa Planning Area
Light Rail
Railroad
Future Freeway
Canal
Special Location
City of Mesa Boundary
N
0 0.5 1 2
Miles
DRAFT
DRAFT

The Mesa 2025 Transportation Plan was adopted in June 2002. Since that time considerable improvements have been made to the roadway network of the City of Mesa. A general summary of some of those improvements are listed below.

- The Arizona Department of Transportation (ADOT) completed work on the freeway segments looping the City of Mesa. This consisted of continuing the L202 Red Mountain freeway from Gilbert Road around the north and east sides of the City to the US 60 freeway. The L202 freeway was then continued south of the US 60 with a different name - The Santan freeway. The L202 Santan freeway extends from US 60 through the eastern and southern portions of the City finally reaching Power Road between Warner Road and Ray Road. The L202 Santan freeway continues to the west through the Town of Gilbert. With these completions, along with the L101 Price freeway on the west, the City of Mesa has a convenient loop of efficient, high speed roadways around the City.

- The development of these freeways required improvements on a number of the arterial cross-streets to support the added traffic volumes accessing the freeways. Therefore, lanes were added at the interchanges at Higley Road, Recker Road, McDowell Road, McKellips Road, Brown Road and Guadalupe Road. In many cases developers continued the widening with their projects adjacent to the interchange.

- Roads near the new freeway segments were also widened to create an efficient system surrounding the traffic interchanges. Thomas Road and McDowell Road were improved between Higley and Recker Roads, Power and Ellsworth Roads were improved at Brown Road, and portions of Guadalupe Road were improved east and west of the Santan freeway access.

- ADOT also widened much of the US 60 through the City of Mesa. Therefore, again cross-streets were improved at the US 60 interchange locations. These roads included Val Vista Drive, Greenfield Road, Crismon Road and Signal Butte Road. In many cases, there is also considerable commercial development in these areas next to freeways. Again, these developments continued the interchange roadway widening improvements across their projects. So, these road improvements also have helped with access to popular shopping destinations.

- Finally, the southeast area of the City has boomed as a major economic engine since the last Transportation Plan was adopted. Much of this is due to the expansion of commercial air services at Phoenix Mesa Gateway Airport (PMGA), formerly Williams Gateway Airport, as well as expansion of the Arizona State Polytechnic campus next to the airport and large scale master planned communities east of Ellsworth Road at the former General Motors Desert Proving Grounds. All of this development demands an efficient roadway system. Therefore, Ray Road and Pecos Road were built north and south of the airport between Power and Ellsworth Roads. The master-planned community called Eastmark worked with the City to improve Elliot and Signal Butte Roads adjacent to the community, in addition to building Ray Road between Ellsworth Road and Signal Butte Road. The Maricopa County Department of Transportation (MCDOT) was the lead agency for widening Ellsworth Road from Guadalupe Road to Germann Road. This widening was done largely to City of Mesa standards allowing the road to be

annexed by the City upon completion of construction.

It is apparent that much of Mesa's street system improvements were driven by the construction of the freeway system by ADOT and the economic development in the southeast area. Several intersections were also improved during this time and these will be discussed later. Additionally, there are several projects underway at the time of this writing that will also be discussed with the future roadway analysis.

Traffic

This section includes a review of existing traffic including travel time data, traffic volumes, and Level of Service.

Travel Time

In the fall of 2006, the City of Mesa began performing semi-annual travel time studies. The decision to perform travel time studies was a result of a performance measurement program initiated by the City of Mesa. The specific goal was to keep the rate of travel time increases below the growth rate of traffic volumes.

Over time, the performance measures reported in the City of Mesa's performance measurement program have changed. However, the data collected and summarized in these travel time studies have been sufficient for the reporting of the varying measures.

At this time, two performance measures are being reported:

1. Average speed of travel in the PM peak hours,
2. Percent change in the average PM travel time compared to the percent change in daily traffic volumes.

Twenty major arterial streets are included in the travel time study program. Two of these arterials, University Drive and Greenfield Road, are studied every fall and used as control corridors. The other 18 arterials are studied once every three years. The studies are conducted twice per year: once in the spring, and once in the fall.

Starting in the spring 2011, only PM peak travel time studies were performed. AM peak and Off peak travel time studies are no longer performed since the data collected for these time periods has been of little interest and the manpower to conduct these studies has been substantial. Since the PM peak is the most congested period of the day, travel conditions during this time period are an adequate measure of quality, efficiency and effectiveness.

Since the beginning of the travel time studies in the fall of 2006 up to the spring of 2013, the average PM travel speeds vary from study to study. The average speeds vary from a low of 29 mph to a high of 34.4 mph. This can be attributed to the performance of the different arterials studied during each overall study, as well as the error deemed

tolerable in the data collection (3 mph, 95% of the time).

Table 2.2.2, below, shows the average PM travel speeds for all studies from 2006 to 2013.

Table 2.2.2 - Average Travel Speed (PM Peak)

Study	Study Period	Study Direction	Average Travel Speed (mph)*
Spring 2013	PM Peak	Both (for each arterial)	33.7
Fall 2012	PM Peak	Both (for each arterial)	31.8
Spring 2012	PM Peak	Both (for each arterial)	31.1
Fall 2011	PM Peak	Both (for each arterial)	32.8
Spring 2011	PM Peak	Both (for each arterial)	29
Fall 2010	PM Peak	Both (for each arterial)	33.2
Spring 2010	PM Peak	Both (for each arterial)	34.4
Fall 2009	PM Peak	Both (for each arterial)	31.7
Spring 2009	PM Peak	Both (for each arterial)	31.3
Fall 2008	PM Peak	Both (for each arterial)	33.8
Spring 2008	PM Peak	Both (for each arterial)	29.1
Fall 2007	PM Peak	Both (for each arterial)	30.1
Spring 2007	PM Peak	Both (for each arterial)	33.6
Fall 2006	PM Peak	Both (for each arterial)	32.8

**Sum of all travel times, divided by total corridors lengths.*

The travel time study schedule allows all arterials to be studied every three years, and the control corridors of University Drive and Greenfield Road to be studied every year. University Drive and Greenfield Road were chosen because of their central locations.

Besides increasing the capacity of the roadways in Mesa through constructing new roadways and widening existing roadways, travel times can be affected by making adjustments to traffic signal timing in response to evolving traffic patterns and volumes, and by reducing demand by promoting alternative modes of transportation.

In addition to providing data for the City's performance measurement program, the semi-annual travel time studies allow Staff to:

- compare current traffic conditions to those of the past,
- Identify congested areas, and make adjustments to traffic signal timings as necessary, and
- Identify congested areas, which will provide decision makers with information that can be used to decide where to spend money intended for roadway improvements.

Traffic Volumes

Traffic volumes are typically described in two different forms. One is a 24-hour volume or daily volume and the other is a peak hour turning movement and is usually identified as the AM or PM peak hour. Daily volumes are obtained on road segments and can either be by direction or the total of both directions. Turning movements are intersection volumes that detail the number of left turns, through, and right turns on each approach. Both types of traffic volumes are summarized in the following sections.

Daily Traffic

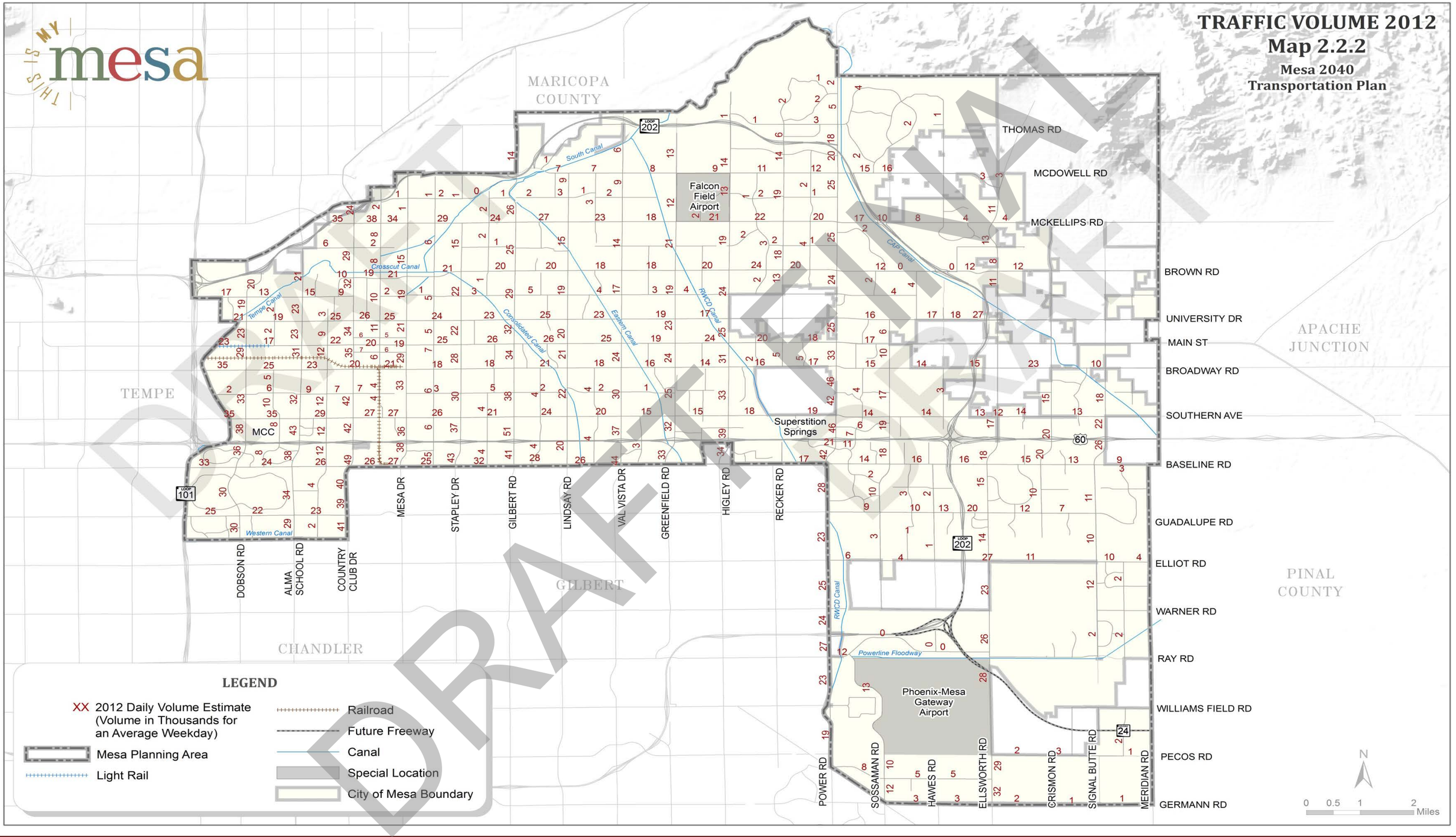
The City of Mesa Transportation Division maintains a very comprehensive traffic counting program on its major streets. Daily traffic counts are conducted on half of the streets every year, which means that each street segment is counted once every two years. The 24-hour volumes are published in map form annually by the Transportation Division. Detailed 15-min count data is also available through an interactive map available on the Transportation website. The "2013 Traffic Volume Map" actually represents 2011 and 2012 traffic data. The existing daily traffic is shown in Map 2.2.2. Those locations with daily traffic volumes in excess of 40,000 vehicles per day are summarized in Table 2.2.3. Daily volumes are an indication of demand on road segments and can be used to gauge the number of through lanes needed on a given street segment.

Note that the highest traffic volumes are found on north-south streets. Volumes on the majority of street sections in the City of Mesa have gone down since the Mesa 2025 Transportation Plan was written in 2002, while those sections that did have an increase in volume are largely located in the northeast portion of the City, or adjacent to a freeway interchange. This may be due to various reasons such as the use of transit, redistribution of traffic, or the economic recession. Additionally, the new freeway sections can be attracting more trips, thereby diverting
surface street volumes.

Street	Limits	Volume Range (Veh/Day)
Alma School Road	Southern Avenue to US60	43,400
Country Club Drive	Broadway Road to Baseline Road	41,600 – 48,800
Stapley Drive	US60 to Baseline Road	43,300
Gilbert Road	Southern Avenue to Baseline Road	41,500 – 51,100
Val Vista Drive	US60 to Baseline Road	44,100
Power Road	Broadway Road to Baseline Road	41,800 – 45,600

Table 2.2.3 Highest Traffic Volumes

MESA 2040 Transportation Plan



Turning Movement Volumes

Intersection turning movement volumes were obtained from the Maricopa Association of Governments (MAG). It is commonly accepted that intersections are the constraint point in a street system and are often analyzed to document current operations as well as potential improvements. An hourly volume of 800 vehicles per through lane is considered the capacity for a major intersection. A left turn volume of 250-300 vehicles per hour is a practical limit for a single left turn. A right turn volume of 150-200 vehicles per hour indicates the need for a separate right turn lane.

Level of Service

Level of Service (LOS) is a term used to describe traffic operations. Level of Service can be calculated for the various elements of a street system including road segments, signalized intersections, and unsignalized intersections. The various levels of service, which range from A to F+, are generally defined as follows:

- Level of Service A represents free flow.
- Level of Service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable.
- Level of Service C is in the range of stable flow, but marks the beginning of the range in which the operation of individual users becomes significantly affected by others.
- Level of Service D represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience.
- Level of Service E represents operating conditions at or near the capacity level. All speeds are reduced to a low but relatively uniform value. LOS E is unstable and can quickly deteriorate to LOS F.
- Level of Service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point.
- Level of Service F+ is far over capacity with unacceptable congestion.

The Level of Service analysis was performed by MAG as part of the travel demand modeling process. According to MAG, the arterial intersection Level of Service is a function of the critical flows at each intersection. The critical flow, however, is a function of the total flows in the intersection and some physical characteristics of the intersection, such as the number of legs in the intersection and number of lanes in each leg. Therefore, an intersection's total critical flow is the sum of the maximum critical flow in each pair of approaching legs, and the critical flows in each leg are proportional to its total hourly flow and its number of lanes.

The capacity criteria, in terms of the volume/capacity ratio, are presented in Table 2.2.4.

Level of Service (LOS)	Volume/Capacity (V/C)
A	less than 0.40
B	0.40-0.58
C	0.58-0.80
D	0.80-0.90
E	0.90-1.00
F	Over 1.00
**Source: Maricopa Association of Governments*	

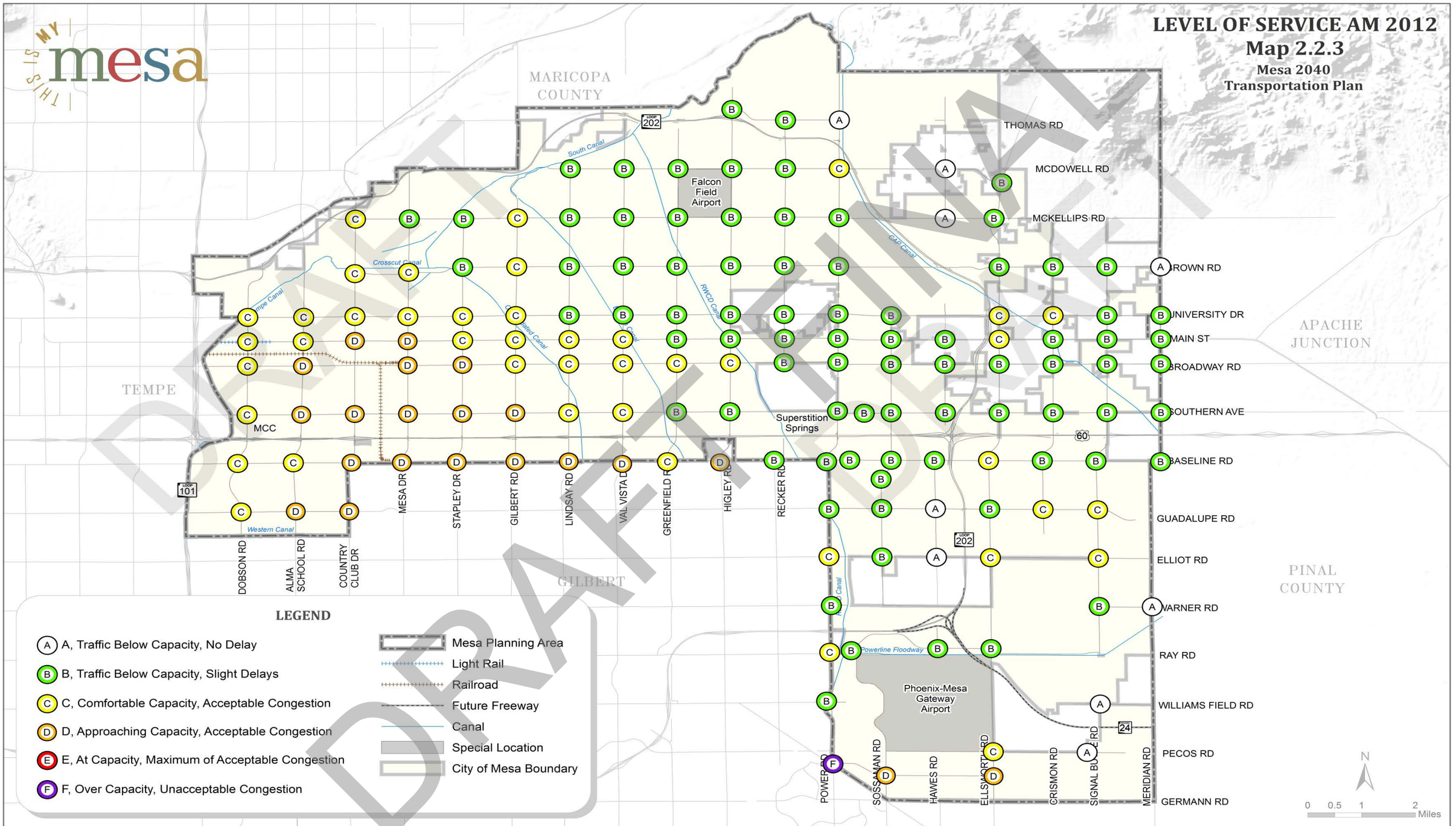
Table 2.2.4 Capacity Criteria For Signalized Intersections

Table 2.2.5 presents a summary of the number of study intersections currently operating at each Level of Service.

	AM PEAK		PM PEAK	
Level of Service	Number of Intersections	Percent	Number of Intersections	Percent
A	9	6	10	7
B	76	53	66	46
C	39	27	43	30
D	19	14	24	17
E	0	0	0	0
F	0	0	0	0

Table 2.2.5 2012 Intersection Level of Service Summary

The AM and PM peak levels of service for the major signalized intersections are shown in Maps 2.2.3 and 2.2.4.


LEVEL OF SERVICE AM 2012
Map 2.2.3
Mesa 2040
Transportation Plan
MARICOPA COUNTY
TEMPE
APACHE JUNCTION
GILBERT
PINAL COUNTY
Falcon Field Airport
Superstition Springs
Phoenix-Mesa Gateway Airport
MCC
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
MESA DR
STAPLEY DR
GILBERT RD
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
South Canal
Crosscut Canal
Western Canal
Consolidated Canal
RWCD Canal
CAP Canal
Powerline Floodway
LOOP 101
LOOP 202
60
24
LEGEND
A, Traffic Below Capacity, No Delay
B, Traffic Below Capacity, Slight Delays
C, Comfortable Capacity, Acceptable Congestion
D, Approaching Capacity, Acceptable Congestion
E, At Capacity, Maximum of Acceptable Congestion
F, Over Capacity, Unacceptable Congestion
Mesa Planning Area
Light Rail
Railroad
Future Freeway
Canal
Special Location
City of Mesa Boundary
N
0 0.5 1 2
Miles
DRAFT
FINAL

LEVEL OF SERVICE PM 2012
Map 2.2.4
Mesa 2040 Transportation Plan

MARICOPA COUNTY
TEMPE
GILBERT
APACHE JUNCTION
PINAL COUNTY
Falcon Field Airport
Superstition Springs
Phoenix-Mesa Gateway Airport
MCC
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
MESA DR
STAPLEY DR
GILBERT RD
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
South Canal
Crosscut Canal
Tempe Canal
Consolidated Canal
Eastern Canal
RWCD Canal
CAP Canal
Western Canal
Powerline Floodway
LOOP 202
LOOP 101
60
24

LEGEND

- A, Traffic Below Capacity, No Delay
- B, Traffic Below Capacity, Slight Delays
- C, Comfortable Capacity, Acceptable Congestion
- D, Approaching Capacity, Acceptable Congestion
- E, At Capacity, Maximum of Acceptable Congestion
- F, Over Capacity, Unacceptable Congestion

- Mesa Planning Area
- Light Rail
- Railroad
- Future Freeway
- Canal
- Special Location
- City of Mesa Boundary

N

0 0.5 1 2 Miles

2.2.2 Future Conditions

A primary function of this plan, and particularly the roadway element, is to serve as a guide for proposing future improvements. The future recommended circulation plan is developed from several considerations:

1) **Ongoing street improvements that were not shown on the 2012 street map and were not included in the MAG analysis. These ongoing projects will be summarized below and shown as future improvements.**

2) **Operational needs determined through MAG travel demand forecasts and operational analysis of future conditions.**

3) **Operational needs determined by the City of Mesa including improvements to address safety issues.**

4) **Closing gaps within the network. This includes connectivity between activity centers, transit corridors, freeways and possible mode transfer points.**

5) **Complete Streets concepts – keeping improvements context sensitive and balanced.**

Once the future recommendations are outlined, Transportation can then propose specific projects to include in the City's Capital Improvement Plan (CIP), or apply for regional or federal funds. A project is then developed using City of Mesa standards and specifications, along with MAG, ADOT and other regional and national guidelines. As mentioned elsewhere in this plan, it is the intent of Transportation to develop a comprehensive Urban Complete Street Design Guide once the 2040 Transportation Plan is adopted. The design guide, based on national models now in use, can help to fulfill the goals and objectives of this plan by presenting a balanced, multi-modal, community-based method for project development.

Current Ongoing Improvements

These following projects were incomplete and not included in MAG's 2012 model analysis. They are either now completed, or scheduled for completion in the coming years. Therefore, they will be a true part of the 2040 roadway network and are shown on the recommended future circulation plan.

Southern Avenue – Dobson Road to Alma School Road: This portion of Southern Avenue is part of a streetscape improvement project for the Fiesta District. Southern Avenue is being reduced from its current six-lanes to four-lanes.

Main Street – Country Club Drive to Mesa Drive: Main Street is being reduced from its current four-lanes to two-lanes as part of the extension of Light Rail through downtown Mesa.

Mesa Drive – US 60 to Southern Avenue: This segment of Mesa Drive was widened from two southbound lanes to three southbound lanes as part of an intersection widening project at Mesa Drive and Southern Avenue. It should be noted the public approved a streets bond that includes continuing these improvements north to Main Street with intersection improvements at Broadway Road.

Lehi Road – McDowell Road to Val Vista Drive: Lehi Road was improved from a two-lane County road to a two-lane City of Mesa collector. These improvements were made as part of the Lehi Crossing residential development.

Power Road – L202 Santan Freeway to Pecos Road: A project was recently completed widening this portion of Power Road from two and four-lanes to

six-lanes. Three jurisdictions share parts of this road – Mesa, the Town of Gilbert and Maricopa County. However, the portion of Power Road north of Williams Field Road will be annexed by the City of Mesa, and the southern section by the Town of Gilbert.

State Route 24 – Loop 202 Red Mountain Freeway to Ellsworth Road: ADOT recently completed the first segment of the SR 24 freeway. This section of freeway has an interchange with the Loop 202 freeway and travels southeast to Ellsworth Road where there is a traffic interchange. ADOT plans to extend this to the east in the future.

McDowell Road, Ellsworth Road and McKellips Road: These roads have all been improved as part of adjacent developments. McKellips Road and Ellsworth Road were widened from two-lanes to four-lanes as part of the Mountain Bridge development, while McDowell Road was widened from two-lanes to four-lanes as part of the (Trovita Estates) development.

Ray Road – Ellsworth Road to Signal Butte Road: This road was built as part of the Eastmark Development and will eventually be six-lanes.

Signal Butte Road – Elliot Road to Ray Road: The Eastmark Development is improving the west side of Signal Butte Road as it grows eventually creating a six-lane road in this segment.

Signal Butte Road – Elliot Road to Baseline Road: Signal Butte Road has scattered widening improvements along this segment, largely a result of adjacent development. These improvements were built to an eventual six-lane road. Therefore, the road will ultimately be a six-lane road here.

Elliot Road – Ellsworth Road to Signal Butte Road: A portion of this road at Signal Butte Road was improved from two-lanes to six-lanes as part of the Eastmark Development. The remainder of this segment will continue to be improved by Eastmark on the south and a City park on the north to an ultimate six-lane road.

MAG Travel Demand Analysis

As described above, the MAG travel demand model was used in determining Levels of Service for 2012 conditions. The MAG travel-forecasting model was also used to develop traffic forecasts for the year 2040. The model uses the socioeconomic forecasts and highway networks as described above. The population and employment that results from the land use plan included in the City of Mesa General Plan was used as the City's socioeconomic data. The transportation network included the regional freeway system and light rail extension. The resulting forecasts for 2040 are shown in Map 2.2.5. While these forecasts are described as 2040, they are more accurately defined as the traffic forecasts when the population reaches 717,071 and the employment reaches 291,636 for the Mesa planning area.

Similar to the existing conditions analysis, the MAG model was used to determine Levels of Service for build-out conditions. The model uses a base future network along with the future volumes to calculate the 2040 levels of service.

The resulting 2040 levels of service are shown on Maps 2.2.6 and 2.2.7.

TRAFFIC VOLUME 2040
Map 2.2.5
Mesa 2040 Transportation Plan

MARICOPA COUNTY

TEMPE

MESA

GILBERT

CHANDLER

APACHE JUNCTION

PINAL COUNTY

Falcon Field Airport

Superstition Springs

Phoenix-Mesa Gateway Airport

MCC

Loop 101

Loop 202

60

24

THOMAS RD

MCDOWELL RD

MCKELLIPS RD

BROWN RD

UNIVERSITY DR

MAIN ST

BROADWAY RD

SOUTHERN AVE

BASELINE RD

GUADALUPE RD

ELLIOT RD

WARNER RD

RAY RD

WILLIAMS FIELD RD

PECOS RD

GERMANN RD

DOBSON RD

ALMA SCHOOL RD

COUNTRY CLUB DR

MESA DR

STAPLEY DR

GILBERT RD

LINDSAY RD

VAL VISTA DR

GREENFIELD RD

HIGLEY RD

RECKER RD

POWER RD

SOSSAMAN RD

HAWES RD

ELLSWORTH RD

CRISMON RD

SIGNAL BUTTE RD

MERIDIAN RD

South Canal

Crosscut Canal

Tempe Canal

Consolidated Canal

Eastern Canal

RWCD Canal

CAP Canal

Western Canal

Powerline Floodway

LEGEND

XX 2040 Daily Volume Estimate (Volume in Thousands for an Average Weekday)

Mesa Planning Area

Light Rail

Railroad

Canal

Special Location

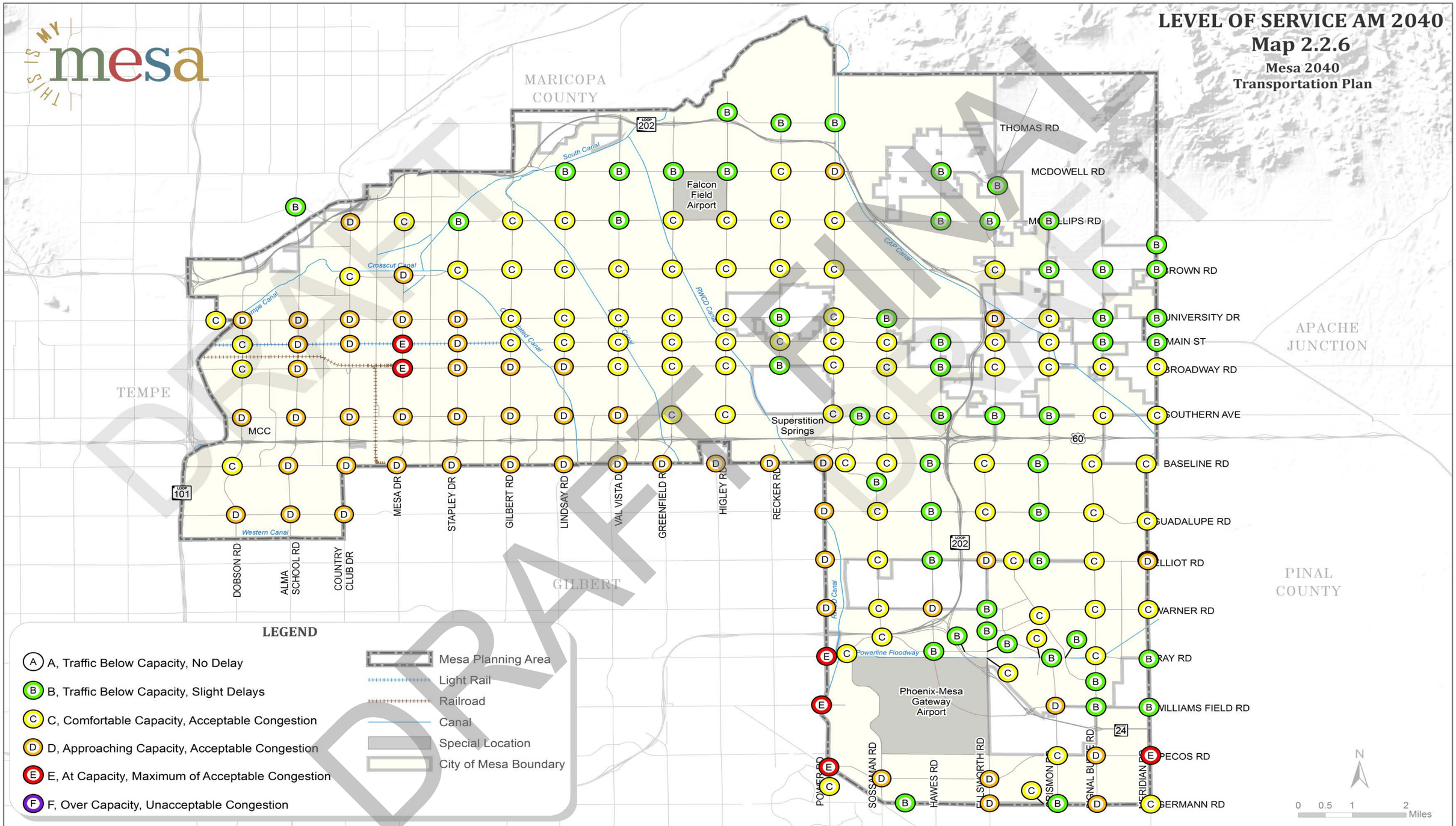
City of Mesa Boundary

N

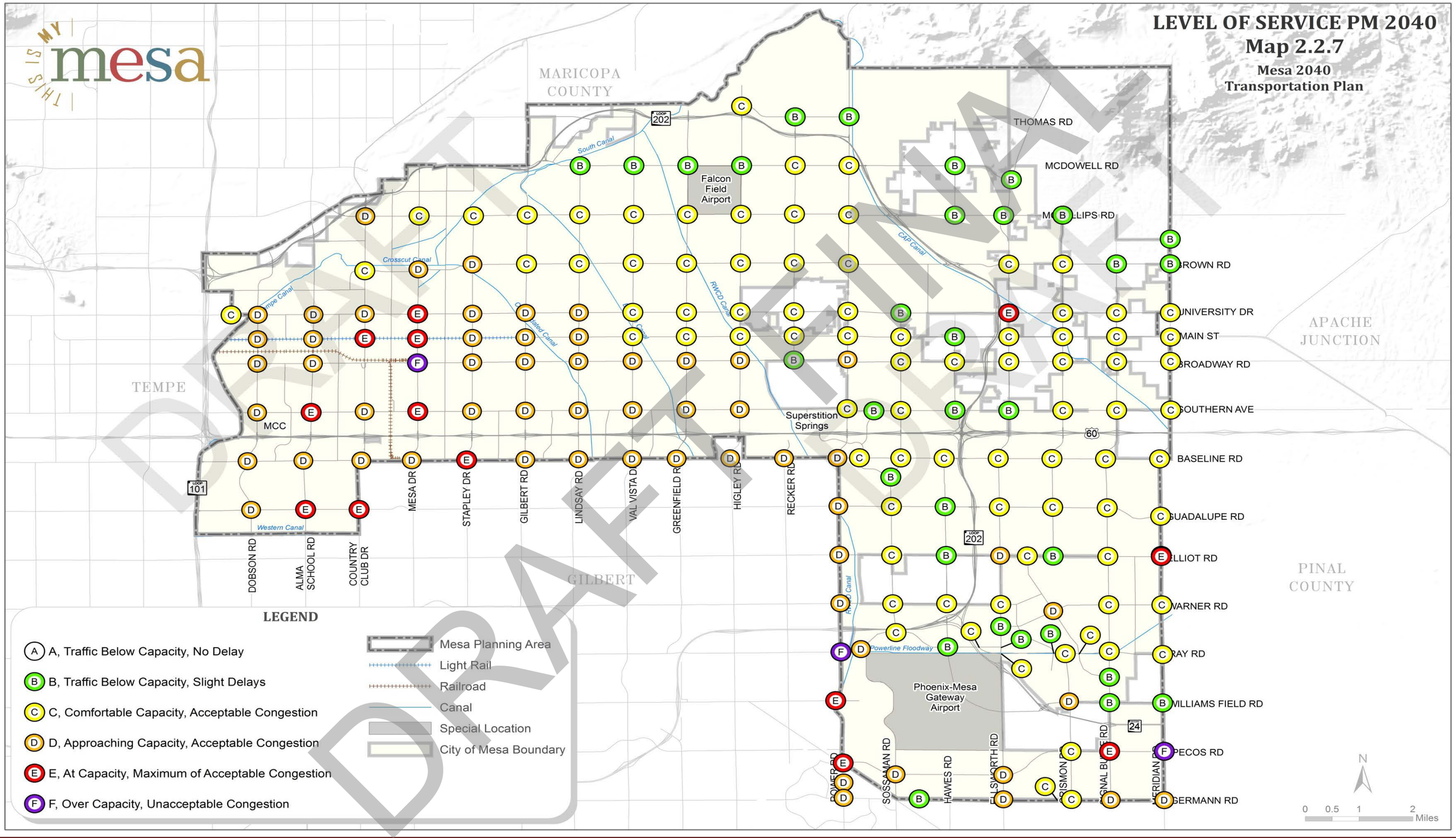
0 0.5 1 2 Miles

M:\Mesa Transportation Plan Update\GIS\Transportation Master Plan\2-2-5 Traffic Volume 2040.mxd 6/2/2014 3:00:50 PM MSowers

MESA 2040 Transportation Plan



LEVEL OF SERVICE PM 2040
Map 2.2.7
Mesa 2040 Transportation Plan



Many road segment volumes are forecast to increase beyond 40,000 ADT compared to their 2012 volumes. These segments are as follows:

- Dobson Road at both US 60 and L202 Red Mountain Freeway
- Broadway Road at the Mesa/ Tempe border
- McKellips Road at Country Club Drive
- Mesa Drive, Val Vista Drive and Higley Drive at US 60
- Elliot Road at L202 Santan Freeway
- Power Road from Warner Road to Pecos Road
- Ellsworth Road between Williams Field Road and Germann Road

These segments are in addition to those listed in Table 2.2.3 which all remained above 40,000 ADT.

Many of the future segments and intersections forecast to be at Levels of Service E and F correspond to these same segments that saw a significant increase in forecast volumes. These segments and intersections include the following:

- Dobson Road, Alma School Road and Higley Road at US 60
- Power Road between Warner Road and Williams Field Road
- Ellsworth Road between Pecos Road and Germann Road

The following road segments and intersections are also forecast to have LOS E or F for future conditions:

- Alma School Road at L202 Red Mountain Freeway
- Guadalupe Road between Alma School Road and Country Club Drive
- Country Club Drive from Baseline Road to Main Street
- Main Street from Country Club Drive to Mesa Drive
- Mesa Drive from Main Street to Broadway Road
- Greenfield Road at the US 60
- University Drive at L202 Red Mountain Freeway
- Sossaman Road at Germann Road
- Pecos Road at Signal Butte Road and at Meridian Road

Many of these locations are areas with existing relatively high volumes. Although these segments may not be forecast to have future ADT beyond 40,000, the calculations for the proposed future roadway conditions resulted in lower Levels of Service. It should be noted that the City of Mesa has generally shifted its philosophy regarding acceptable traffic conditions. In the past most roadway improvement decisions were largely based on Levels of Service. Those improvements that resulted in “better” calculated Levels of Service were favored in an effort to reduce congestion. However, recently the City is adopting the idea that some congestion in urbanized areas may be acceptable as a way to indicate “energy” in the area. So, as stated throughout this plan, street improvements need to be considered within context, as well as with consideration for all street users. Improvements that make conditions more comfortable for drivers could make conditions worse for bicyclists or pedestrians.

The southeast area of the City of Mesa continues to grow and evolve and will do so into the future. Both the Phoenix-Mesa Gateway Airport and the Eastmark development conducted extensive studies recently that included traffic forecasts. These two studies resulted in considerably higher future volumes for surrounding roads than the MAG model. These localized studies likely provide a better indication of future conditions.

Therefore, the MAG forecasts need to be tempered with the additional data from these other studies. Roadway characteristics in the southeast area of Mesa need specific analysis at the time of development in order to reflect the most current knowledge of the land use.

The following roads in particular need to be reviewed:

- Elliot Road from Power Road to Signal Butte Road
- Signal Butte Road from Elliot Road to Williams Field Road
- Williams Field Road from Ellsworth Road to Signal Butte Road
- Hawes Road from Elliot Road to Ray Road
- Ray Road from Hawes Road to Signal Butte Road
- Ellsworth Road from Elliot Road to Ray Road

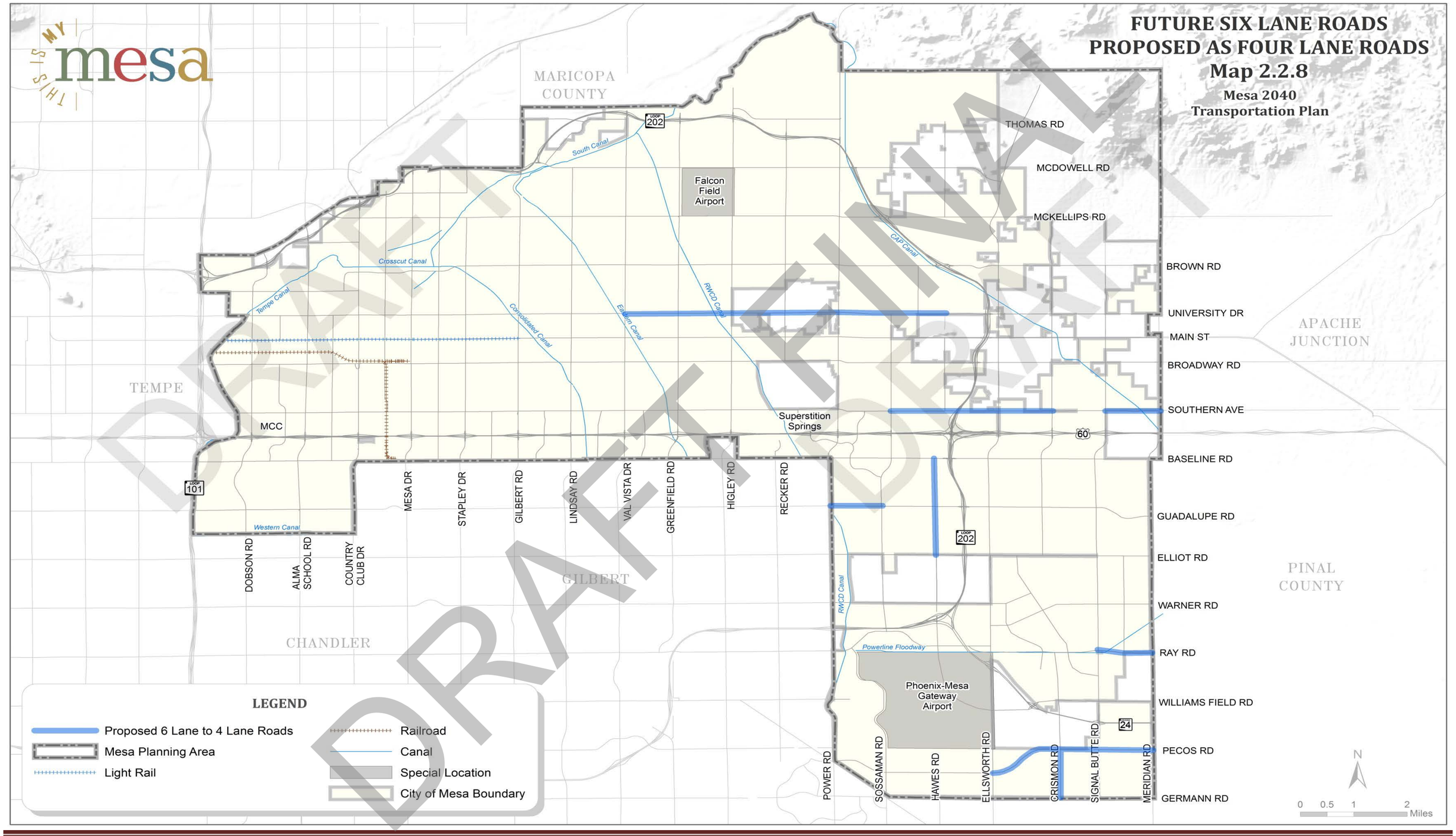
In many cases it is advantageous to have less lanes of traffic than more. More lanes result in more pavement to maintain and an increase in radiant surface heat. Most important though is the impact to pedestrians. More lanes create a wider crossing for pedestrians, which can be inhibiting to elderly and disabled individuals. Additionally, more crossing time impacts traffic signal cycles, thereby impacting vehicular signal time at a signalized intersection. On the other hand, future improvements must be able to accommodate development and this may mean building more travel lanes. Again, context and balance must be considered.

Therefore, Mesa Transportation staff looked at the results of future conditions from MAG and the smaller development studies, as well as surrounding community plans, to see if any proposed six-lane roads could be reduced to four lanes with minimal impacts. To do this, a set of simple criteria were established – six lane streets with ADT less than 40,000 ADT, one or no freeway traffic interchanges, and currently not built out to the six lane section. From these criteria the following roadway segments were determined to be candidates for four lane streets rather than the modeled six lane street:

- University Drive from Val Vista Drive to Hawes Road
- Southern Avenue from Sossaman Road to Meridian Road
- Hawes Road from Baseline Road to Elliot Road
- Ray Road from Signal Butte Road to Meridian Road
- Pecos Road from Ellsworth Road to Meridian Road
- Crismon Road from Pecos Road to Germann Road

These are shown on Map 2.2.8.

MESA 2040 Transportation Plan



As discussed above, the number of lanes on Ray Road, Pecos Road and Crismon Road need to be evaluated at the time of improvement and built according to the latest understanding of surrounding development.

Connections

An adequate web of infrastructure for all modes of travel is described throughout this plan. This chapter focuses on roadways as a whole, on a large scale. Therefore, although we begin with the roads as a travel way for motorized vehicle efficiency, a road can be advantageous to pedestrians and bicyclists in the right context. The roadways will be added to the choices bicyclists and pedestrians have to get to a place, especially the activity nodes listed below. If no convenient street is available for bicyclists or pedestrians, alternative off-street facilities need to be considered. On the other hand, if acceptable streets are available for bicyclists and pedestrians, then there may not be a need for additional facilities.

The purpose of this discussion is to determine roadway needs. These needs include balanced usability by all modes of travel per the given context. Future connectivity will be addressed in several perspectives:

1) Gaps in current roadway network
2) Access to Citywide activity nodes
3) Support of transit corridors
4) Neighborhood livability

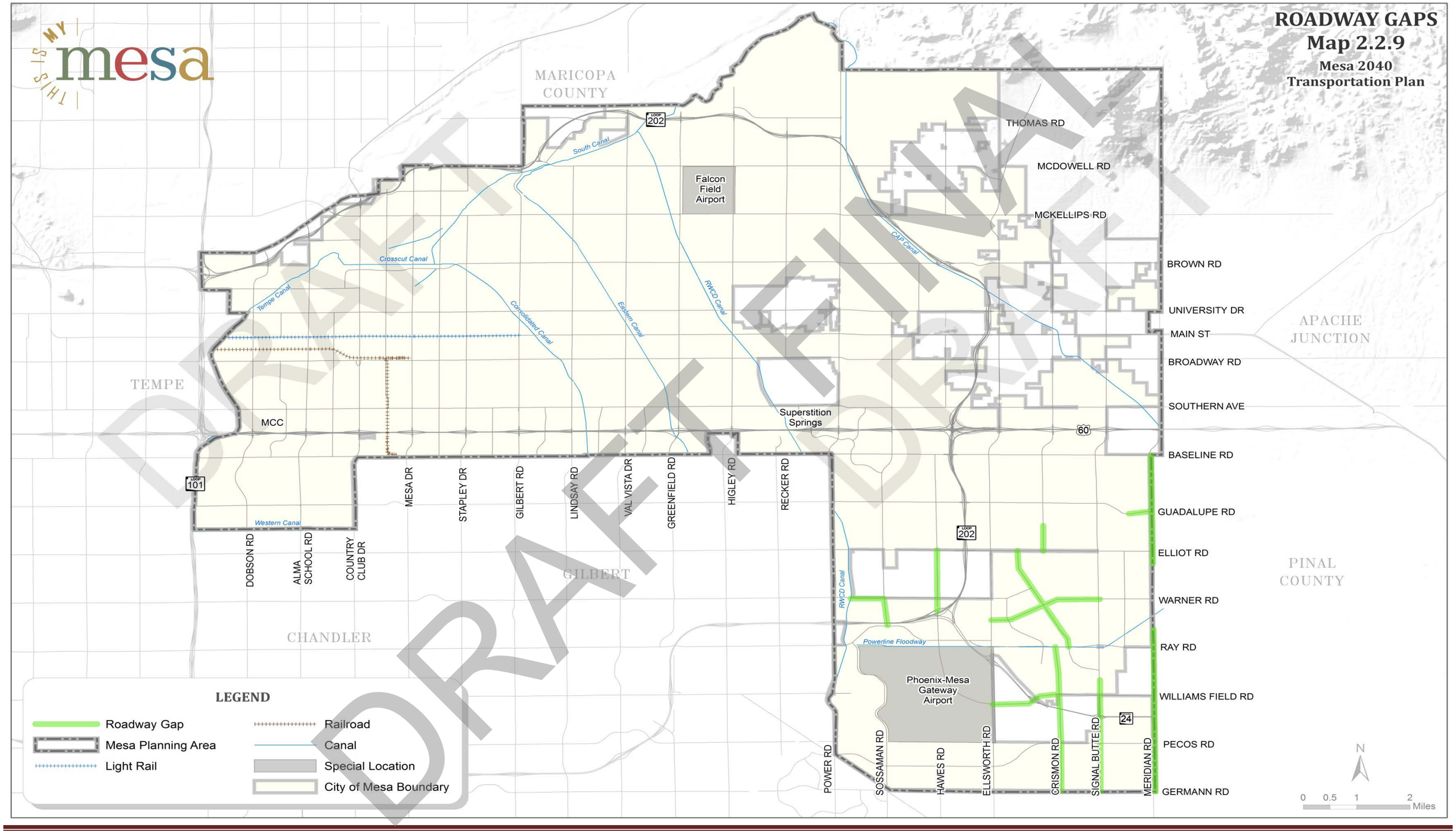
Gaps

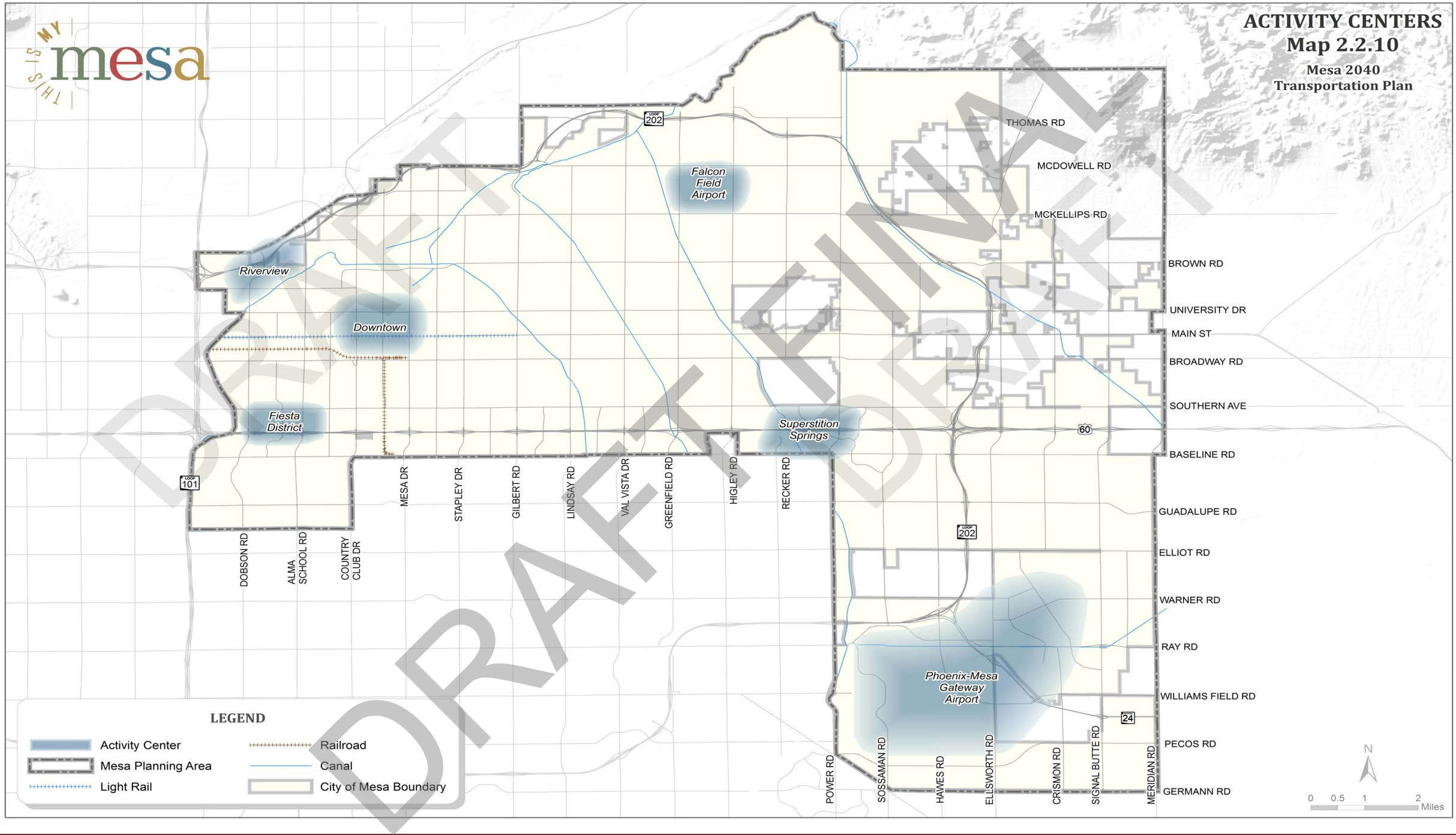
A handful of gaps in the existing City of Mesa roadway network must be connected in order to complete the network per the proposed future plan. These road segments are not funded for completion at the time of this writing.

The network gaps are as follows:

- Warner Road from east of Power Road to Sossaman Road
- Sossaman Road from Warner Road to Ray Road
- Hawes Road from Elliot Road to L202 Santan Freeway
- Guadalupe Road from Mountain Road to Meridian Road
- Meridian Road from Baseline Road to Paloma Avenue and from Knox Road to Germann Road
- Signal Butte Road from Galveston Road to Germann Road
- Crismon Road from Galveston Road to Germann Road and from Paloma Avenue to Elliot Road
- Williams Field Road from Ellsworth Road to Crismon Road

It should be noted that Warner Road and Crismon Road are proposed to be shifted off the mile grid within the Eastmark Development. Crismon Road is offset between Elliot Road and Ray Road and named Eastmark Parkway. Warner Road is offset between Signal Butte Road and Ellsworth Road and named Point Twenty-Two Boulevard. Both of these roads are planned to be built by the Eastmark Development in the coming years. The roadway gaps are shown on Map 2.2.9.


ROADWAY GAPS
Map 2.2.9
Mesa 2040
Transportation Plan
MARICOPA COUNTY
TEMPE
MCC
GILBERT
CHANDLER
APACHE JUNCTION
PINAL COUNTY
Superstition Springs
Falcon Field Airport
Phoenix-Mesa Gateway Airport
Loop 202
Loop 101
60
24
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
MESA DR
STAPLEY DR
GILBERT RD
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
South Canal
Crosscut Canal
Tempe Canal
Consolidated Canal
Eastern Canal
RWCD Canal
CAP Canal
Western Canal
Powerline Floodway
LEGEND
Roadway Gap
Mesa Planning Area
Light Rail
Railroad
Canal
Special Location
City of Mesa Boundary
N
0 0.5 1 2
Miles
DRAFT FINAL
DRAFT


ACTIVITY CENTERS
Map 2.2.10
Mesa 2040
Transportation Plan
THIS IS MY mesa
Riverview
Downtown
Fiesta District
Falcon Field Airport
Superstition Springs
Phoenix-Mesa Gateway Airport
LOOP 202
LOOP 101
60
24
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
MESA DR
STAPLEY DR
GILBERT RD
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
LEGEND
Activity Center
Mesa Planning Area
Light Rail
Railroad
Canal
City of Mesa Boundary
N
0 0.5 1 2
Miles
DRAFT
DRAFT FINAL

Activity Centers

As described in the goals and objectives of this plan, the focal points for the future transportation network should be activity centers. Based on the current updates to both the Mesa General Plan and Transit Plan, six distinctive places can be considered major activity nodes:

- Riverview
- Fiesta District
- Downtown
- Falcon Field Airport
- Superstition Springs
- Phoenix-Mesa Gateway Airport

These activity centers are shown on Map 2.2.10. Each of these nodes must serve balanced travel options such as driving, transit, bicycling and walking. Therefore, each activity center is examined below:

Riverview – The Riverview area is located on the east and west sides of Dobson Road between L202 Red Mountain Freeway and Rio Salado Parkway. This area consists of a shopping center on the east side, and car dealerships, a public park and the Wrigleyville training facility on the west side. This area is well served by the surrounding roads, including freeway access at Dobson Road and Alma School Road. Buses serve this area, including within the shopping area. Future shared use paths along the Salt River and from the east will help bicyclists and pedestrians access this area, along with bike lanes on the adjacent streets. It should be noted that the Sycamore Light Rail station is located about two miles south on Dobson Road, and the Fiesta District another two miles south at Southern Avenue. Therefore, Dobson Road can easily become a critical corridor to connect these three sites for all modes.

Fiesta District - The Fiesta District is adjacent to Southern Avenue generally from Extension Road on the east to the Mesa/ Tempe border on the west. The district is named after the Fiesta Shopping Mall located on the south side of Southern Avenue, west of Alma School Road. This district also includes Mesa Community College and Banner Desert Medical Center. Although there are many commercial developments within the district, many sites are derelict and unused. Therefore, the City of Mesa is providing economic development assistance by rebuilding Southern Avenue into a pedestrian friendly corridor. This rebuilding consists of reducing the lanes on Southern Avenue, building shared use paths along both sides of the street and adding aesthetic and landscaping improvements, including paseo nodes. This activity center is served by arterial and collector roads and has traffic interchanges with the US 60 freeway at Dobson Road and Alma School Road. Buses currently serve the area along Southern Avenue, and there are bike lanes and routes in the area. As mentioned with the Riverview Area, the Fiesta District is only two miles south of the Light Rail Transit station at Main Street. Therefore, more connections should be provided between the Fiesta District and the Light Rail stations, including future

stations in Downtown Mesa. Particularly, low stress options are required for bicyclists and pedestrians to travel between the west Mesa activity centers of Riverview, Fiesta and Downtown.

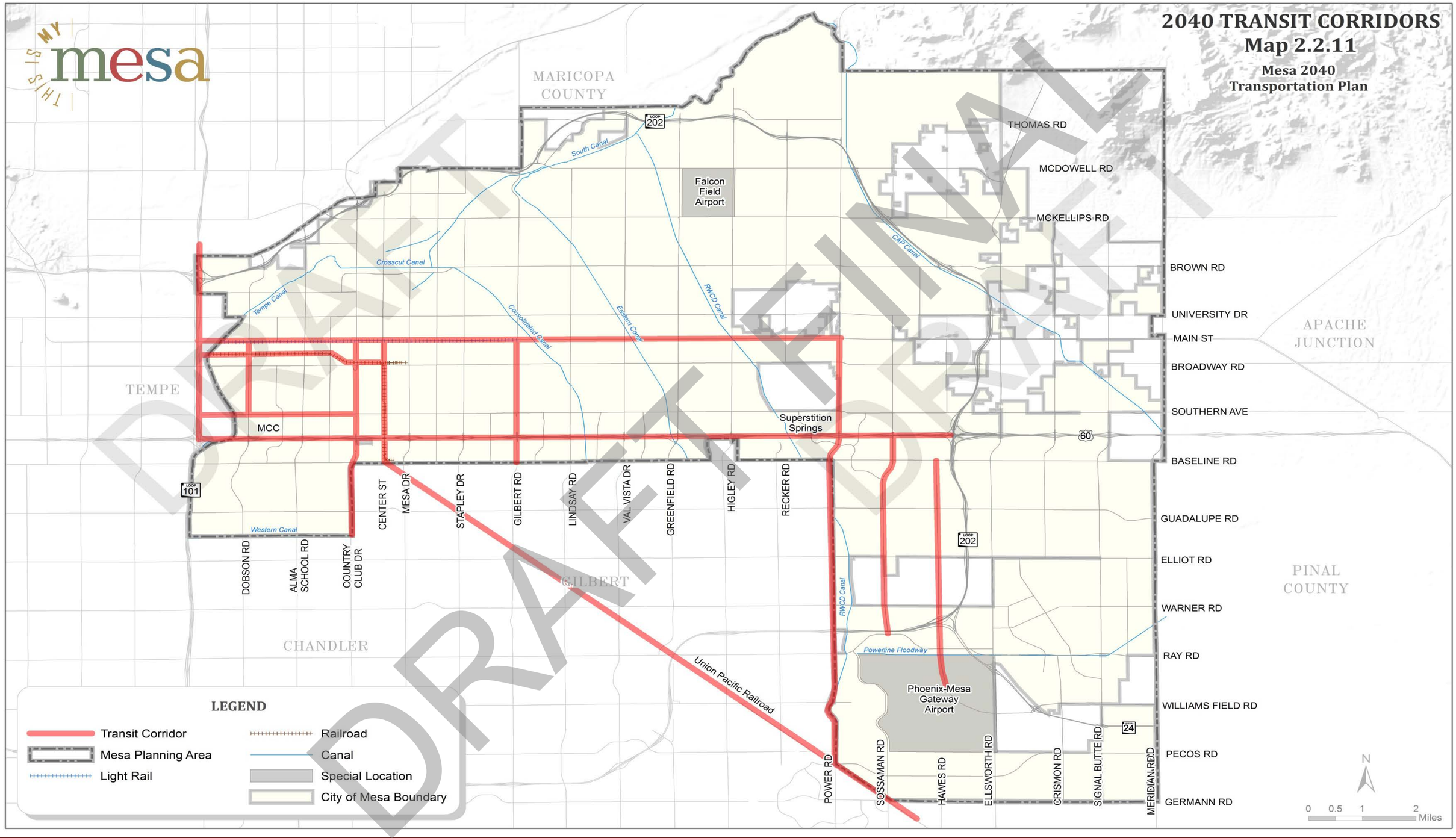
Downtown Mesa – Downtown is located in the original square mile settlement of the City. This square mile is bounded by University Drive on the north, Broadway Road on the south, Country Club Drive on the west, and Mesa Drive on the east. This square is bisected by the north-south collector Center Street, and the east-west arterial Main Street. The intersection of Center Street and Main Street is not only the physical center of Downtown, but in many ways the heart of Mesa. Mesa City Plaza (city hall) is located on the northeast corner and the grand Mesa Arts Center is on the southeast corner. Main Street west of Center Street is a traditional downtown neighborhood with small restaurants, boutiques and independent businesses. At the time of this writing the Light Rail Transit line is being extended east through Downtown Mesa. Therefore, there is adequate transit service with plenty of streets. Downtown is relatively walkable and there are options for bicyclists. However, although light rail can provide plenty of connectivity for Downtown, more usable connections along existing corridors for bicyclists and pedestrians can be provided to the Fiesta District and Riverview. The future West Mesa Connector shared use path will help to provide connections between Downtown and Riverview.

Falcon Field Airport – Falcon Field is a City owned airport described in the Airport Element. The airport is bounded by McDowell Road on the north, McKellips Road on the south, Greenfield Road on the west, and Higley Road on the east. This is the most isolated activity center, and it is not an activity center per se at this time. But this location serves well to be considered a central gathering place, especially for travel modes, for the northern portion of Mesa into the future. Transit service here is limited, but the updated Transit Plan shows some additional service proposed for the future. Both Greenfield Road and Higley Road have nearby traffic interchanges with the L202 Red Mountain Freeway to the north. These two roads also have interchanges with US 60 several miles to the south. The airport is largely surrounded by industrial and agricultural land uses. However, there is a large retail shopping center on the south side of McKellips Road across from the airport. Pedestrians, and especially bicyclists, can be better served for commuting options. There are several canals and half-mile collectors that may help to accomplish this. This activity node is largely connected to surrounding activity nodes by arterials and freeways. Building community open spaces and intermodal transfer stations should be encouraged with further development in this area.

Superstition Springs – Similar to the Fiesta District, Superstition Springs is a large shopping mall. This mall is located on the northwest corner of the US 60 and Power Road interchange. Additionally, the west side of the mall is bounded by Superstition Springs Boulevard, a major collector that also has a partial interchange with US 60. Finally, Southern Avenue runs along the north side of the mall. A considerable amount of commercial development has been built surrounding Superstition Springs Mall on both sides of US 60. Additionally, there is a transit center located at the mall that is accessed from the freeway ramps. Therefore, this activity center has plenty of roadway and transit access, including a Bus Rapid Transit (BRT) stop at the transit center. This BRT travels along Main Street to and from the Sycamore Light Rail station. The area surrounding the mall is predominately designed for motor vehicle use, so bicycle and pedestrian access is poor. Power Road is considered a corridor for future high-tech development due to sites along this corridor such as Banner Baywood Medical Center to the north and the ASU Polytechnic Campus to the south. Power Road and US 60 act as main connections to and from Superstition Springs. These corridors, or adjacent facilities, need to be enhanced to provide balanced options for bicyclists and pedestrians.

Phoenix-Mesa Gateway Airport – Phoenix-Mesa Gateway Airport (PMGA) is considered a large part of the economic future for the City of Mesa. The airport is described in the Airport Element. As an activity center the area also includes the ASU Polytechnic campus to the west, and the Eastmark development to the east. Forethought was given to provide adequate access to the airport in the future with the development of the L202 Santan Freeway to the north and the SR 24 offshoot to the east. These facilities will allow a wide range of airport users to access places throughout the valley. Along with the Northeast Area Development of the airport, Eastmark has made convenient bicycle and pedestrian access a priority. Since these areas are largely unbuilt, the City has the opportunity to develop balanced roadway networks. Closing the gaps at Hawes Road, Sossaman Road and Warner Road will not only help to distribute vehicular traffic, but also can be used by bicyclists and pedestrians to access the PMGA area. Additionally, the City plans to develop a shared use path along the L202 Santan Freeway alignment, again adding ways for bicyclists and pedestrians to get to the airport. There are also several canal and power line easements that can possibly be developed as shared-use paths in this area. The Transit Plan shows several options for long-range transit service to the airport and ASU as well. Therefore, this activity center has an opportunity to become a balanced transportation hub.

MESA 2040 Transportation Plan



Transit Corridors

The Mesa General Plan and Transit Plan updates identify future networks and overlay corridors that can provide higher transit services. These corridors include: Main Street, Dobson Road, Country Club Drive, Gilbert Road, Power Road, Southern Avenue, and several proposed corridors to serve PMGA. These transit corridors are shown on Map 2.2.11. Similar to the activity centers, the proposed future road network must support these corridors for use by the transit vehicles as well as other modes. Transit users typically travel to transit stops by bicycle or by foot. Therefore, these corridors and nearby areas need to be especially comfortable, usable and accessible by bicyclists and pedestrians.

Based on the General Plan update, Main Street is shown to have neighborhood village centers almost every mile from Downtown Mesa to Power Road. Additionally, the adjacent area along Main Street is predominantly residential. The future MAG traffic estimates along this portion of Main Street show 2040 volumes of 26,000 ADT or less. The existing street configuration is six lanes, which will likely provide more capacity than required for future conditions. Therefore, this segment of Main Street would be a good candidate not only as a transit corridor, but for a Complete Street as well. The center lanes can be converted to be used by transit, or as a shared-use path.

Dobson Road and Gilbert Road also will have a considerable number of transit users, as well as high levels of shopping and employment destinations, especially along the Dobson Road corridor. Dobson Road is currently being improved between Broadway Road and Main Street to add shared use paths to add connectivity to the Sycamore Light Rail station. Continuing this roadway configuration as a Complete Street along the entire Dobson Road corridor would help serve the Fiesta District, Light Rail and Riverview.

Country Club Drive, Southern Avenue and Power Road are forecast to have high traffic volumes and various commercial land uses. This environment will be uncomfortable and stressful for many non-motorized vehicle travelers. Therefore, these corridors will need to provide access for bicyclists and pedestrians in alternate parallel routes. These can be along canals, easements or half-mile collector streets.

With the exception of Falcon Field Airport, the proposed future transit network works well to connect the activity centers of the City.

Neighborhood Access

As stated in the Goals and Objectives of this plan, each square mile of the City of Mesa should be able to function as a complete unit. There should be transportation options and accessibility to adjacent destinations such as schools, shopping centers, churches and places of employment. Although much of this accessibility for bicyclists and pedestrians will take place by shared-use paths, on a neighborhood level the local street is just as important.

Arterials surrounding a square mile should be designed according to City standards, particularly the future Urban Complete Street Design Guide. However, internal streets will need to be designed with more attention paid to the specific neighborhood. Many of the square miles of Mesa are bisected by so-called “half-mile” or “mid-section” collectors. These collectors are critical in the square mile concept. They are the most complete street. These streets must be designed adequately for motorized vehicles to travel on them, but they also provide local street functions for many residents. These collectors provide a very convenient, direct path around the neighborhood with less traffic than that found on the surrounding arterials.

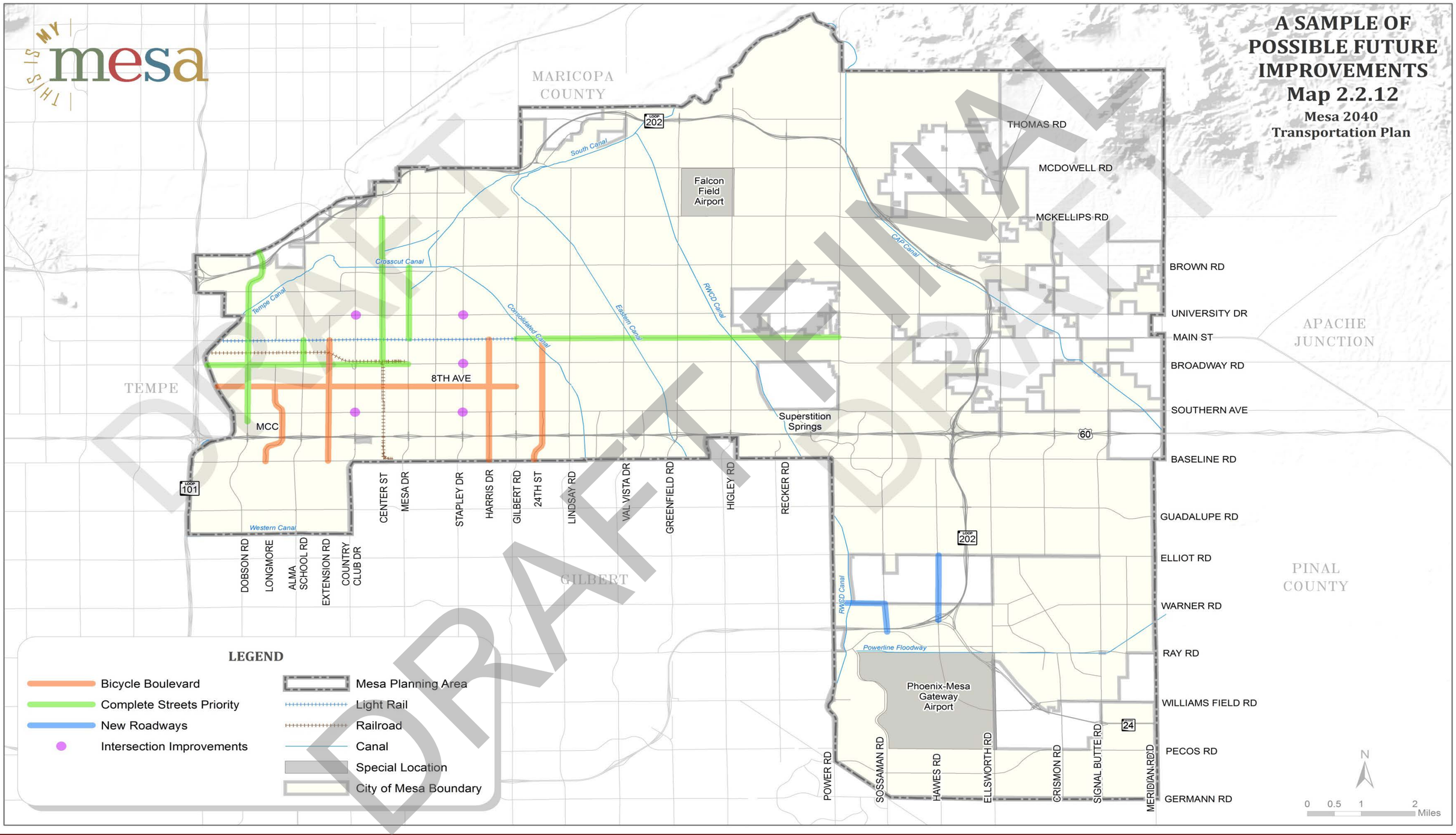
One issue found throughout many square mile sections is an obstacle disrupting one part of the square from another part. This is caused by facilities such as freeways, canals, railroads and some powerline easements. In many cases the half-mile collector is the only way to get past these barriers. Fortunately, many parts of Mesa have half-mile collectors that operate through the neighborhood. However, there are many that are still bisected and future improvements should consider adding some form of facility to unify a square mile that has been disrupted.

Some "problems" can be turned into solutions. Canals and easements can be converted into shared-use facilities that can at least help bicyclists and pedestrians overcome the barrier, if not motorized vehicles.

Future Improvements

The basis of improvement for the future street system considers a number of qualitative and quantitative factors including those assessed above. However, a "reality check" always must take place considering right of way, politics and input from the public and Transportation Advisory Board (TAB) at the time of improvement.

The assessments of the MAG travel demand model results, coupled with considerations for overall connectivity conducted above help to determine some high level concepts for priority improvements. Table 2.2.6 below is a list of potential future projects culled from the analysis above. This list is a high-level sampling of possibilities and does not intend to cover all design requirements. Rather these projects can help develop the Mesa road network into a reflection of future needs. Also, the list is not prioritized in any way. These proposed improvements are shown on Map 2.2.12. Following the list are explanations of what some of these improvements might be and how the City can carry them out.


A SAMPLE OF POSSIBLE FUTURE IMPROVEMENTS
Map 2.2.12
Mesa 2040 Transportation Plan
MARICOPA COUNTY
TEMPE
GILBERT
APACHE JUNCTION
PINAL COUNTY
Falcon Field Airport
Superstition Springs
Phoenix-Mesa Gateway Airport
MCC
South Canal
Crosscut Canal
Tempe Canal
Consolidated Canal
Eastern Canal
RWCD Canal
CAP Canal
Western Canal
Powerline Floodway
8TH AVE
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
DOBSON RD
LONGMORE
ALMA SCHOOL RD
EXTENSION RD
COUNTRY CLUB DR
CENTER ST
MESA DR
STAPLEY DR
HARRIS DR
GILBERT RD
24TH ST
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
LOOP 101
LOOP 202
60
24
LEGEND
Bicycle Boulevard
Complete Streets Priority
New Roadways
Intersection Improvements
Mesa Planning Area
Light Rail
Railroad
Canal
Special Location
City of Mesa Boundary
N
0 0.5 1 2
Miles
DRAFT
FINAL
DRAFT

Street	Segment	Proposed Improvements
Dobson Road	Southern Avenue to Rio Salado Parkway	Complete Streets Priority
Broadway Road	City of Tempe Border to Mesa Drive	Complete Streets Priority
Alma School Road	Broadway Road to Main Street	Complete Streets Priority
Longmore	Baseline Road to Broadway Road	Bike Boulevard or Complete Streets Priority
Extension Road	Baseline Road to Main Street	Bike Boulevard or Complete Streets Priority
8th Avenue	City of Tempe Border to 24th Street	Bike Boulevard or Complete Streets Priority
Center Street	Broadway Road to McKellips Road	Complete Streets Priority
Mesa Drive	Main Street to Crosscut Canal	Complete Streets Priority
Harris Drive/Williams	Baseline Road to Main Street	Bike Boulevard or Complete Streets Priority
24th Street	Baseline Road to Main Street	Bike Boulevard or Complete Streets Priority
Main Street	Gilbert Road to Power Road	Complete Streets Priority
Warner Road	Power Road to Sossaman Road	Construct Four Lane Arterial Road
Sossaman Road	Warner Road to Ray Road	Construct Four Lane Arterial Road
Hawes Road	Elliot Road to L202 Red Mountain Freeway	Construct Six Lane Arterial Road
Arterials and Collectors	Various	Add sidewalks to gaps per pedestrian plan
Mid-Section Collectors	Various	Research and determine barriers to cross
Country Club Drive	At Southern Avenue, and at University Drive	Intersection improvements per past plans
Stapley Drive	At Southern Avenue, and at Broadway Road	Intersection Improvements for safety

Table 2.2.6 Possible Future Improvements

Descriptions of Improvements

There are a number of different types of street improvements that are shown in the table above. Each is briefly described below.

Complete Streets Priority

It is explained in the Complete Streets element how, in a general sense, the City of Mesa already applies a balanced approach to streets. However, here the purpose is to address the needs defined in this chapter. As a proposed improvement, this means to develop a focused intent for these specific corridors to include modal balance. In other words, specific assessments can be conducted on these featured corridors in order to develop either one whole, or phased, future design and construction project. Projects can be as diverse as simple landscaping and shading improvements, to full-scale cross-section changes in their scope.

The corridors listed in the table above proposed for Complete Street priority are intended to improve connections for the activity nodes in the western part of the City. This includes the previously discussed Dobson Road corridor which can

connect the Fiesta District, the Sycamore LRT station and Riverview. There are few comfortable paths between the Fiesta District and Downtown Mesa for bicyclists and pedestrians. Broadway Road as a complete street can help provide a better crosstown connection. Additionally, this segment of Broadway Road is used by many bicyclists, pedestrians and transit users, largely for commuting. Alma School Road improvements can help transit users get to the Alma School Road LRT station. Center Street and Mesa Drive improvements help bicyclists and pedestrians to connect between Downtown and pathways to the north and south. Finally, Main Street is similar to Dobson Road in that it can be a major corridor for all modes, connecting Downtown with the eastern portion of the City, including Superstition Springs. Main Street also crosses canals that are proposed to have shared-use paths in the future that can connect to both Falcon Field and PMGA. Main Street has considerable right-of-way that can be used for exclusive paths for all modes.

Bicycle Boulevards

Bicycle Boulevards can be considered a subset of Complete Streets. Additionally, these streets can be called Bicycle and Pedestrian Boulevards as propose here. The core intent of these so-called boulevards is to signal to road users, sometimes symbolically, that pedestrians and bicyclists are the dominant users of these facilities. Motorized vehicles are secondary and drivers need to travel with absolute caution and regard for pedestrians and bicyclists. This concept is still developing but on a practical level it largely involves traffic calming and diverging. These techniques make it "uncomfortable" for through traffic and help to clarify that the road is intended for local access. Ideally the local residents and road users will respect this designation and play a part in the design.

Similar to Complete Streets, the improvements can be extremely diverse, from pavement markings and landscape planters, to full alignment shifts. Again, it is paramount that the adjacent community is involved with designs. Also, a big part of Bicycle Boulevards is the idea of "interim" improvements where temporary devices are placed in the road for a low cost in order to observe and get feedback. If the results are positive, the project can move forward to build permanent conditions.

The proposed Bicycle Boulevards here are intended to improve connectivity and pathways for non-motorized users in the more densely populated areas of west Mesa where bicycling, walking and transit access is more predominant.

New Four-Lane Street

Although there are numerous roadway segments in the City that will either be widened or built new to a four-lane street for the ultimate road network, Warner Road and Sossaman Road are featured due to the importance these connections will lend to the PMGA activity area. Adding these missing segments will provide more route choices for all modes and help to distribute traffic more efficiently in the surrounding area.

This cross section includes a bike lane and two travel lanes in each direction with a center two way left turn lane or a raised median. The outside features of the cross section include curb, gutter, and sidewalk. The intersection of Warner Road and Sossaman Road would include two left turn lanes and one right turn lane on each approach at the major intersections per City of Mesa design standards. However, it is critical to plan the intersection to meet actual needs. A microscopic analysis of future turning movements should be conducted, along with bicyclist, pedestrian and transit needs. Only then should a final design be developed for "true" conditions and context.

New Six-Lane Street

Similar to Warner Road and Sossaman Road, this segment of Hawes Road is featured due to its

benefits to the PMGA area. Building this part of Hawes Road will also provide access to the L202 Santan Freeway from the north.

The cross section for a six-lane street includes a bike lane and three travel lanes in each direction with a center two way left turn lane or a raised median. The outside features of the cross section include curb, gutter, and sidewalk. Six-lane streets would include two left turn lanes at all major intersections, and one right turn lane on each approach where needed. Similar to the four-lane intersection, the design should be developed for actual needs.

Connect Sidewalk Gaps Per the Pedestrian Element

The pedestrian element of this plan includes locations where sidewalks are missing along developed arterial and collector streets. Adding these sidewalks should be of the highest priority. The future Pedestrian Plan will help to prioritize the segments, but in general, the most important segments are those that will help to provide access and connectivity to activity centers. Sidewalks are part of the roadway cross-section and can be constructed as roadway projects.

Determine Square Mile Barriers

This would be a large scale study of specific square miles that are disrupted by major barriers. A set of criteria should be established to determine priority such as number of residences and surrounding activity destinations. Then, specific design solutions will be required, many custom to a given condition. These solutions can include bridges, tunnels, alternate access routes or elimination of the barrier.

Intersection Improvements

Similar to the four and six-lane streets above, there will be numerous intersection improvements required over time to meet the demands as the City's road network grows to ultimate conditions. However, the two intersections along Country Club Drive are featured for two reasons: 1) Improvement plans have already been completed for these intersections, and 2) The MAG model shows poor conditions for these two intersections and this corridor in general. This is a major transit corridor and will be more so with an LRT station at Main Street. Improving these intersections will benefit all user travel modes and help with connectivity for the Downtown.

Additionally, the intersections of Stapley Drive at Southern Avenue, and at Broadway are included to improve safety. Crash trends reveal these needs. Also, a preliminary design has been developed for the intersection of Southern Avenue and Stapely Drive which could be used as a base for future improvements. The intersection of University Drive and Stapely Drive should also be monitored to determine if safety improvements may be needed there in the future.

There are different types of intersection improvements depending on the configuration of the intersecting streets per standard design details. Generally, the scope of an intersection improvement includes widening to provide a bike lane, two or three through lanes, dual left turn lanes and a right turn lane on each approach, as well as traffic signal improvements. However, every intersection is unique to its context and user needs. Although these intersection designs are complete, they can always be reevaluated for new conditions if the reasons are sound. It is recommended to apply future funds to complete these intersection improvements.

Again, the improvements listed here are a general idea to help illustrate some stronger candidates for future improvements. However, there should be ongoing monitoring of major intersections to determine if there is a need for future improvements based on traffic delays and safety concerns. Any improvement needs should be added to bond requests and the CIP as needed

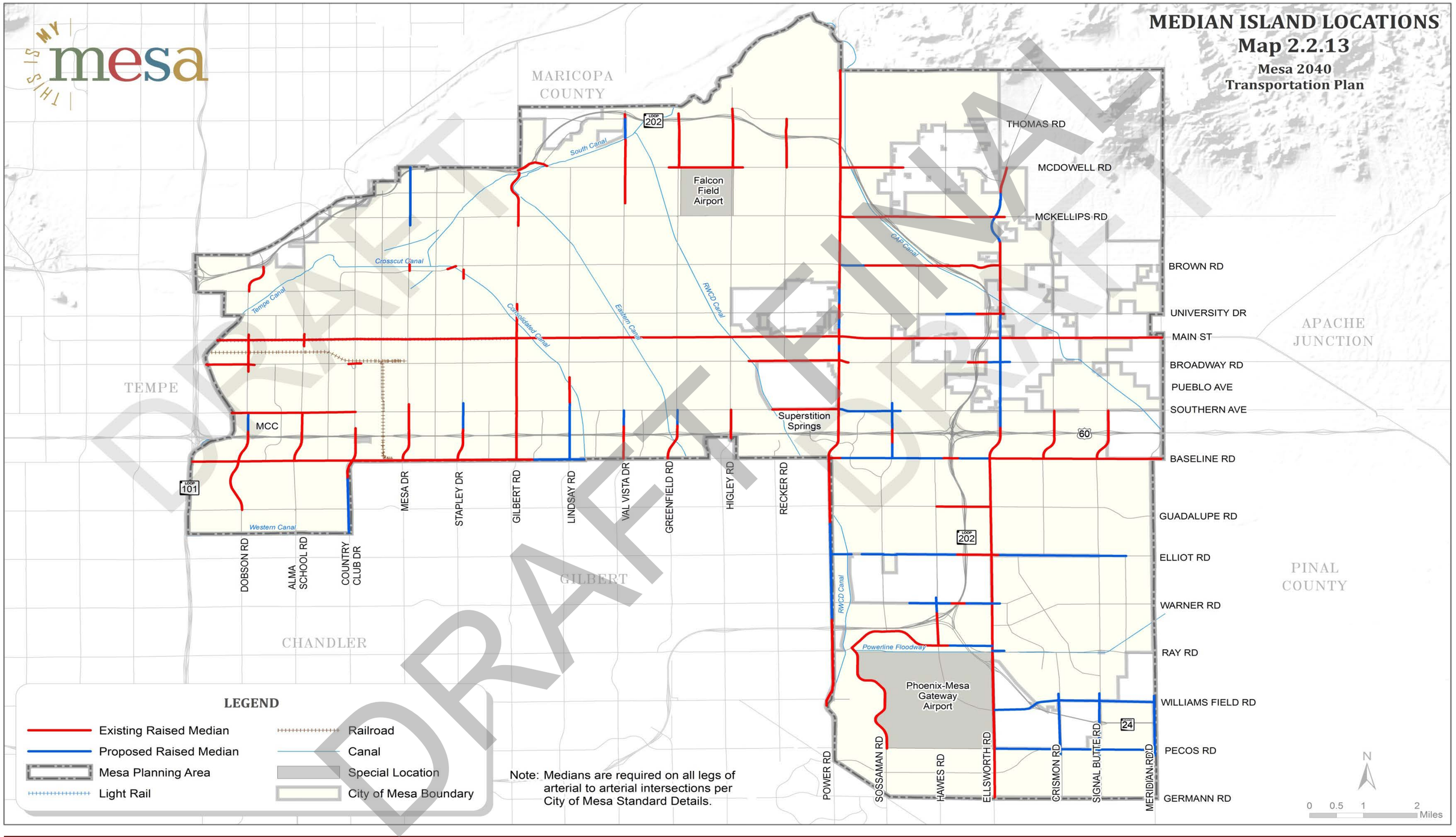
Medians

The City of Mesa incorporates raised medians at selected locations on the arterial street system to provide access control, improve operations by minimizing mid-block left turns, and enhance aesthetics of the roadway. A number of existing streets have a raised median and several more are recommended. Map 2.2.13 shows the existing and proposed median locations. Additionally, it is City of Mesa practice to place raised medians on all approaches to Arterial – Arterial intersections. The length and configuration of these "approach only" medians are based on the given, or planned, conditions. Details and explanations for specific median design requirements can found in the Mesa Standard Details and Specifications, and the Engineering and Design Standards (Engineering Procedure Manual), both which can be found on the City of Mesa website.

In many cases median design is tied to driveway and traffic signal locations. Driveway access and traffic signal location requirements can also be found in the Standard Details and Engineering Procedure Manual. As with any design, median design impacts all modes, and specific conditions and context must be considered.

Care must be taken to avoid too many median openings, or too closely spaced openings to the point where the purposes of the medians are defeated. Enhanced aesthetics through attractively landscaped medians is a key reason for including them, especially on the six-lane streets.

MESA 2040 Transportation Plan

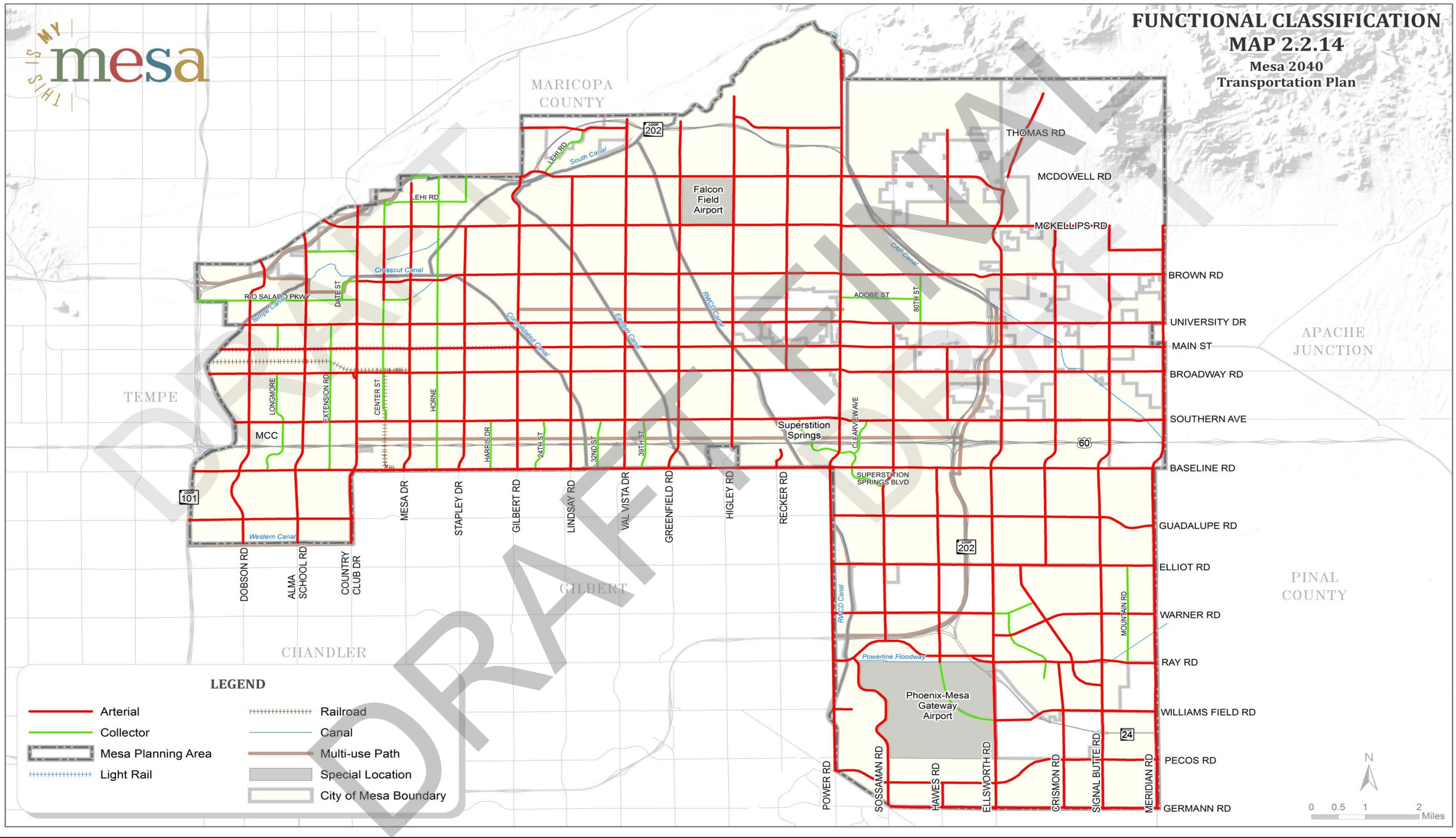


Functional Class

A street system can be defined by how individual streets function for vehicular access and mobility.

The functional class for the preferred street system is presented in Map 2.2.14. Generally, the higher the functional class, the higher the level of mobility and the less direct access. Conversely, the lower the functional class, the lower the level of mobility and the more direct access. A freeway is considered the highest functional roadway class since it provides good regional mobility and only has access at traffic interchanges. Local streets are considered the lowest functional roadway class because the primary purpose is local access. Arterial streets primarily serve through traffic; however, they also have local access at driveways and intersecting streets. Collector streets, as the name suggests, help to gather a specific area's local street traffic and provide access between those local streets and arterials or freeways. Some collectors can be used more like an arterial with freight access, predominantly commercial land uses and larger amounts of through traffic. These can be considered "major" collectors.

MESA 2040 Transportation Plan

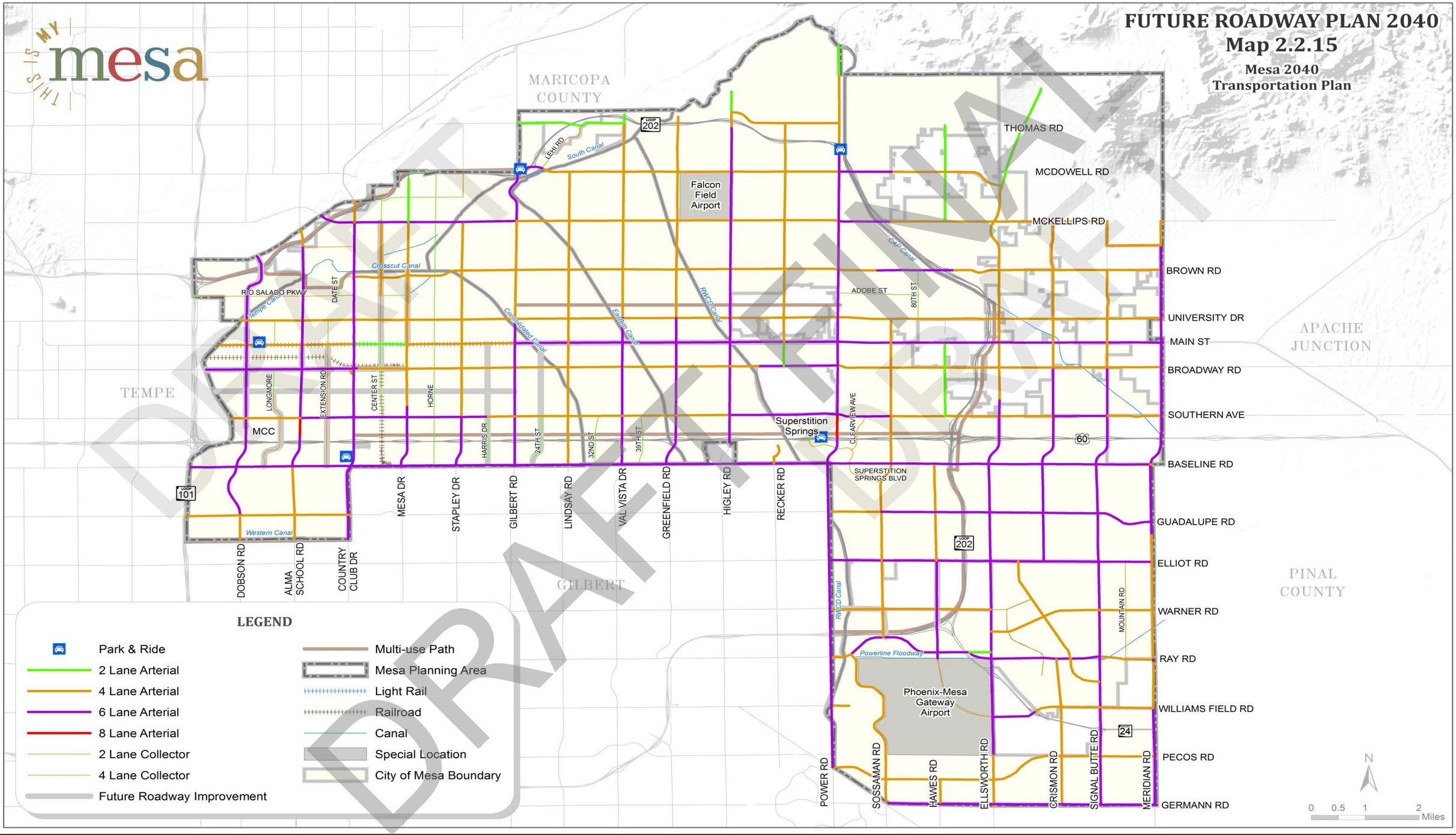


2.2.3 Conclusion

The development of the future street system depends on the types of projects that will address connectivity, safety, and mobility needs for all types of users throughout the City. The resulting street plan showing the recommended number of lanes and location of proposed improvements as currently anticipated is shown in Map 2.2.15. The implementation of the street plan is expected to occur in phases over the next 25 years. Actual implementation will depend on a number of factors including funding, public input, and development patterns. Additional projects may be identified to address changing safety or congestion needs, and some projects may be deferred or eliminated as future bond and capital improvement programs are developed. However, all projects should contribute to developing the vision and goals presented in this plan.

The roadway is not only a place for motorized vehicles, but a public cross-section that must be planned and built for all roadway users. Part III of this plan continues this process with suggestions for projects that integrate the needs of all users into City projects.

MESA 2040 Transportation Plan



2.3.0 Transit Element

The City of Mesa Transit Master Plan identifies the types of transit services, facilities, and features that are needed to support a multi-modal transportation system in the City of Mesa. The Transit Master Plan is being developed in conjunction with the General Plan and Transportation Master Plan. The Transit Master Plan will develop an activity center-based transit plan that identifies transit priority corridors and multi-modal connections within the City of Mesa. This effort will consider various travel markets and transit technologies, including METRO light rail, LINK bus service, local and express bus service, future intercity and commuter rail, and demand response service.

2.3.1 Why is the Transit Master Plan Needed?

The Transit Master Plan is needed to provide recommendations for transit improvements in the City of Mesa in the context of existing and future funding constraints.

Connect Activity Centers

The Transit Master Plan is needed to address connections to activity centers, which often serve as gateways to other destinations. Examples within Mesa include Downtown, the Fiesta District, Falcon Field, Riverview, Superstition Springs Center, Phoenix-Mesa Gateway Airport (Gateway), and the Arizona State University (ASU) Polytechnic campus. Regional examples include Sky Harbor International Airport, Downtown Phoenix, and multiple ASU campuses.

Transit Priority Corridors

The Transit Master Plan is needed to make recommendations that further consolidate transit service into priority corridors in the City of Mesa. This has already been started with METRO light rail and LINK bus service.

Local and Regional Transit Circulation

The Transit Master Plan is needed to identify differences in local and regional transit circulation, as the demand for internal trips within the City of Mesa differs from external trips serving regional corridors and destinations. The City of Mesa will continue to evaluate corridors connecting to other communities that enhance education, economic development, and overall quality of life.

Changes in Travel Patterns

The Transit Master Plan is needed to respond to a change in travel patterns in the City of Mesa, as land use and transit opportunities become more urban in character. This includes an increased emphasis on making connections to major activity centers and regional transportation nodes.

Main Street Link

2.3.2 Existing Transit Service

Existing transit service in Mesa includes METRO light rail transit (LRT), LINK bus rapid transit (BRT), local and express bus service, a neighborhood circulator, and paratransit. Transit service in Mesa has changed dramatically in the last five years with the implementation of METRO light rail and LINK bus service.

Transit Services

Existing transit service in Mesa is shown in Figure 2.3.1 while a list of transit routes, including service hours and frequency, is provided in Table 2.3.1.

METRO Light Rail

METRO light rail transit service began operation in December 2008. There is one light rail station in Mesa, located at Sycamore and Main Street. This station is the eastern terminus for the 20-mile light rail system and is the highest ridership station in terms of boarding's and alighting's. A 3.1-mile extension of METRO light rail to Downtown Mesa is currently under construction and scheduled to open in 2016. The Gilbert Road extension, an additional 2 miles, is under study and tentatively scheduled to open in 2018.

LINK Bus Rapid Transit

There are two LINK bus rapid transit lines in Mesa. Main Street LINK operates between the Sycamore light rail station and the Superstition Springs Transit Center and Park-and-Ride. Arizona Avenue/Country Club Drive LINK operates between the Sycamore light rail station and Downtown Chandler and the Chandler Park-and-Ride. Both routes will be modified once METRO light rail is extended to Downtown Mesa.

METRO Light Rail

Main Street Link

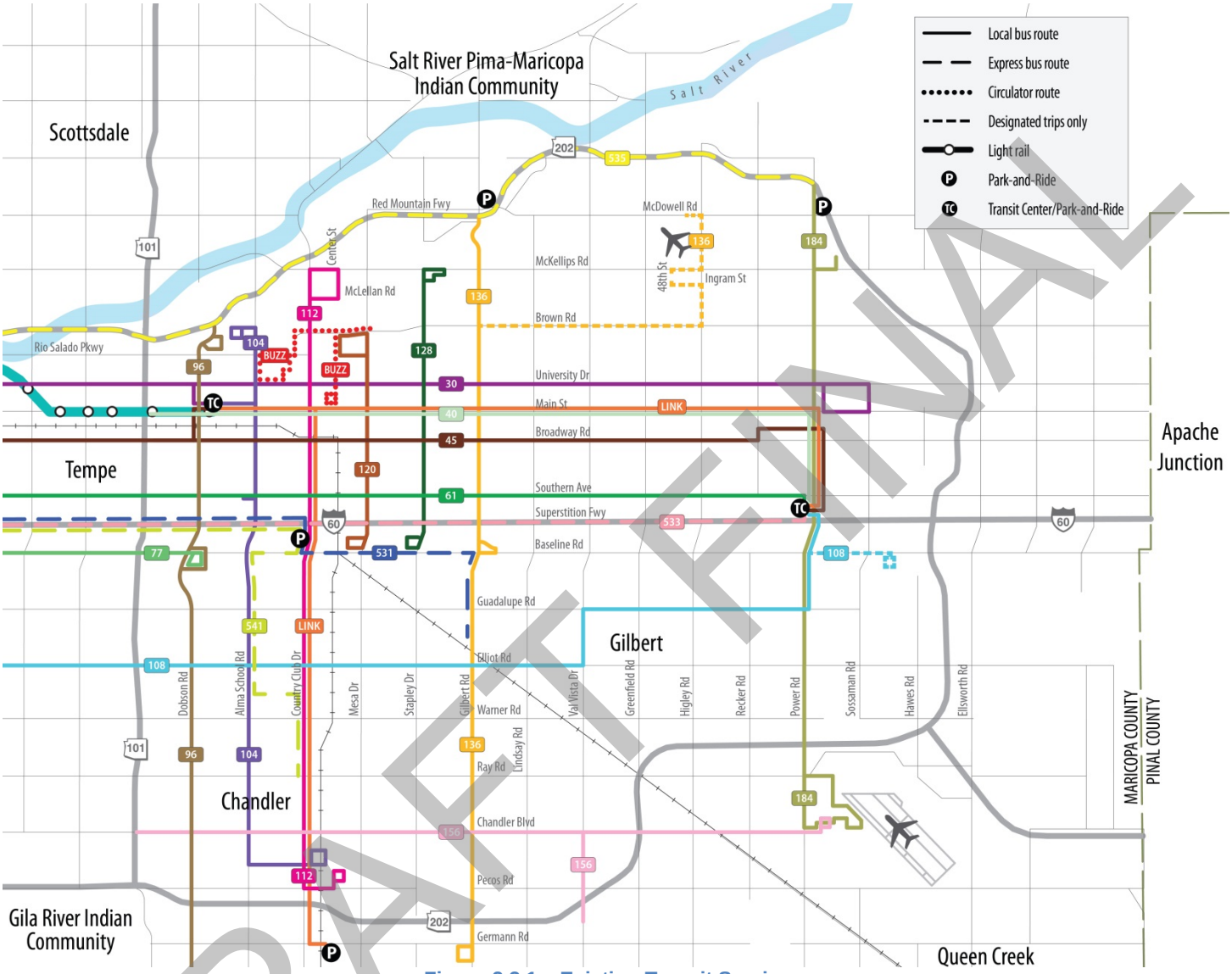


Figure 2.3.1 – Existing Transit Services

Table 2.3.1: Transit Service Hours and Frequency

ROUTE/NAME	WEEKDAY				SATURDAY			SUNDAY		
	Hours	Peak	Off-Peak	Night	Hours	Day	Night	Hours	Day	Night
Light Rail										
METRO	4:40am-11:00pm	12	12	20	5:00am-2:00am	15	20	5:00am-11:00pm	20	20
Bus Rapid Transit										
LINK - Main St	4:00am-10:30pm	15	25	30	No service	--	--	No service	--	--
LINK - Arizona Ave	4:45am-10:45pm	25	25	60	6:45am-11:00pm	60	60	7:30am-9:30pm	60	--
Local Bus										
30 - University	4:00am-11:00pm	30	30	30	5:00am-11:00pm	60	60	No service	--	--
40 - Apache/Main	4:45am-11:00pm	30	30	30	5:45am-11:00pm	30	30	5:45am-10:45pm	30	30
45 - Broadway	4:45am-10:15pm	30	30	--	6:00am-10:15pm	60	--	No service	--	--
61 - Southern	5:00am-11:45pm	15	30	30	4:45am-11:30pm	30	30	5:15am-11:30pm	60	60
77 - Baseline	5:00am-11:00pm	30	30	--	5:15am-10:00pm	60	--	No service	--	--
96 - Dobson	4:30am-11:30pm	15	30	30	5:15am-11:00pm	30	30	5:15am-11:00pm	30	30
104 - Alma School	6:00am-9:45pm	30	30	--	6:00am-9:45pm	60	--	No service	--	--
108 - Elliot	5:00am-9:30pm	30	30	--	7:00am-8:45pm	60	--	7:00am-7:45pm	60	--
112 - Country Club/Arizona Ave	5:30am-10:00pm	30	30-60	--	6:30am-9:30pm	60	--	7:15am-9:00pm	60	--
120 - Mesa	8:45am-9:00pm	30	30	--	8:45am-8:30pm	60	--	No service	--	--
128 - Stapley	5:45am-6:45pm	30	30	--	5:45am-7:00pm	60	--	No service	--	--
136 - Gilbert	4:45am-7:15pm	30	30	--	7:45am-7:15pm	60	--	No service	--	--
156 - Chandler/ Williams Field	5:30am-10:00pm	30	30	30	6:45am-9:30pm	30	--	7:15am-7:30pm	30	--
184 - Power	4:30am-10:00pm	15-30	30	--	5:00am-9:00pm	60	--	5:00am-9:00pm	60	--
277 - Baseline (Seasonal)	6:00am-9:00pm	30	30	--	7:00am-10:00pm	60	--	No service	--	--
Express Bus										
531 - Mesa/Gilbert	6 trips AM peak, 6 trips PM peak				No service	--	--	No service	--	--
533 - Mesa	6 trips AM peak, 6 trips PM peak				No service	--	--	No service	--	--
535 - Northeast Mesa	5 trips AM peak, 5 trips PM peak				No service	--	--	No service	--	--
541 - Chandler	4 trips AM peak, 4 trips PM peak				No service	--	--	No service	--	--
Circulator Bus										
BUZZ	5:30am-8:00pm	30	30	--	7:00am-9:30pm	60	--	No service	--	--

Local Bus Service

There are fourteen local bus routes and one seasonal route in Mesa. Local bus service hours and frequency vary by route, with some routes providing early morning and late evening service.

Local Bus Route 184 (Power Road)

Express Bus Service

There are four express bus routes in Mesa, all of which provide service to and from Downtown Phoenix. These routes primarily originate at regional park-and-ride facilities.

Express Bus Route 533 (Mesa Express)

Circulator

The BUZZ is a free circulator in Downtown Mesa that serves designated bus stops on major streets and flag stops on neighborhood streets using a smaller transit vehicle.

Buzz Circulator Vehicle

Paratransit

Paratransit service in Mesa is provided by East Valley Dial-a-Ride (EVDAR) and can be used by passengers who are certified by the American with Disabilities Act (ADA). ADA requires that complementary paratransit service be provided in all areas within three-fourths of a mile of fixed route transit service. Mesa provides this service citywide, regardless of the distance from a fixed route. The EVDAR service area is shown in Figure 2. In addition to EVDAR, service to persons with disabilities and seniors is provided through East Valley RideChoice Program, which is a cab connection service.

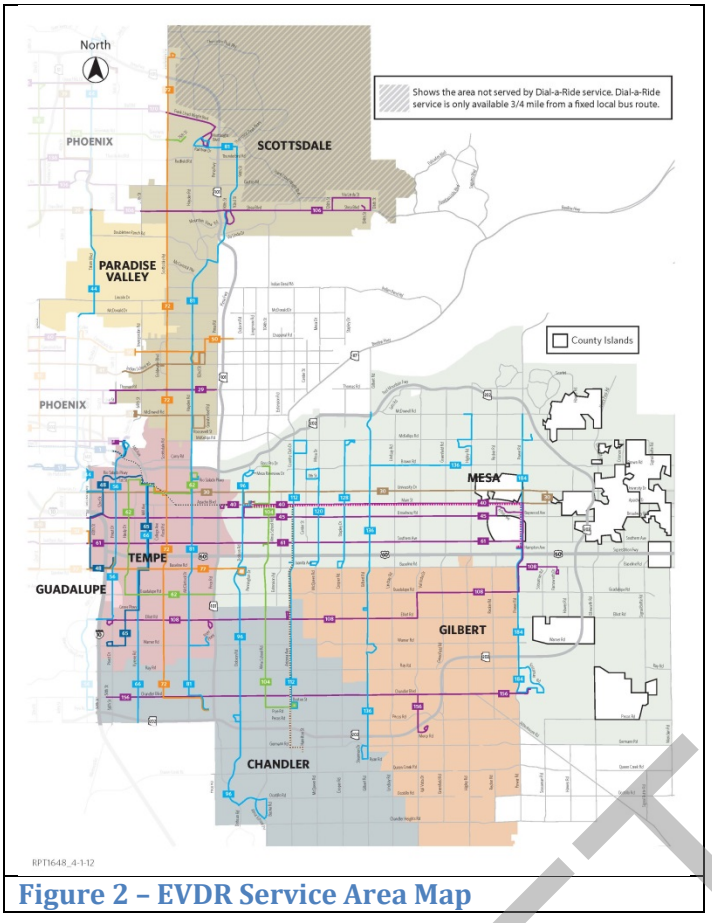


Figure 2 – EVDR Service Area Map

Transit Facilities

Existing transit facilities in Mesa include both transit centers and regional park-rides.

Superstition Springs Transit Center

Transit Centers

There are two transit centers in Mesa (Figure 2.3.3). The Sycamore/Main Street Transit Center is located adjacent to the METRO light rail station at Sycamore and Main Street. The Superstition Springs Transit Center is located at the US 60 and Power Road next to Superstition Springs Center. Both transit centers include regional park-and-ride lots. A third transit center and park-and-ride lot is proposed at Gilbert Road as part of the Gilbert Road extension project. A fourth passenger facility is planned in Downtown Mesa and will accommodate two buses at one time.

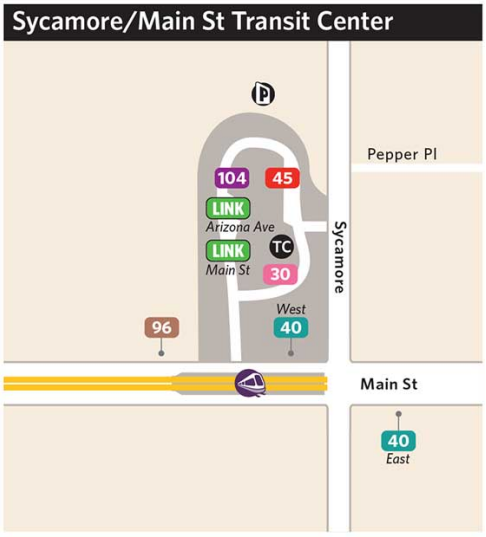


Figure 2.3.3 Source: Valley Metro, 2013

Transit Shelter at Superstition Springs Park-and-Ride

Park-and-Rides

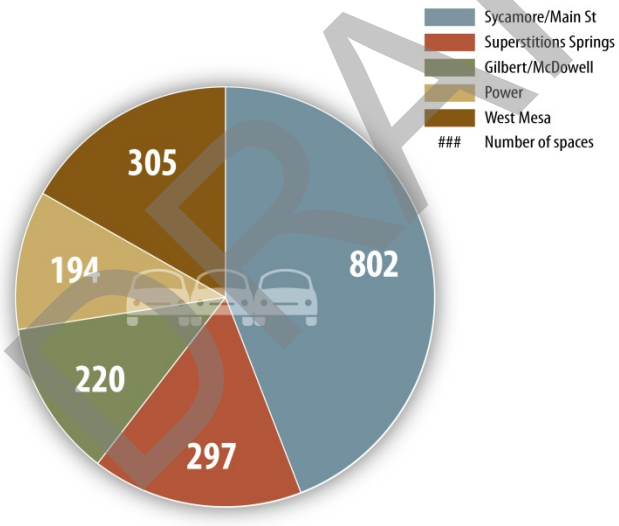
There are five regional park-and-rides in Mesa, all of which have been constructed since 2007. The Sycamore/Main Street and Superstition Springs Center Park-and-Rides are the largest. Table 2.3.2 and Figure 2.3.4 describe the regional park-and-rides in Mesa.

Table 2.3.2: Regional Park-and-Rides

Park-and-Ride	Routes Served	Parking Space		Bicycle Storage
		Total	Covered	
Sycamore/ Main St	METRO light rail LINK - Main St LINK - Arizona Ave 30 - University 40 - Apache/Main 45 - Broadway 96 - Dobson 104 - Alma School	802	0	28
Superstition Springs (Power/US 60)	533 - Mesa LINK - Main St 40 - Apache/Main 45 - Broadway 61 - Southern 108 - Elliot 184 - Power 277 – Baseline	297	0	16
Gilbert/McDowell (Gilbert/L202)	535 - Northeast Mesa 136 - Gilbert	220	0	48
Power (Power/L202)	535 - Northeast Mesa 184 - Power	194	24	27
West Mesa (Country Club/ US 60)	531 - Mesa/Gilbert 541 - Mesa LINK - Arizona Ave 112 - Country Club	305	0	32

Source: Valley Metro Park-and-Ride Survey, 2013

Figure 2.3.4: Mesa Park-and-Ride Capacity



Gilbert/McDowell Park-and-Ride

2.3.3 Alternative Transit Plan Scenarios

The Alternative Transit Plan Scenarios identify the types of transit services, facilities, and features that are needed to support a multi-modal transportation system in the City of Mesa. The Transit Master Plan includes five Alternative Transit Plan Scenarios:

- One **Short Term** transit plan scenario that correlates to the opening of the Gilbert Road light rail extension in 2018.
- Two **Mid Term** transit plan scenarios that correlate to a 15-20 year planning horizon (2030).
- Two **Long Term** transit plan scenarios that correlate to the build-out planning horizon for the City of Mesa General Plan (2040).

The goal of the Alternative Transit Plan Scenarios is to develop an activity center-based transit plan that identifies transit priority corridors and multi-modal connections within the City of Mesa. This effort considers various travel markets and transit technologies, including METRO light rail, LINK bus service, local and express bus service, future intercity and commuter rail, and demand response service.

The methodology for developing the Alternative Transit Plan Scenarios starts with a transit propensity analysis. This analysis uses the information compiled in the transit profile to identify where transit service is needed based on demographics such as population/employment density and transit dependent populations. It then compares this demographic information with existing transit performance to identify transit priority corridors and multi-modal connections. These transit priority corridors are then refined using transit supportive policies related to transit service, facilities, and fleet.

The existing and future High Capacity Transit (HCT) network dictate opportunities and constraints for transit service in Mesa. Therefore, the Alternative Transit Plan Scenarios are developed in context of what the future of the HCT network might look like. The primary differences in the various Mid Term and Long Term transit plan scenarios are the assumptions related to future HCT service (BRT, LRT, and passenger rail).

METRO Light Rail Train

Table 2.3.3: Summary of Transit Network Changes by Phase	
Phase	Routes Served
Short Term	Extend METRO light rail east to Gilbert Road Modify Main Street LINK to originate at Gilbert Road Modify Country Club LINK to also serve Fiesta District Increase peak frequency to 15 minutes on Country Club LINK and Routes 30 (University), 45 (Broadway), 104 (Alma School), 112 (Country Club), 120 (Mesa), 136 (Gilbert), and 184 (Power) Increase Sunday frequency to 30 minutes on Route 61 (Southern) Add 4 new trips for Route 533; 1 new trip for Route 525
Mid Term 1	Extend METRO light rail east on Main Street to Power Road Modify Main Street LINK to operate solely on Power Road and extend to Gateway Add new Southern Avenue LINK between Phoenix/Tempe and Country Club Drive Extend Routes 30 (University), 45 (Broadway), and 61 (Southern) east from Power Road to Ellsworth Road Increase peak/off-peak frequency to 12/20 minutes on Main Street LINK and Country Club LINK Increase peak frequency to 15 minutes on Route 77 (Baseline) Add new Routes 4 (McKellips/Center), 152 (Val Vista), and 168 (Higley)
Mid Term 2	Extend METRO light rail south on Gilbert Road to US 60 and east on US 60 to Greenfield Road Extend Main Street LINK south on Power Road to Gateway Add new Southern Avenue LINK between Phoenix/Tempe and Country Club Drive Extend Routes 30 (University), 45 (Broadway), and 61 (Southern) east from Power Road to Ellsworth Road Increase peak/off-peak frequency to 12/20 minutes on Main Street LINK and Country Club LINK Increase peak frequency to 15 minutes on Route 77 (Baseline) Add new Routes 4 (McKellips/Center) and 160 (Greenfield/McKellips)
Long Term 1	Extend METRO light rail south on Power Road from Main Street to Superstition Spring Transit Center Modify Power Road LINK to operate solely on Power Road between Superstition Springs and Gateway Add new passenger rail in US 60 corridor between Downtown Phoenix and Gateway Add new Route 208 (Ellsworth) between Superstition Springs and Gateway
Long Term 2	Extend METRO light rail east on US 60 from Greenfield Road to Superstition Springs Extend Southern Avenue LINK service east from Country Club Drive to Gilbert Road Add new passenger rail in Phoenix Southeast Subdivision corridor between Downtown Phoenix and Gateway Add new Route 208 (Ellsworth) between Superstition Springs and Gateway

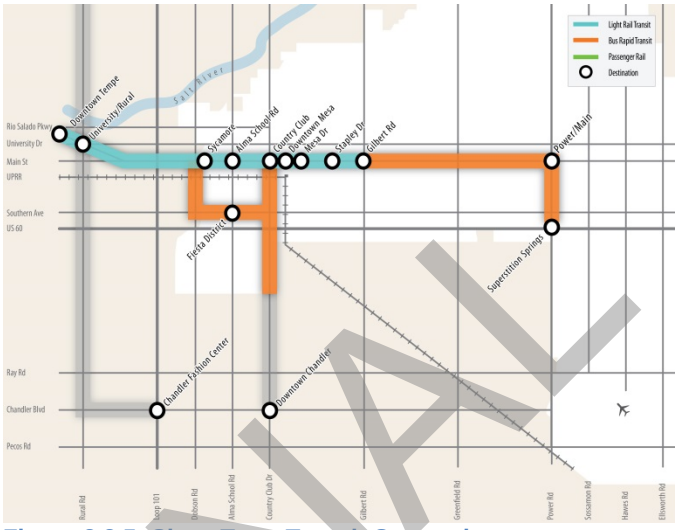


Figure 2.3.5: Short Term Transit Comparison

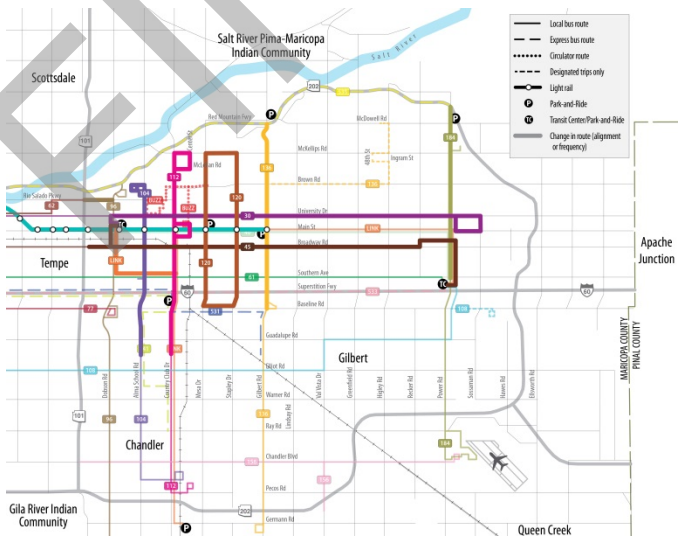
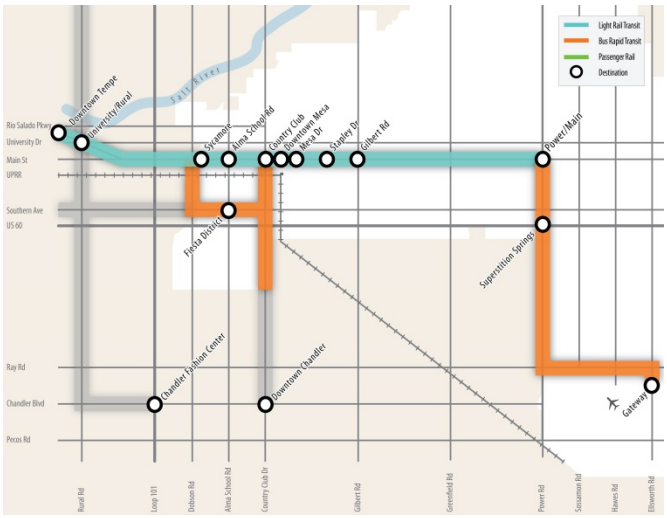
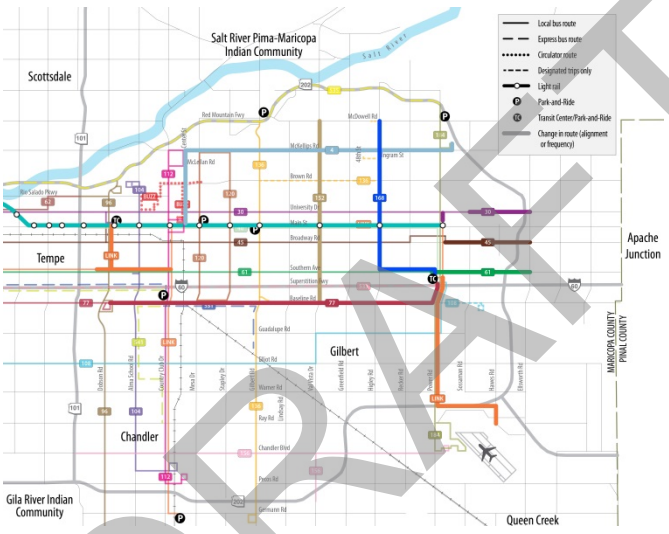


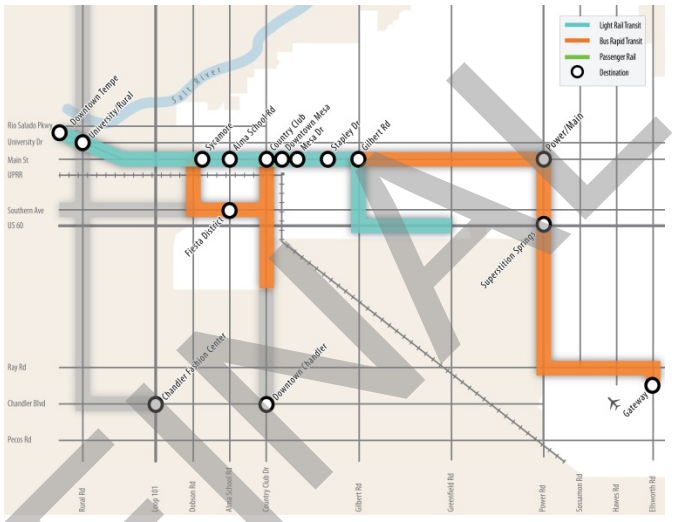
Figure 2.3.6: Mid Term Transit Comparison

Mid Term 1





Mid Term 2



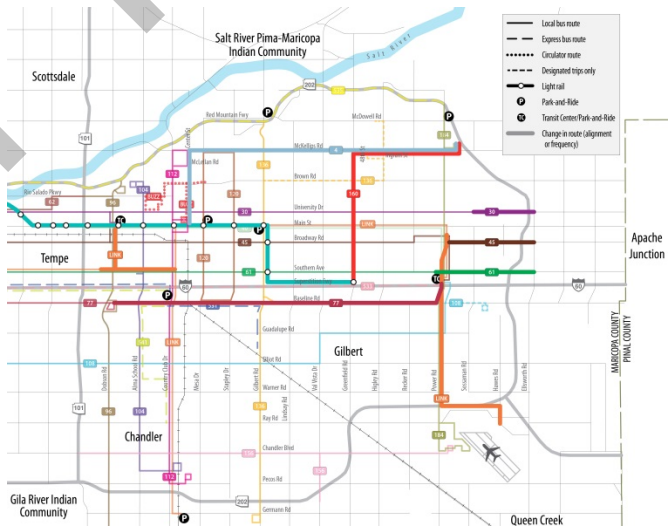
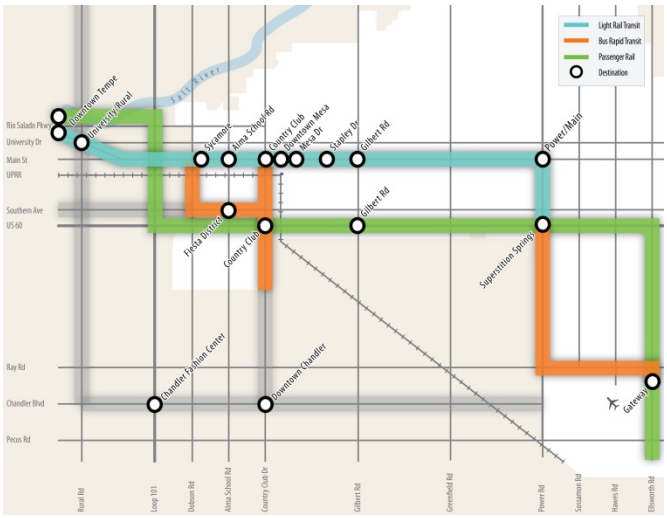
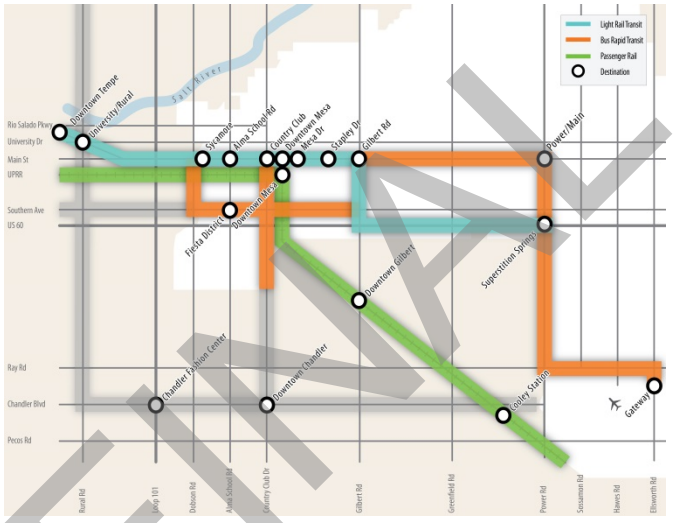


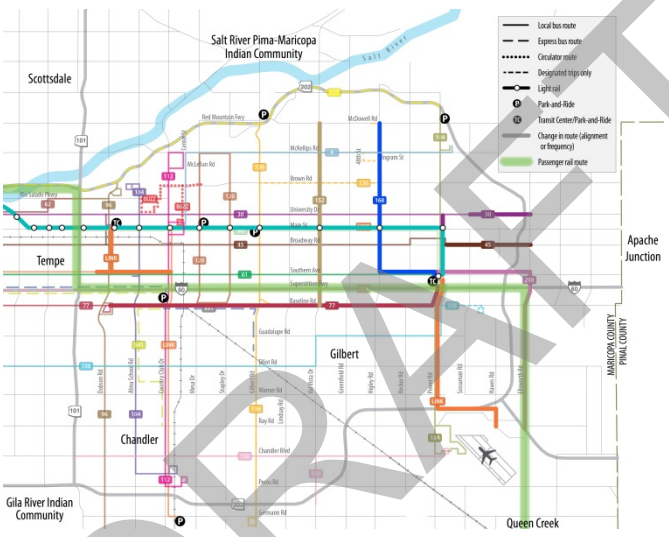
Figure 2.3.7: Long Term Transit Comparison

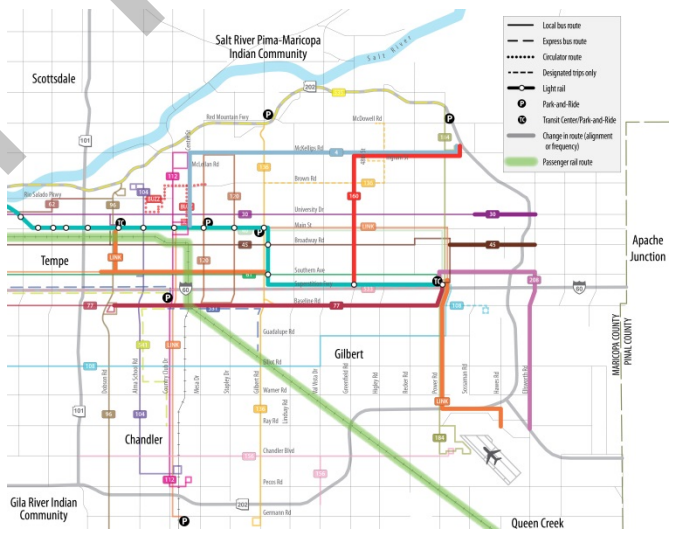
Long Term 1



Long Term 2







2.4.0 Pedestrian Element

2.4.1 INTRODUCTION

The purpose of this element is to provide a better understanding of the needs of pedestrians in the transportation system. Creating a pedestrian environment is more than simply laying down a sidewalk and installing a pedestrian traffic signal. A functional and viable pedestrian system takes into account both the big picture and the smallest details – from how the city was built, climate and connectivity to what is under the pedestrian's feet. Facilities should be accessible by all pedestrians, including children and those with disabilities. Walking is the most basic of human activities and is often overlooked in the pursuit to build an urban transportation network. Automobile-centric transportation networks that dominated 20th century western communities are giving way to 21st century walkable and livable communities. The number of people who walk regularly has become an important measure of a city's quality of life. Sidewalks provide places for casual socializing, and businesses benefit when people stroll and window-shop. The presence of pedestrians in the community indicates that people feel safe and confident outdoors.

Why Walk?

In communities across the world, there is a growing need and concern to provide choices that give people the opportunity to walk—to walk more often, to walk to more places, and to feel safe while doing so. Walking for recreational and utilitarian purposes brings great benefits to the pedestrian and the surrounding environment. These benefits include:

- Health of the environment
- Health of the individual walking
- Quality of life
- Congestion mitigation and
- Traffic reduction

Economic rewards are also great motivators to pedestrians when they begin to realize the reduction in medical expenses, decreased dependency on the automobile, reductions in petroleum purchases, and lower expenses for automobile upkeep. Providing adequate sidewalks, crosswalks, and access to services creates a new choice by not forcing people to travel by automobile. For those who do not have the option to drive, such as adolescents, those unable to afford a car, and people with certain disabilities, the lack of walking as a viable choice in transportation creates an inconvenient and socially unjust barrier to mobility.

Cities around the world are being graded and ranked by their walkability and how that walkability directly reflects the livability of that city. These rankings are being considered by businesses worldwide when deciding where to invest. By increasing the ability to leave the automobile behind and walk for trips, communities are becoming social places again where people engage one another on the street in lieu of the anonymous experience of traveling alone in a vehicle.

Where are people walking?

People are walking from place to place on a daily basis and making those mode decisions based on the mobility options that they are offered. "Do I walk to the corner market for my loaf of bread, or do I get in my automobile and make that trip because there is a lack of pedestrian connections?" or "Do I walk my child to school or, do I drive?" When choosing between walking and driving, comfortable and accessible pedestrian environments will encourage people to walk. It is human nature to walk and the more opportunities to do so, the more people will walk instead of drive.

Trends

When studying US Census travel trends and relationships between how Mesa residents move from place to place throughout the City, current trends show the distribution of personal trips in recent years has changed dramatically. Data also show that fewer miles were traveled by private auto, while transit travel remained unchanged, which could imply that people are traveling by alternative modes such as walking and bicycling to complete trips that would have historically been taken by automobile.

Facts

- Households with an annual income less than $25,000 are nine times more likely to have no car than households with incomes greater than $25,000.
- While only accounting for 12 percent of the population, African-Americans make up 20 percent of pedestrian fatalities.
- Only 0.7 percent of federal transportation funds are spent on improving pedestrian facilities.

"Social Justice Benefits." *Walkinginfo.org:*. N.p., n.d. Web. 29 Aug. 2013.

2.4.2 WALKING IN MESA

Existing Conditions

Pedestrian travel in the City of Mesa typically occurs on sidewalks adjacent to City streets. The current City of Mesa Design Guidelines require 4-foot sidewalks on all local streets and 6-foot sidewalks on collector and arterial streets. Most City streets currently have sidewalks, which is favorable compared to many other communities.

Missing segments of sidewalks along arterials will be built as the adjacent properties are developed and street reconstruction projects are conducted. Those missing sidewalk segments that can be constructed with future projects are shown in table 2.4.1 and Map 2.4.1 "Arterial and Collector Street with Sidewalk Gaps" below.

Many trip destinations are located along busy arterial streets where sidewalks are typically immediately behind the curb. Some areas have sidewalks that are separated from the curb, which provides a more inviting walking experience. The interior sidewalks of the downtown core area between Country Club Drive and Mesa Drive and between University Drive and Broadway Road have been enhanced with setbacks, landscaping, awnings, mid-block crossings, seating and bicycle parking making the downtown core area a unique place to walk.

Elsewhere, pedestrian access between the sidewalk and adjacent businesses is frequently hindered by automobile oriented development patterns and a lack of pedestrian amenities. For example, the typical strip shopping center is separated from the adjacent street by walls and large parking lots with few or no shade trees, and no designated walkways. Pedestrian access is provided at vehicular driveways, where people on foot have to negotiate their way between parked cars, cars backing up, and oncoming traffic before reaching their destination.

Sidewalk Gaps on Arterial and Collector Streets

Street	From	To
Baseline Road	Hawes Road	Ellsworth Road
Broadway Road	Ellsworth Road	Meridian Road
Brown Road	Val Vista Drive	Higley Road
Center Street	McLellan Road	Lehi Road
Crismon Road	US 60	Hampton Avenue
Elliot Road	Power Road	Crismon Road
Ellsworth Road	Baseline Road	Germann Road
Germann Road	Sossaman Road	Meridian Road
Higley Road	Baseline Road	Loop 202 Red Mountain
Main Street	54th Street	Meridian Road
McKellips Road	32nd Street	Higley Road
Mesa Drive	McKellips Road	Loop 202 Red Mountain
Mountain Road	Pecos Road	Ray Road
Pecos Road	Power Road	Meridian Road
Ray Road	Sossaman Road	Ellsworth Road
Recker Road	Main Street	Thomas Road
Signal Butte Road	Guadalupe Road	Ray Road
Sossaman Road	Pecos Road	University Drive
Stapley Drive	Southern Avenue	Emerald Avenue
University Drive	Higley Road	Meridian Road

Table 2.4.1

Mobility Issues

According to the United States Census Bureau, 56.7 million people in the United States live with a disability as of 2010. Arizona ranks thirtieth in the United Stated with 11.5% of the population having a disability that limits their mobility. These numbers have been increasing steadily over the past decades because of the aging population in Arizona and the United States. Mesa has an obligation to safely accommodate individuals with mobility issues so that they can negotiate the City's transportation network.

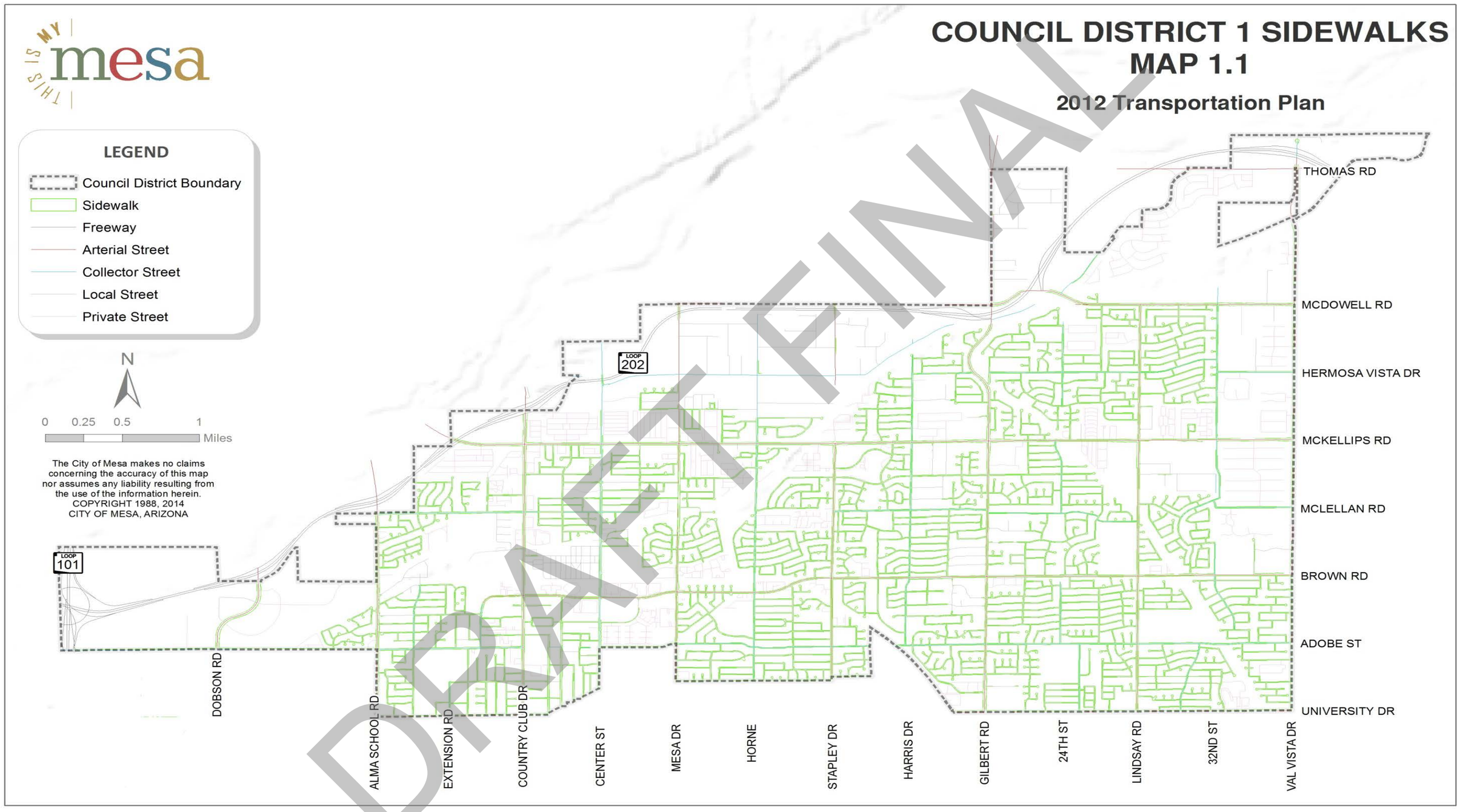
Pedestrians with ambulatory impairments many times use devices such as wheelchairs, walkers, canes, and scooters that require additional space to safely maneuver through the pedestrian environment. Pedestrians who use these mobility aids often have difficulty negotiating steep cross slopes and grades and require more time to cross streets and negotiate obstacles due to reduced endurance, slower walking speeds, and slower reaction times.

Pedestrians with visual and hearing impairments lose the ability to pick up and react to visual and audible cues that people without disabilities use to safely travel along pedestrian routes. As many as 40% of older adults have hearing and visual impairments, which teamed with slower walking speeds and reduced reaction times make pedestrian travel particularly challenging. Pedestrians with these disability characteristics often:

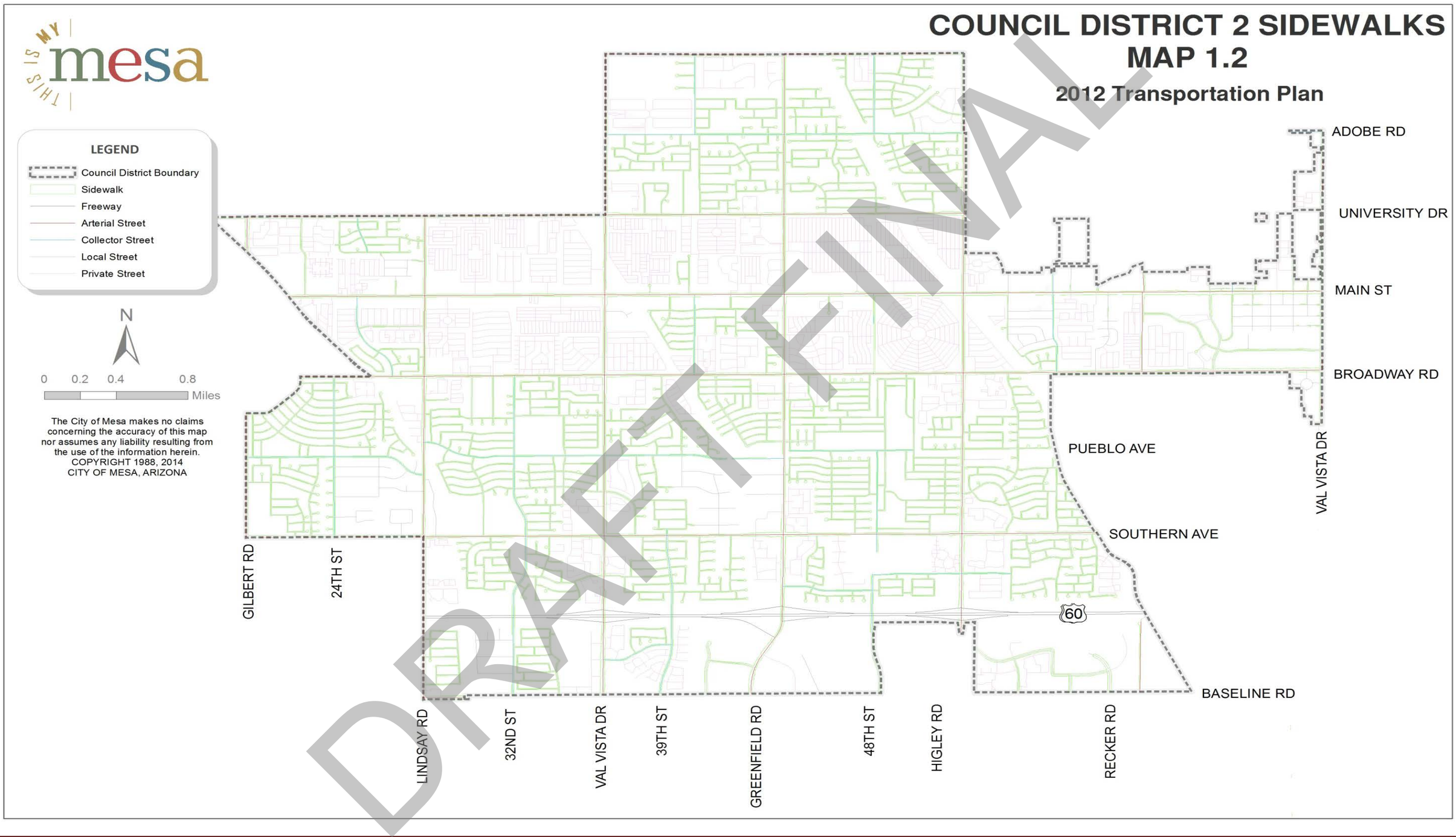
- Have limited perception of the travel path ahead of them
- Navigate with reduced or limited information about their surroundings, increasing the danger they are susceptible to
- Rely on memory, unchanging conditions, and travel routes that are learned over time

Pedestrian facilities should be compliant with the Americans with Disabilities Act Access Guidelines (ADAAG) to safely accommodate all types of pedestrians including children, adults, seniors and people with disabilities. While it is difficult to balance the needs of all modes of travel, it is Mesa's mission to ensure that its pedestrian facilities are suitable for all pedestrians to access.

COUNCIL DISTRICT 1 SIDEWALKS
MAP 1.1
2012 Transportation Plan

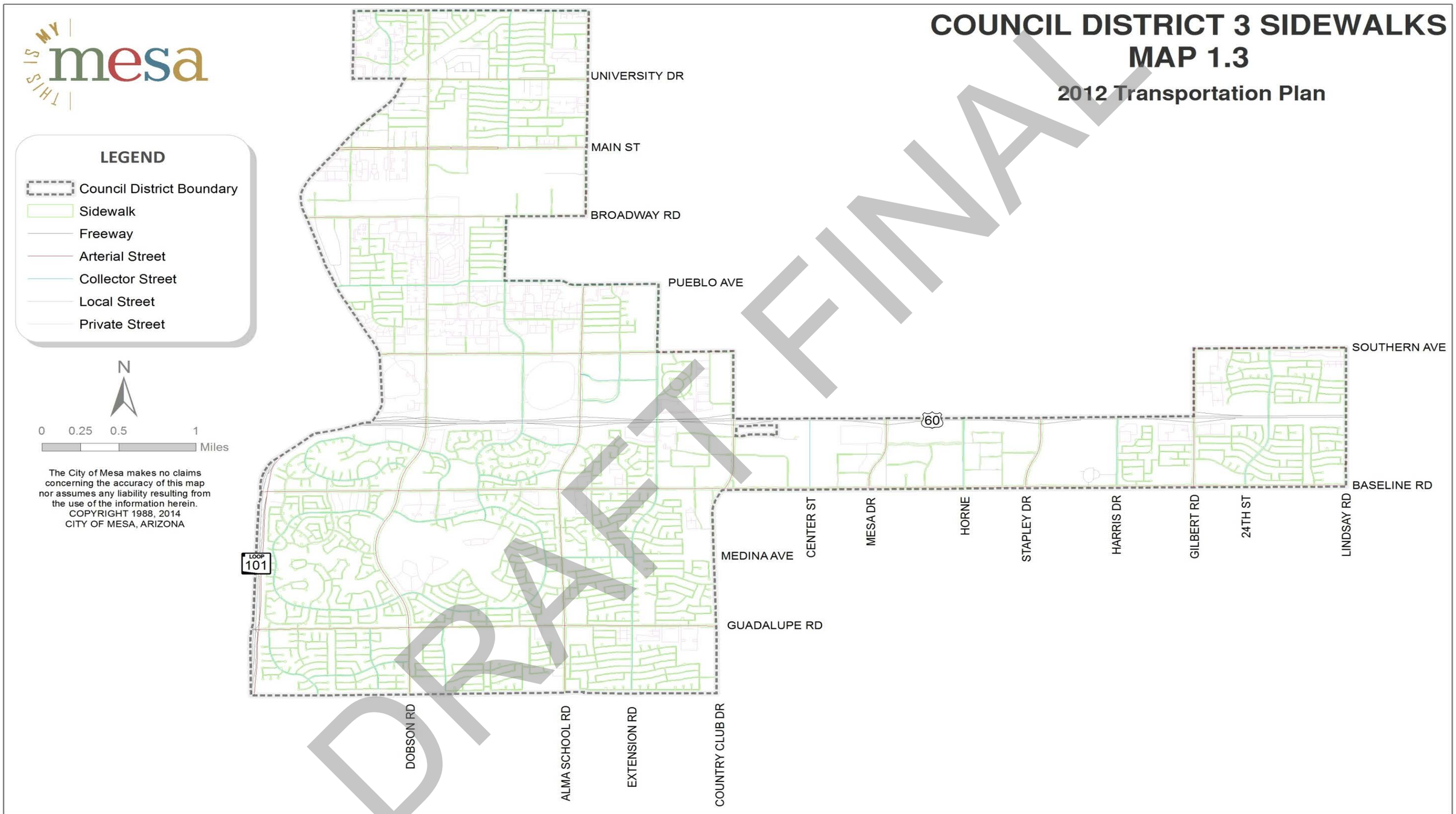


COUNCIL DISTRICT 2 SIDEWALKS
MAP 1.2
2012 Transportation Plan



COUNCIL DISTRICT 3 SIDEWALKS MAP 1.3

2012 Transportation Plan

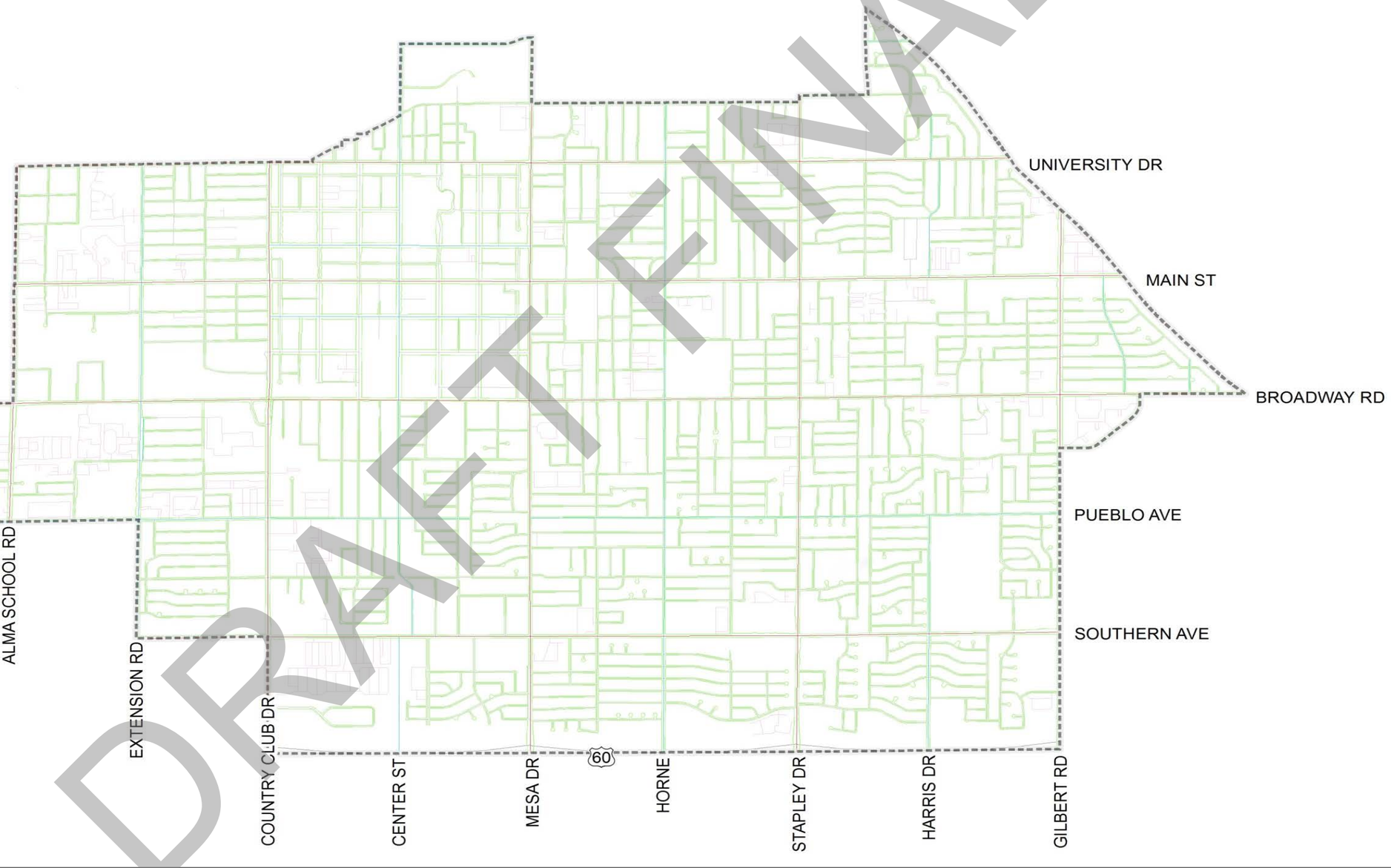


COUNCIL DISTRICT 4 SIDEWALKS MAP 1.4

2012 Transportation Plan

LEGEND

- Council District Boundary
- Sidewalk
- Freeway
- Arterial Street
- Collector Street
- Local Street
- Private Street



N

0 0.175 0.35 0.7 Miles

COUNCIL DISTRICT 5 SIDEWALKS MAP 1.5

2012 Transportation Plan

LEGEND

- Council District Boundary
- Sidewalk
- Freeway
- Arterial Street
- Collector Street
- Local Street
- Private Street

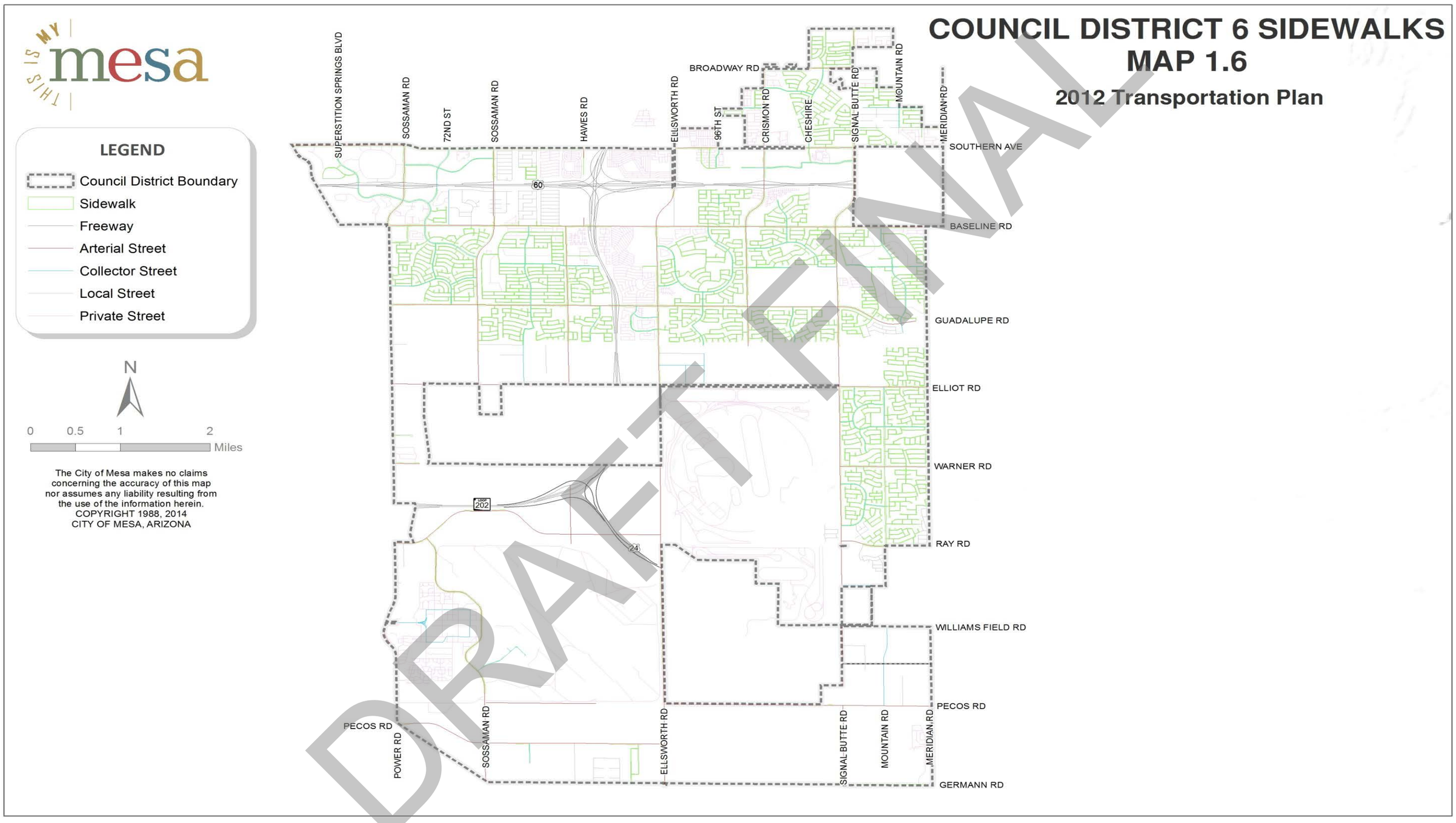
N

0 0.35 0.7 1.4 Miles

THOMAS RD
MCDOWELL RD
HERMOSA VISTA DR
MCKELLIPS RD
LOOP 202
MCLELLAN RD
BROWN RD
ADOBE ST
UNIVERSITY DR
VAL VISTA DR
40TH ST
GREENFIELD RD
48TH ST
HIGLEY RD
ALTA MESA DR
RECKER RD
64TH ST
MAIN ST
ELLSWORTH RD
CRISMON RD
104TH ST
SIGNAL BUTTE RD
MOUNTAIN RD
MERIDIAN RD
BROADWAY AVE
PUEBELO AVE
SOUTHERN AVE
POWER RD
72ND ST
SOSSAMAN RD
80TH ST
HAWES RD

COUNCIL DISTRICT 6 SIDEWALKS MAP 1.6

2012 Transportation Plan



MESA ARTERIAL AND COLLECTOR STREETS WITH SIDEWALK GAPS

Map 2.4.7

Mesa 2040 Transportation Plan

MARICOPA COUNTY

TEMPE

MCC

CHANDLER

GILBERT

APACHE JUNCTION

PINAL COUNTY

Superstition Springs

Falcon Field Airport

Phoenix-Mesa Gateway Airport

Loop 202

Loop 101

60

24

South Canal

Crosscut Canal

Tempe Canal

Consolidated Canal

Eastern Canal

RWCD Canal

CAP Canal

Western Canal

Powerline Floodway

THOMAS RD

LONGBOW PKWY

MCDOWELL RD

HERMOSA VISTA DR

MCKELLIPS RD

MCLELLAN RD

BROWN RD

ADOBE ST

UNIVERSITY DR

MAIN ST

BROADWAY RD

PUEBLO AVE

SOUTHERN AVE

BASELINE RD

MADERO AVE

GUADALUPE RD

ELLIOT RD

MESQUITE ST

WARNER RD

RAY RD

GALVESTON ST

WILLIAMS FIELD RD

FRYE RD

PECOS RD

WILLIS RD

GERMANN RD

EVERGREEN RD

DOBSON RD

LONGMORE

ALMA SCHOOL RD

EXTENSION RD

COUNTRY CLUB DR

CENTER ST

MESA DR

HORNE

STAPLEY DR

HARRIS DR

GILBERT RD

24TH ST

LINDSAY RD

32ND ST

VAL VISTA DR

40TH ST

GREENFIELD RD

48TH ST

HIGLEY RD

56TH ST

RECKER RD

64TH ST

POWER RD

72ND ST

SOSSAMAN RD

80TH ST

HAWES RD

88TH ST

ELLSWORTH RD

96TH ST

CRISMON RD

SIGNAL BUTTE RD

MOUNTAIN RD

MERIDIAN RD

LEGEND

- Sidewalk Gaps
- Mesa Planning Area
- Existing
- Railroad
- Multi-Use Path
- Canal
- Special Location
- City of Mesa Boundary

N

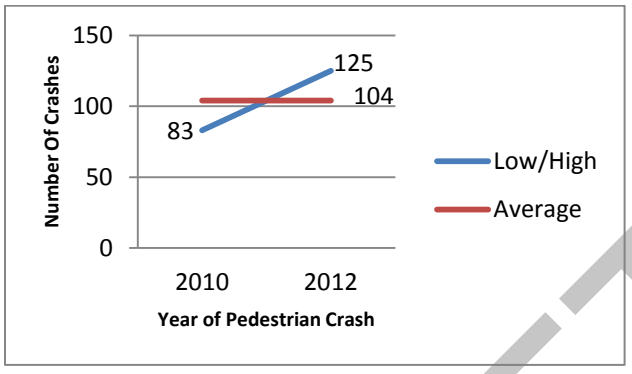
0 0.5 1 2 Miles

M:\Mesa Transportation Plan Update\GIS\Transportation Master Plan\2-4-7 Sidewalk Gaps.mxd 6/6/2014 4:13:26 PM MSowers

Safety

An analysis of crashes involving pedestrians and motor vehicles was completed to better understand the underlying causes of collisions between pedestrians and motor vehicles. The data used in this analysis has been collected through police accident reports and compiled by the Traffic Records Section of the Arizona Department of Transportation for all crashes within the City of Mesa from 2008 to 2012 as shown on Chart 2.4.1.

The total number of crashes in the City of Mesa and statewide has generally decreased from 2008 to 2010 then began to increase from 2010 to 2012.



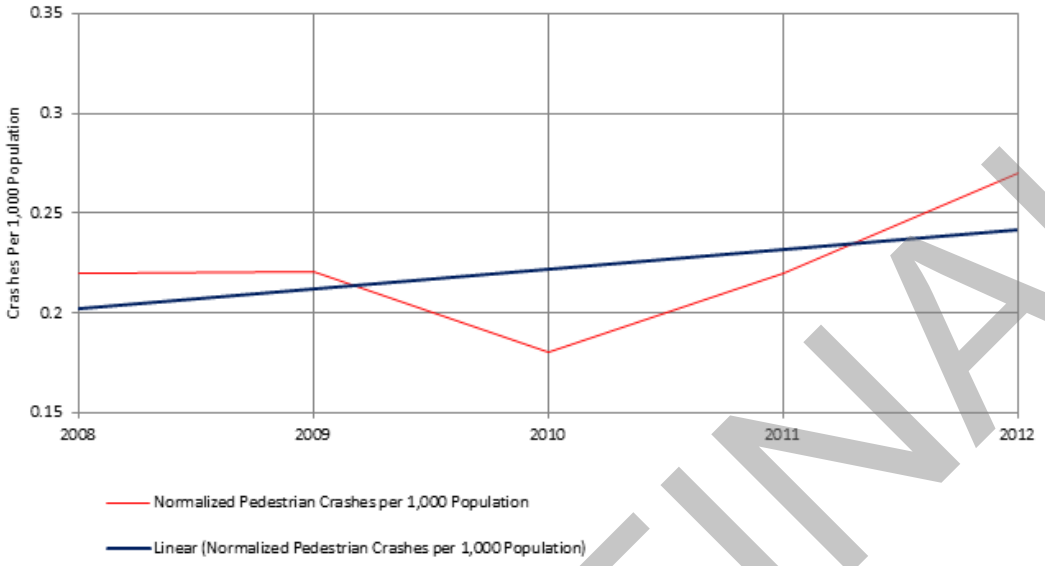
Mesa has averaged six fatal pedestrian crashes per year with a high of ten in 2012 and a low of two in 2010.

Normalization of crash data identifies the number of individuals involved in a type of crash for a given portion of the population. The highest normalized value of total pedestrian crashes occurred in 2012 at 0.27 for every 1,000 Mesa residents involved in a crash and a low of 0.18 in 2010.

The following are facts and figures highlighted in the City of Mesa Annual Pedestrian Crash Analysis 2012.

- Total pedestrian crashes decreased in frequency from 104 in 2008, to a low of 83 in 2010, then increased to 125 in 2012;
- Crashes involving mid-block pedestrian crossings decreased in frequency from 40.8% of all pedestrian crashes in 2008, to 32.5% in 2010, then increased to a 55.0% in 2012;
- When the pedestrian data was normalized the 15-19 age group had the highest overrepresentation in crashes for all age groups at 0.55 individuals involved in a collision for every 1,000 Mesa residents;
- Male pedestrians were 3.2 times more likely to be involved in a crash than female pedestrians;
- The pedestrian was considered the individual at fault in 57.5% of pedestrian collisions;
- Between the hours of 3:00 PM and 6:00 PM 35.3% of all pedestrian crashes occurred;
- The months of October to March contained 60.7% of all pedestrian crashes, and
- The frequency of pedestrian crashes involving alcohol or drugs has steadily declined from 19 in 2008 to 9 in 2012.

Chart 2.4.1 – City of Mesa Annual Pedestrian Crash Analysis 2012



2.4.3 MESA'S PEDESTRIAN FACILITIES TOOLBOX CONCEPT

The Mesa Pedestrian Toolbox concept provides information about tools that can be used to address common pedestrian issues, with six specific toolboxes that focus on:

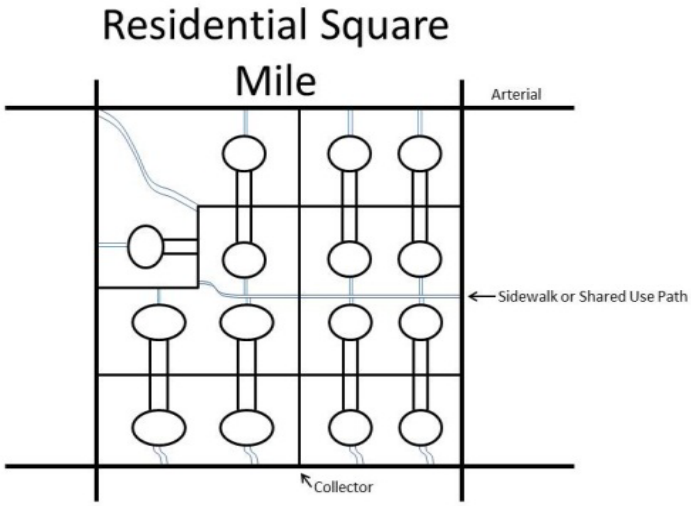
1. **Engineering** – safe and accessible roadways and pedestrian facilities
2. **Education** – of roadway users, pedestrians, property owners, and decision makers about rules, rights, and responsibilities
3. **Enforcement** – of laws, proper behaviors, and use of roadway and pedestrian facilities
4. **Encouragement** – of walking and physical activity throughout the community
5. **Evaluation** – of short- and long-term planning, land use, and zoning for the built environment promoting equity, health, and environmental sustainability
6. **Funding** – to support and sustain pedestrian improvements

Engineering

The Engineering Toolbox is a collection of pedestrian facilities, design strategies, and urban elements that can be installed or implemented to improve the pedestrian environment.

Pedestrian Oriented Design

The Goals and Objectives of this Plan suggest that each square mile neighborhood should be able to connect to an activity center by multiple modes of transportation. This concept is shown below. When considering pedestrian-oriented site development, ensuring that the pedestrian's needs are considered throughout the planning and design process is imperative. Design of a street and private development must meet a wide range of pedestrian needs that encompass all mobility types and limitations.



The best way for this to be achieved is to look at the design of the street and/or proposed development from the perspective of the pedestrian. Planners and engineers need to understand that the design should not just accommodate walking, but should encourage it. The following list as presented in the American Association of State Highway and Transportation Officials (AASHTO) "*Guide for the Planning, Design, and Operation of Pedestrian Facilities*" identifies some of the key elements of a pedestrian-friendly design as:

- Common walkways through parking lots delineated with visible and tactile methods
- Connections to neighborhoods and surrounding areas
- Easily identified building entrances and building frontages located along the street rather than across the parking lots
- A sense of place through sound planning and urban design principles
- Integrated travel modes that emphasize convenience and accessibility for pedestrians, bicyclists, and transit users

Pedestrian-oriented design embodies the notion that transportation planning and land use planning must be linked in order to provide a safe and convenient walking environment. It is characterized by the creation of attractive, interesting places for people to gather, accessible sidewalks and walking paths, buildings oriented to the street, protection from auto traffic, and protection from inclement weather (in Mesa, this usually means shading from the hot desert sun). Pedestrian-oriented design should not be pursued as a means to exclude automobiles; rather, it should incorporate auto travel as a component of the overall transportation system. Several communities have created very effective pedestrian-oriented design guidelines.

Locally, the Maricopa Association of Governments has developed Pedestrian Area Policies and Design Guidelines, and the Regional Public Transportation Authority (RPTA) prepared Pedestrian-Oriented Design Guidelines that are intended to serve as models for Valley Communities. Both documents provide valuable design information, and were considered in preparing this Pedestrian Element.

Commercial Development Design

Conventional commercial land uses are characterized by strip development patterns and chain retail architecture. Typical elements include a building that is separated from the street by a large parking lot, physical separation from adjacent land uses, and an overall lack of pedestrian access and amenities. Pedestrians are forced to travel longer distances to their destinations, and often forced to mix with vehicle traffic.

Conversely, projects designed with pedestrian oriented design concepts and fundamentals in mind provide a convenient, enjoyable pedestrian environment with a mix of uses that are easily accessible. Buildings face the street, providing spatial definition and direct front door access from

sidewalks. Automobile access is provided, although it is integrated as a part of the overall design, rather than as the dominant theme. On-street parking may be provided, and on-site parking is either behind or beside buildings. Pedestrians have the opportunity for window-shopping and social interaction along the sidewalk. Amenities such as awnings, benches, and pedestrian level lighting make walking more convenient. The distance pedestrians must travel to reach their destinations is greatly reduced, making access quick and convenient.

Neighborhoods

The design of new residential neighborhoods has undergone vast changes over the past 70 years. Today, conventional residential tract development is characterized by wide streets, a disconnected network of cul-de-sacs and loops, attached sidewalks, and walled neighborhoods. The most dominant feature, the garage has overtaken the traditional front porch, which has been reduced to a small space outside the front door. Conventional neighborhoods are usually segregated from nearby commercial uses by concrete walls and arterial streets. Many conventional subdivisions back up to arterial streets, necessitating the placement of a continuous wall on both sides of the street creating a tunnel effect, which in turn increases the perception of the street as the domain of the automobile.

Alternatives to the conventional residential neighborhood have developed in recent years. So-called neo-traditional design is geared toward creating more sustainable, pedestrian friendly neighborhoods. Key design features include an interconnected network of narrower streets and smaller blocks, detached sidewalks, alleys with rear loading garages, and pedestrian access to nearby neighborhood commercial uses. Homes in neo-traditional neighborhoods include a variety of architectural styles. Residential and commercial uses are blended together rather than strictly separated as in conventional neighborhoods.

2.4.4 Pedestrian Facilities and Design Considerations

A safe, inviting pedestrian realm is a crucial part of multi-modal street design. A well-designed pedestrian realm provides the following:

- Continuous, interconnected pedestrian travel corridors
- Convenient pedestrian access between commercial and residential land uses
- Convenient access to transit facilities
- A physical buffer from incompatible adjacent uses between adjacent land uses and noise from street traffic
- Visually interesting and inviting public spaces for exercise and social interaction

Key considerations when designing the pedestrian realm include safety, comfort, ease of access, and relationships to other elements of the street realm. The pedestrian realm provides spatial definition to the street, and helps reduce the dominance of auto traffic. Adjacent land uses should be oriented to the street to focus pedestrian activity and to improve access to transit facilities.

Following is an overview of the design elements for specific components of the pedestrian realm-sidewalks, pedestrian amenities, on-street parking, landscaping, signalized street crossings, shared-use pathways, and transit. Each element is discussed in terms of general issues and more specific design considerations. Further review will be necessary to determine how and where the guidelines would be applied in the City of Mesa. For example, the provision of pedestrian amenities (e.g., benches and water fountains) may be appropriate for activity areas like the downtown core, but not for less intensely developed areas.

Sidewalks

Sidewalks are the most basic element of the pedestrian system. Sidewalks provide access to adjacent land uses, transit facilities, and on-street vehicle parking. Sidewalks provide more to the community than simply moving people on foot; they provide space for vital social interaction, window-shopping, bicycle parking, and space for pedestrian amenities. Sidewalks that are detached from the curb provide an additional buffer for pedestrians from automobile traffic. This increases the feeling of personal safety, whereas attached sidewalks create an uncomfortable feeling of vulnerability due to the proximity of automobile traffic, greatly reducing pedestrian confidence and walkability.

Sidewalks should provide the most direct connection possible between a pedestrian's origin and destination. This concept is especially important in Mesa's hot desert climate, where walk distances may be limited during the summer months. Sidewalks that are detached from the curb should follow the contour of the street. Deviations under certain circumstances (e.g., to avoid an existing landscape feature) may be necessary, but should be gradual, and should be minimized.

Design Considerations

- All sidewalks should be continuous and interconnected, and should be provided on both sides of the street.
- In areas outside activity centers, sidewalks should be detached from the curb to provide space and comfort for pedestrians.
- Sidewalk width should be determined based on the use and amount of activity that is expected, but should be no less than six feet wide on arterials and collectors.
- The preferred width of a sidewalk is 12 to 15 feet in commercial and mixed-use areas with storefronts close to the street. The minimum width in these areas is eight feet.
- All sidewalks should provide a minimum five-foot clear zone, as required by the Americans with Disabilities Act to allow passing space for wheelchairs. ADA requires a wheelchair passing space every 200 feet along public walkways.
- Pedestrians want to walk in the shortest distance possible – meandering sidewalks should be avoided. Landscaping, pedestrian amenities, and other features can provide a more visually interesting atmosphere without forcing pedestrians to walk longer distances.
- Sidewalk widths of greater than 12 feet provide space for pedestrian amenities and for local business activity to spill out onto the sidewalk.

- Ensure the area dedicated to pedestrian through traffic is not obstructed with street furniture, utility poles, garbage cans, traffic signs, or vegetation.

- Vehicle access to adjacent land uses (curb cuts) should be consolidated to minimize auto/pedestrian conflict points.

- All driveways should incorporate ADA compliant design per City of Mesa Standard Details.

- General maintenance (e.g., fixing potholes and broken sidewalks) is crucial to the pedestrian experience, both for physical safety and to provide an overall sense of security.

- Sidewalks should not be combined with bikeways unless the facility is specifically designated as a shared-use path with a preferred 12-foot width.

- Materials and construction methods should be selected that consider long-term maintenance and appearance.

Pedestrian Amenities

Pedestrian amenities include items like benches, water fountains, shade structures, information kiosks and maps, transit stations, and trash receptacles.

Sidewalk amenities serve pedestrians and those doing outdoor activities. Additional streetscape features, such as lighting and signing for motorists, are typically placed within the sidewalk environment, and should be integrated with the overall pedestrian realm.

Pedestrian amenities increase the convenience of the pedestrian environment. Selecting, designing, and placing amenities require special consideration. Their placement shouldn't necessarily be uniform; rather, they should be located where they're needed, and should be flexible as the area changes over time.

Design Considerations

- Provide areas for people to gather in informal settings to enjoy the outdoors. Ensure that seating is well located and comfortable.
- Pedestrian plazas, benches, café tables, bus shelters, special landscaping, etc., should be provided along public streets to give people an opportunity to socialize and spend time outdoors.

Special pedestrian areas, such as the Pedestrian Overlay Area in the downtown core, require special consideration for pedestrian amenities, including pedestrian level lighting. Pedestrian amenities should be placed for the length of the special use area, and typically with much greater frequency.

On-Street Parking

On-street parking is a feature of many well-designed streets. It is located between the curb and the outside travel lane (or bicycle lane on some streets), and is either parallel or diagonal to the curb. On-street parking supports area businesses and improves pedestrian safety by providing a buffer from busy street traffic. It also visually narrows the street, signaling drivers to slow down.

On-street parking should be provided to help meet the needs of adjacent land uses. In regional activity centers with higher density development, additional public or shared parking structures will be needed. Parking below grade is preferred to above grade structures to preserve street level space for commercial activities. However, below grade parking is more expensive.

Design Considerations

- The standard parking lane width for parallel parking is seven feet to eight feet.
- Consider extending sidewalks and curbs at transit stops across the on-street parking lane to increase pedestrian access.
- To minimize urban space used for vehicle storage in activity centers, consider crediting on-street parking towards parking requirements for adjacent uses, particularly in pedestrian activity areas.

Landscaping

Natural vegetation, in particular trees, provides an important element to the pedestrian experience. Trees provide shade, help buffer pedestrians from busy streets, and help establish rhythm and character. Ground cover, shrubs, and flowers also add character, and help provide texture and scale along pedestrian ways.

Natural landscaping in medians helps break up the "sea of asphalt" prevalent with many Valley arterial streets. Planter strips should be provided between the curb and sidewalk in areas where pedestrian demand is less, to provide opportunities for trees and shrubs to enhance the walking experience. In particular, the walking environment along busy arterials can be greatly enhanced with detached sidewalks and trees and shrubs added to the planting strip, giving the pedestrian an increased feeling of safety. Vegetation used along public streets should reflect the identity of the Sonoran Desert, and should follow xeriscaping principles that minimize water needs.

Design Considerations

- Maintain adequate safety standards, including sight distance, in the design of natural landscapes.
- Use drought tolerant trees and shrubs, perennials, and groundcovers cited in the Arizona Department of Water Resources low-water use plant list.
- Trees should typically be planted between 15 and 25 feet apart, depending on species, to maintain a continuous tree canopy. However spacing needs to be adjusted near intersections and driveways to maintain sufficient sight distance.
- Landscape strips with trees should be at least eight feet wide. Landscape strips with some tree types, or with shrubs and ground cover may be less than eight feet.
- Provide adequate funding and resources to maintain investments in landscaping.

Signalized Street Crossings

Street crossings provide important connections along pedestrian routes. Wide intersections often divide areas of the community, and discourage pedestrian traffic. Long pedestrian crossing distances also negatively impact automobile traffic, as longer walk intervals are required to allow the pedestrians to safely cross the street. In some instances, curb extensions or bulb-outs may be used to shorten the distance pedestrians must

travel, both at intersections and mid-block crossings.

Key elements in developing a pedestrian friendly environment at street crossings include the width of the street, geometry of the intersection, volume of pedestrian and auto traffic, right-of-way constraints, and frequency of crossing opportunities. In many instances, improvements for pedestrians (and bicyclists and transit users) require trade-offs with vehicle through capacity. Consideration should be given to pedestrians as well as other modes when designing and constructing intersection improvements.

Curb radii affect the speed of turning auto traffic. An intersection with a shorter radius forces drivers to move more slowly when making turns, which is desirable in high pedestrian areas. Issues to consider when establishing curb radii requirements include pedestrian and auto traffic volumes, and the size and number of large vehicles expected on the street.

Mid-block signalized crossings are sometimes necessary to allow pedestrians to cross large streets in areas with infrequent crossing opportunities that would require the pedestrian to travel a significant distance out of their way. A thorough analysis should be employed to evaluate a proposed mid-block signalized crossing before installation. Factors to be considered include pedestrian volume, sight distance, vehicle speed, accident history, lighting, traffic volume, adjacent land uses, etc. Improperly installed mid-block signalized crossings can result in disruption of traffic flow that increases the potential for collisions and potential driver confusion for signals that are too close together.

Design Considerations

- The types of pedestrians using crosswalks, in particular children and the elderly, should be considered in establishing pedestrian crossing times at signalized intersections.

- Depending on specific site conditions, consider mid-block crossings when the spacing of signalized intersections is greater than 660 feet and pedestrian travel demand in the area is high.

2.4.5 Shared-Use Pathways

Shared-use paths are facilities exclusive to non-motorized users and have minimal vehicle cross traffic. Shared-use paths are not to be confused with trails, which are similar with regard to right-of-way, but typically are not paved.

Shared-use paths provide excellent recreational opportunities for bicyclists as well as joggers, walkers, roller-bladers, and wheelchair users. Shared-use paths can occupy abandoned railroad alignments, canal access roads, or utility

easements, as well as parks and educational campus environments.

An important consideration when planning and designing shared-use paths are the aspect of access management to local residential and commercial development. Access opportunities should be provided frequently for local streets, neighborhoods, activity centers, and parks. Shared-use paths should be well lit to provide security and visibility.

The City of Mesa strives to achieve a minimum of 10 to 12 feet in width for shared-use paths. A 10-foot wide path complies with the AASHTO Guide. However, when possible, paths ranging from 12-15 feet are preferred. Conversely, there are often situations where the area is too narrow to obtain the minimum desired width. In those cases it is better to reduce the path width for a distance than terminate it all together.

- In locations that will be used by equestrians in addition to bicyclists and pedestrians, consideration should be given to additional accommodations for horses. Equestrians should be offered a mode separation that will afford a horse better footing such as decomposed granite or sand.

2.4.6 Transit

Pedestrian improvements are needed to connect public walkways and adjacent land uses with transit centers, bus stops, light rail stations, and park-and-ride lots. The pedestrian amenities discussed above, including shade and benches, help ensure the facilities are comfortable and safe for transit passengers waiting for their ride.

2.4.7 Other Design Considerations

There are numerous other design issues that impact the quality of the pedestrian environment. Each should be considered when developing pedestrian oriented design standards. These include the following, which are further discussed below:

- Activity Centers or Nodes
- Removing barriers
- Maintenance and construction practices
- Buffer, fences, and soundwalls
- Site access control
- On-site parking
- Designing for the elderly
- Traffic calming

Activity Centers or Nodes

The concept of “Activity Centers” is defined as “any place that attracts people for shopping, working, studying, recreation or socializing.”[10] It is a goal of using activity centers to reduce individual car usage and encourage people to transfer to another mode of transportation. This concept could possibly help to reduce fuel consumption, as well as save users money and time for more efficiency in the long term. In order to ensure the success of this concept, public transportation must be an attractive option for travelling to activity centers. Without the correct multi-modal transportation infrastructure in place, people may turn back to their single occupant private motor vehicles for transportation.

[10] (Department of Sustainability and Environment, 2002)

Removing Barriers

Improving the pedestrian environment often requires finding solutions to physical barriers. Barriers are either permanent physical features (e.g., canals, railroads, retention basins, retaining walls, narrow bridges, and freeways) or temporary, as in the case of trash pick-up day in many neighborhoods. Brick crosswalks can also be hazardous to wheelchair-bound pedestrians and the visually-impaired. Solutions can include alternate routing, facility modifications, or new pedestrian overpasses or underpasses.

Maintenance and Construction

Pedestrian facilities that are not maintained can be deterrents to walking. Walkways, traffic signs, and traffic signals all require routine maintenance to ensure proper working order. In addition, vegetation should be routinely trimmed to maintain adequate sight distances at intersections and driveways and to avoid creating hiding places for criminals. Adequate funding and maintenance practices are needed to preserve walkways in a smooth, clean, and safe condition.

Buffers, Fences, and Soundwalls

Buffers, fences, and soundwalls provide physical separation between the public right-of-way and adjacent land uses, and can be used to enhance the overall appearance of roadways. Fencing and soundwalls should not isolate neighborhoods. Ideally (for bicycle and pedestrian access), breaks should be provided at a rate of approximately 8 per mile, with a maximum spacing of 660 feet.

Site Access Control

The point at which a sidewalk crosses a driveway creates a primary conflict point between pedestrians crossing the driveway when traveling along the sidewalk and vehicles entering and exiting the property. Minimizing the number of driveways that serve adjacent land uses reduces the number of conflict points.

On-Site Parking

As previously discussed in the section on Commercial Development, the design of on-site parking is an important part of the pedestrian environment. Properly designed parking areas accommodate pedestrian circulation, as well as accommodating the car. Conversely, poorly designed, over-sized parking areas are difficult for pedestrians to negotiate, and contribute to the perception of an auto-dependent society. Elements to consider in designing pedestrian friendly parking areas include the following:

- Clearly delineated walkways that are separated from traffic lanes (preferably between rows of head-in parked cars); walkways should provide direct access from the street and between buildings.
- Landscaping that delineates pedestrian walkways and helps visually reduce the size of the parking lot.
- Screening to reduce the visual impact of the parking area.
- Internal circulation and shared parking between adjacent land uses.

2.4.8 Designing for the Elderly

The population of Maricopa County residents 60 and older is expected to rise from approximately 13% in 2011 to 26% by 2050.[11]

Pedestrian design standards that consider the special needs of the elderly will become increasingly important in the future. Clear, unobstructed walkways, longer crossing times at intersections, higher lighting levels, brighter lane markings, and larger, brighter signs are just a few elements that are important in meeting the needs of the elderly population.

2.4.9 Traffic Calming

When arterials become congested, motorists often look for short-cuts through residential neighborhoods. Neighborhood traffic calming techniques (e.g., speed humps, traffic circles, narrow streets, curb extensions, chicanes, and diverters) are designed to help reduce cut-through traffic and excessive speeds in residential areas, greatly improving the pedestrian environment.

Existing and Future Needs

Recommendations for future pedestrian improvements should center on improving the accessibility and convenience of the overall pedestrian environment. This will require developing and implementing pedestrian-oriented design standards, both for capital roadway improvements and for the design of future development and redevelopment projects. The level to which the City is able to retrofit existing transportation facilities will vary according to existing site conditions, financial resources, and community support. For example, when constructing a street improvement project, it may be cost prohibitive to obtain enough right-of-way to include a detached sidewalk. However, the design guidelines should be considered a starting point in developing a more enjoyable and convenient pedestrian environment.

In developing pedestrian design standards, the City should consider the following elements:

- Development of an interconnected, local street network
- Integration of the pedestrian system with other modes of travel
- Community design principles that provide balanced approach for all modes of transportation
- Context Sensitive awareness and design
- Integration of land uses through neo-traditional design principles
- Integration of appropriate pedestrian amenities into the pedestrian realm
- Building setback and orientation requirements that help create active, pedestrian frontages
- Parking design requirements that enhance pedestrian access
- Identification and elimination of barriers to pedestrian travel
- Changing design needs associated with the projected increase of elderly residents in Mesa

[11] (http://slhi.org/pdfs/studies_research/CoA_Geo-demographics_of_Aging.pdf).

- Traffic calming practices for both new and existing development
- Specific design requirements associated with Mesa's desert environment

Education

Education can be a powerful tool for changing behavior and improving safety skills. Pedestrians and motorists can both benefit from instructive tools and messages that communicate to them the rules, rights, and responsibilities of people using various modes of travel.

There are major distinctions in the walking abilities, behavioral patterns, and learning aptitudes of different groups of pedestrians. Children possess different physical and cognitive capacities than adults. New drivers' exhibit different behaviors and driving skills than experienced drivers do. All drivers are pedestrians who can be reached through differing educational models. Due to these differences in learning capabilities and preferences, educational programs need to be tailored to the specific audiences they intend to address and to the behaviors they seek to modify.

For each of these groups, it is important to consider:

1. **When and how the audience should receive information**—for instance, children, depending on their stage of development, may not be able to understand certain messages or complicated images used to convey messages.

2. **Demographic factors**—for example, how the percentage of non-English speakers in a community affects the educational materials developed or how people with disabilities or low-income populations can get access to the information.

Awareness campaigns intended for commuters or employees often concentrate on messages to encourage motorists to carpool, use transit, or consider non-motorized transportation means.

When developing pedestrian education programs in Mesa, staff will concentrate its focus on the following groups:

1. Roadway Users
    a. Child Pedestrians
    b. College Age Pedestrians
    c. Adult Pedestrians
    d. Elderly Pedestrians
2. Commuters
3. Transportation Officials

Focusing on those groups listed above ensures that Mesa is reaching out to a wide and diverse cross section of its population. By expanding the educational programs to reach such a large number of Mesa residents the information that is taught and distributed will provide a solid base of awareness to the majority of users on the roads.

Enforcement

Laws should be consistent and interpreted consistently so that neither police nor users (motorists and pedestrians) will be confused on what is legal behavior.

Enforcement of pedestrian laws is a function of the Mesa Police Department. Enforcement of traffic

laws is an important component of educating motorists and pedestrians about the laws of the road as well as improving safety of the interactions between both users.

Police enforce laws for pedestrians, bicyclists, and vehicle drivers, to improve safety. Enforcement of pedestrian violations within the community helps promote compliance with traffic laws, potentially reducing the number of violators and repeat traffic offenders. By increasing enforcement of pedestrian related laws, there may be a reduction in fatalities and the number of car/pedestrian crashes, thus promoting increased safety.

Types of enforcement throughout the City may include issuing citations, conducting arrests, or providing written or verbal warnings to pedestrians concerning traffic violations. Legal obligations for pedestrians can be found in Title 28 of Arizona Revised Statutes.

Based on observations and input from citizen advocates, advisory boards, survey respondents, and City staff, typical pedestrian-motor vehicle conflicts that should be addressed include the following items:

- Motorists not yielding to pedestrians.
- Pedestrians walking in bicycle lanes.
- Motorists failing to yield to pedestrians in crosswalks.
- Pedestrians disobeying traffic signals.
- New drivers and winter visiting drivers not aware of pedestrian laws.

Between community education and support for enforcement efforts, the City of Mesa can help to build respect between pedestrians and motorists. The Mesa Police Department and the Maricopa County Sheriff's Office can help in identifying high risk areas that have above average crashes and fatalities. The City of Mesa will continue to assess future enforcement needs to promote a safe environment for walking throughout the community. There will also be a thorough analysis of how the City can work to incorporate enforcement components to increase safety for the mode of walking, in order to maintain walking as a safe and efficient mode of transport for citizens of Mesa.

2.4.10 Encouragement

By encouraging people to walk, Mesa staff is helping to build support for creation of more walkable places, contribute to the reduction of air pollution and traffic congestion, and improve physical health. By promoting walking and alerting residents to the benefits of walking through events, incentives and facilities, Mesa is striving to become one of the most walkable communities in Arizona and the US. Mesa is committed to fostering relationships with advocacy organizations that are committed to working to improve the pedestrian environment and to encourage walking through lobbying, research, and community involvement.

The Transportation Advisory Board

The Transportation Advisory Board is an 11 member board of civic-minded citizens wishing to become involved in their local government and make recommendations to the Mesa City Council. This board typically meets monthly to consider transportation related issues and policies involving various modes of transportation, including walking.

The role of the Transportation Advisory Board on pedestrian issues includes:

- Advise the City Council on pedestrian policy issues.
- Interact with citizens on pedestrian issues and mediate when necessary.
- Act as a sounding board for staff on pedestrian operational matters.

- Be knowledgeable about the benefits walking provides within a community.
- Be ongoing citizen/neighborhood contact within member's area of influence and liaison to staff.
- View issues from a "big picture" and "greater good" perspective.
- Be a cheerleader for walking in the community.

Safe Routes to School –

Through efforts to continually expand and enhance the current City of Mesa Safe Routes to School (SRTS) program, the following will be addressed:

- Creation of a new vision statement for City staff that will outline the direction and proposed advancement of the SRTS program strategies related to engineering, enforcement, education, encouragement, and evaluation.
- Cooperation with school officials to add new programs in schools with walking students.
- Established SRTS programs with champions in place will continue to be supported, but will be encouraged to be self-sustaining.
- Additional schools will be recruited to participate in International Walk to School Day.

School Crossing Guard Training — Sponsored by the Maricopa Association of Governments, the City of Mesa provides the location and training for annual East Valley crossing guard training. Past and current Mesa Public School crossing guards, as well as adjoining school districts' crossing guards, are educated in crossing procedures, equipment, traffic laws, health, and safety. The crossing guards then educate the students on how to cross the street while walking and instruct students who ride their bicycles how to cross a crosswalk onto campus.

2.4.11 Evaluation

Performance Measures

Performance measures and benchmarks, which are used to gather and evaluate information that will be used to guide future decisions regarding the expansion of programs and priorities for funding, which are used to gather and evaluate these categories.

These five major categories are:

1. Mode share
2. Rates of crashes, injuries, and fatalities
3. Behaviors (such as looking, crossing, yielding, and driving behaviors)
4. Annual surveys that focus on knowledge, opinions, and attitudes
5. Pedestrian counts
6. Split your trip

1) **Measuring Mode Share –** U.S. Census Bureau, 2012 American Community Survey (ACS) data, identifies Mesa's current walking mode share as of 2011 to be 1.7%, which falls well below the current national average of 2.8%. The Pedestrian Element of the Mesa Transportation Plan

lays out a vision that intends to increase walking trips to work and school mode share within the life of the plan. Annual data will be collected to monitor mode share progression through annual Maricopa County Clean Air Surveys and the continuation of data collection from the ACS.

2) **Pedestrian related crashes, injuries, and fatalities –** Pedestrian crash rates directly reflect walkability. Mesa has been measuring and analyzing pedestrian accidents for many years. When analyzing pedestrian related accidents, Mesa measures those crashes annually, tracking crashes involving pedestrians investigated and reported by the City of Mesa Police Department.

The purpose of analyzing pedestrian related crashes is to better understand the underlying causes of collisions between pedestrians and motor vehicles. Analysis of the crashes reveals the types of streets where crashes happened, behavior of pedestrians and motorists that caused the crashes, the times of day and year crashes occurred, and ages and genders of the pedestrians involved. Once an understanding of the root causes of pedestrian related accidents is gained, the Transportation Department can do further analysis to determine if the traffic environment in the City of Mesa can be made safer for pedestrians.

Analysis of pedestrian related accidents also helps in developing appropriate messages for educating the public on safer walking habits and how pedestrians and motorists can best share the streets. The number of pedestrian related accidents has fluctuated over the past five years. Crashes are normalized by looking at how many pedestrian related crashes occur per every 1,000 people in Mesa's population in a given year. Normalization puts into perspective an increase or decrease in the number of pedestrian related crashes when there is a concurrent rise in the number of drivers, pedestrians and automobiles due to population growth. These reports are conducted annually and can be reviewed at: *http://www.mesaaz.gov/transportation*

3. **Behaviors (such as looking, crossing, yielding, and driving behaviors) –** Like all taught behaviors, there is a necessity to teach the correct behavior to pedestrians in order to achieve those actions, which are cautious and predictable to motorists and other users of the road in order to eliminate confusion and reduce possible conflict situations. These behaviors need to be introduced at a very early age in order to ensure that children form a good foundation for their safety. The City of Mesa contributes to this grass roots method of behavior modeling with programs that are recognized nationally as best practices.

The East Valley crossing guard training that is taught to crossing guards volunteering at area schools is one of the earliest reinforcement programs that Mesa can offer with regards to pedestrian safety. These authority figures are there at the crosswalks every morning of every school day from the first day of school until the end of a student's elementary education, molding young minds and teaching proper and consistent walking concepts. Being there every day with reinforcement and remedial training, the crossing guards confirm that these young pedestrians are navigating the pedestrian walkways of Mesa properly.

These concepts and lessons are taught and retaught by teachers, police, fire, and advocates

in Mesa when pedestrians are children. Then they are reintroduced as a new but familiar concept as the pedestrian becomes a driver of a bicycle and then an automobile providing them with a solid base of understanding with regards to the rules of the road and safe and predictable movements that will keep them out of harm's way.

4. **Annual surveys that focus on knowledge, opinions, and attitudes, and pedestrian counts** – Every year Mesa will set goals to increase user satisfaction of facilities throughout the City. The information Mesa gathers will measure high level relationships with users and will draw attention to areas where Mesa needs to focus more attention. Annual Customer Satisfaction Surveys will be conducted via the Internet allowing staff to collect feedback from users citywide each fiscal year. Information collected through these annual satisfaction surveys will then be compiled, analyzed, and published in a Bicycle and Pedestrian Annual Report that will be presented to the Transportation Advisory Board and made available to the general public.

2.4.12 Future Pedestrian Network

The future network scenario will focus on three guiding goals that are the foundation of the overall future transportation network. These principles have been discussed in other chapters and are reiterated in this element to ensure that all modes of transportation are in synchronization and well-connected throughout Mesa.

This pedestrian element helps to ensure:

- All future pedestrian planning efforts are well connected and accessible.

- All pedestrian facilities are complete.

- The pedestrian facilities network has clearly defined routes connecting origins to the many destinations in Mesa without requiring travel out of the way due to barriers or gaps in the system.

- All current gaps in the arterial and collector pedestrian network will be eliminated with future reconditioning and reconstruction projects.

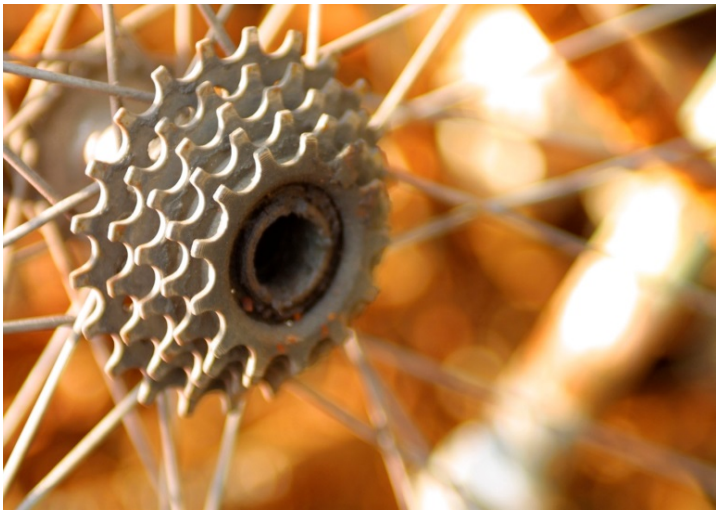
Part III of this plan will address the prioritization of filling gaps at activity centers, along transit corridors and dense square mile neighborhoods.

2.4.13 Summary

This Pedestrian Element of the City of Mesa Transportation Master Plan addresses residents' walking needs. The element also looked at the implementation of those needs through the foundation of Walk Friendly Communities' designation.

The incorporation of the strategies described in each toolbox category of engineering, education, enforcement, encouragement and evaluation will contribute to ensuring that Mesa is creating a more livable community that its residents will enjoy for many years.

Once the 2040 Transportation Master Plan is adopted, ways to fund, coordinate, improve and evaluate facilities and build the future network can be established.



2.5.0 BICYCLE ELEMENT

This Element of the Mesa TMP40 is based on the Executive Summary of the City of Mesa Bicycle Master Plan that was adopted by City Council on January 28, 2013. Much of the material specifics in this element are a direct reflection of in-depth work that is explained and conducted within the 2012 Mesa Bicycle Master Plan. This summation of that plan is meant to give an overall look at the body of work represented by the Bicycle Master Plan. For more detailed information refer to the 2012 Mesa Bicycle Master Plan itself.

The City of Mesa began its bicycle planning nearly 35 years ago when the first Mesa Bicycle Study was conducted, resulting in the first 14.5 miles of bike lanes in the City. Thirty-five years and four bicycle plan documents later, the City of Mesa is one of the premier cities in the southwestern United States for bicycling.

The 2012 Mesa Bicycle Master Plan defines a set of goals, objectives, and strategic performance measures to be completed within the life of the plan, to make Mesa a world class community for bicycling.

While the 2012 Mesa Bicycle Master Plan is visionary, it also constructs a framework that is practical and functional, which will create a bicycle network and supporting facilities and programs necessary to make bicycling a viable choice for a wide variety of trips. This plan is designed to increase social interaction on streets, offer alternatives to driving, reduce pollution, and promote education and awareness, thereby advancing Mesa towards achieving Bicycle Friendly Community "Platinum" status.

As Mesa becomes ever more mindful of the need to be sustainable as a City and to provide a well-connected and intelligent transportation network, it is natural that bicycling is woven into the square mile neighborhoods to provide residents of Mesa the tools needed to function as a city of the 21st century. Bicycling is already a popular form of transportation in Mesa, and current economic factors are motivating more and more residents in Mesa to get out of their automobiles and reunite with bicycling.

2.5.1 Goals and Objectives

The City of Mesa Bicycle Master Plan presented five goals that will be pursued over the life of the plan. These goals are in direct alignment with the goals and objectives that are presented in the Mesa TMP40. These goals can be considered directives that must be taken to achieve both plans' intent. The goals presented in the Bicycle Master Plan are:

Goal One: To increase bicycle mode share for trips to work and school in Mesa within the life of the plan.

Goal Two: To improve safety of bicyclists throughout Mesa, reducing the rate of bicycle related crashes by one-third by the year 2022.

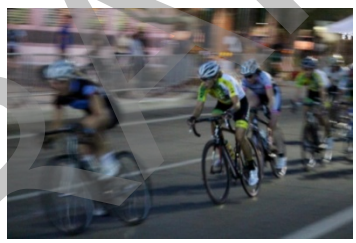
Goal Three: To develop and implement the League of American Bicyclists five measurable E's of a Bicycle Friendly Community: Education, Enforcement, Engineering, Encouragement, and Evaluation.

Goal Four: To achieve Silver, then Gold, and then Platinum level Bicycle Friendly Community Status by the year 2022.

Goal Five: To establish capital and operating budgets for the Bicycle Program at a level to accomplish these goals by 2022.

Each goal is broken down into a series of objectives and strategic performance measures in the Bicycle Master Plan in order to provide realistic steps toward each goal and methods to account for achievements.

2.5.2 Education, Encouragement, and Enforcement



There is an emphasis on the City's intent to attain League of American Bicyclists, Bicycle Friendly Community "Platinum" status. The League of American Bicyclists is the long entrenched advocacy program that has provided the standard for states and communities to strive towards in order to be a complete and holistic place for cyclists to ride.

The League believes in:

- Better biking infrastructure, so people feel safe riding in their community
- Better biking education, so motorists and bicyclists interact safely
- Better biking culture, so that people are encouraged to ride more
- Better biking laws, so that bicyclists are treated fairly Better bike plans, policies and programs, so that our communities enable bicycling to flourish

Currently in Mesa safety education and encouragement programs include media campaigns, special events, public outreach, and participation in the Safe Kids Coalition of Maricopa County. The City also provides resource materials such as bike maps and safety information brochures.

Establishing and developing additional programs and educational opportunities will increase awareness and enthusiasm for bicycling. Proposed new programs include education for children and adults, diversion programs for traffic infractions, education material for motorists, and more participation in the Safe Routes to School program.

2.5.3 MESA'S BICYCLE FACILITIES

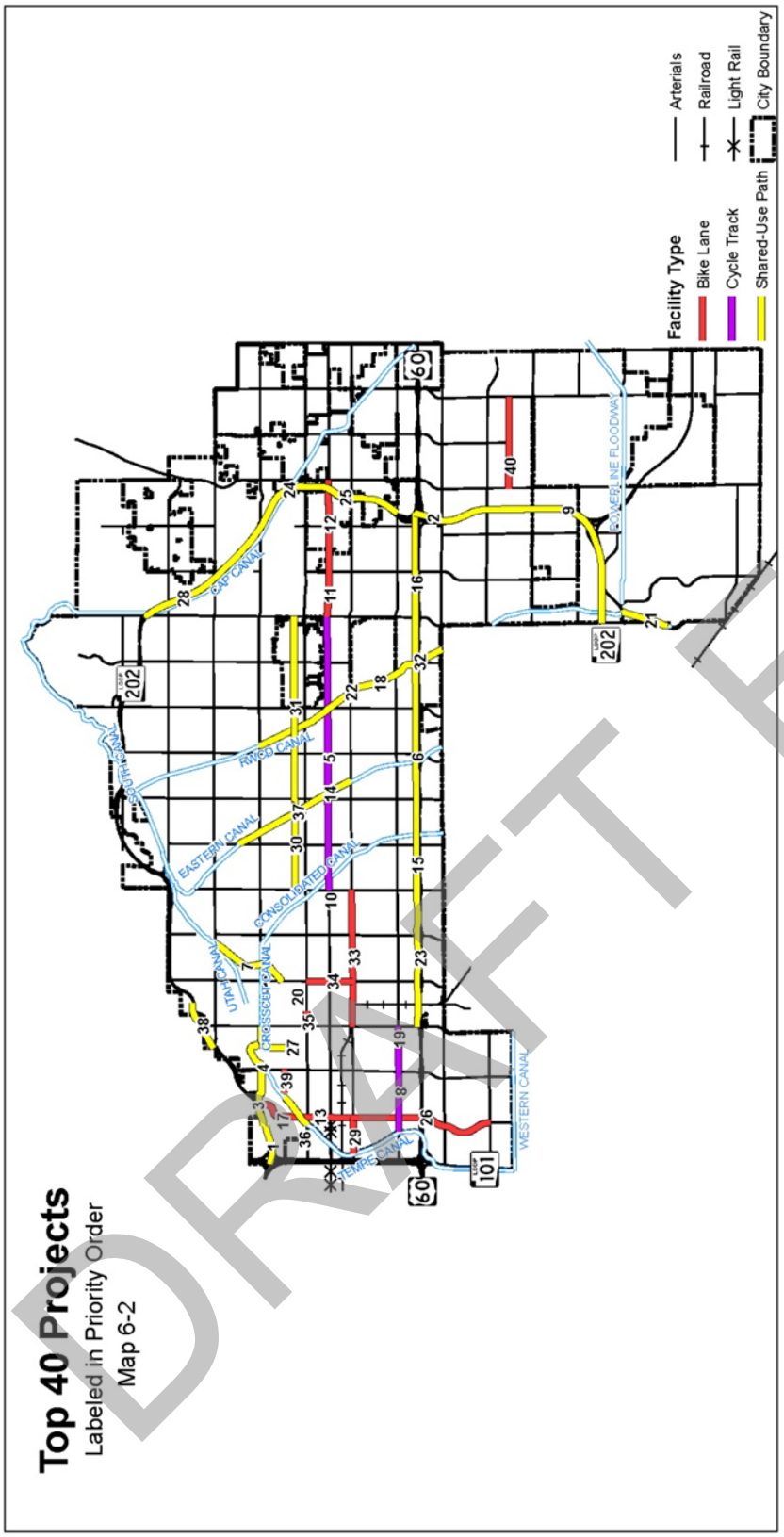
The City of Mesa currently uses standard bike facility elements such as bike lanes and bike routes. The Bicycle Master Plan discusses and proposes design alternatives such as raised, colored and separated bike lanes, "sharrows," pedestrian traffic signals, shared-use paths, wayfinding, and bicycle parking. Bicycle usage can be enhanced by providing short-term and long-term parking as well as increasing availability of bicycle parking in the public right-of-way and in private developments. The

relationship between bicycling and other modes of transportation must always be considered in any future bike facility planning, particularly at activity centers. Mode transfer to or from a bicycle needs to be easy.

2.5.4 MESA'S BICYCLE NETWORK NEEDS

The Mesa Bicycle Master Plan presents a strategy for progression to Bicycle Friendly Community "Platinum" status by recommending expansion of network on-street facilities from 274 centerline miles to 394 centerline miles and off-street facilities from six miles to 93 miles during the life of the plan.

To determine where new facilities are needed, a methodology based on gaps in the existing network was developed. Essentially the analysis consists of identifying various types of gaps across the network to develop a ranking system for needs. This analysis resulted in five levels of need for network segments citywide. These levels are presented graphically as different colors on the Top 40 Projects Map, Figure 1.



Priority	District	Project Location and Description	Facility Type	Multiple District Project
1	One	Riverview/Rio Salado Pathway - Wrigleyville West to Tempe Rio Salado Pathway	Shared-Use Path	
2	Six	Loop 202 Red Mountain Freeway R.O.W. - Baseline Road to U.S. 60	Shared-Use Path	
3	One	Riverview/Rio Salado Pathway - Wrigleyville West to Dobson Road	Shared-Use Path	
4	One	West Mesa Connector - Country Club Drive to Dobson Road	Shared-Use Path	
5	Two	Main Street - Consolidated Canal to Power Road	Cycle Track	
6	Two	US 60 R.O.W. - Lindsay Road to Recker Road	Shared-Use Path	
7	One	Porter Park Pathway - Mesa Drive to McKellips Road	Shared-Use Path	
8	Three	Southern Avenue - Country Club Drive to West City Limit (Fiesta District)	Cycle Track	
9	Six	Loop 202 Red Mountain Freeway R.O.W. - Power Road to Baseline	Shared-Use Path	
10	Four	Main Street - Gilbert Road to the Consolidated Canal	Cycle Track	
11	Five	Main Street - Power Road to Sossaman Road	Bike Lane	
12	Five	Main Street - Sossaman Road to Ellsworth Road	Bike Lane	
13	Three	Dobson Road - Broadway Road to 8th Street	Bike Lane	
14	Two	Shared-Use Path - Eastern Canal - University Drive to Broadway Road	Shared-Use Path	
15	Three	Shared-Use Path - US 60 R.O.W. - Gilbert Road to Lindsay Road	Shared-Use Path	
16	Six	US 60 R.O.W. - Recker Road to the Loop 202 San Tan Freeway	Shared-Use Path	
17	One	Dobson Road - Rio Salado Parkway to the Loop 202 Red Mountain Freeway	Bike Lane	
18	Two	RWCD/EMF - Broadway Road to Southern Avenue	Shared-Use Path	
19	Four	Southern Avenue - Country Club Drive to Extension Road	Cycle Track	Three
20	One	University Drive - Country Club Drive to Macdonald	Bike Lane	

Priority	District	Project Location and Description	Facility Type	Multiple District Project
21	Six	RWCD/EMF - Roy Road to Williams Field Road	Shared-Use Path	
22	Two	R.W.C.D Canal SUP - Brown Road to Broadway Road	Shared-Use Path	
23	Four	US 60 R.O.W. - Country Club Drive to Gilbert Road	Shared-Use Path	
24	Five	Loop 202 Red Mountain Freeway - McKellips Road to University Drive	Shared-Use Path	
25	Five	Loop 202 Red Mountain Freeway - University Drive to Southern Avenue	Shared-Use Path	
26	Three	Dobson Road - Broadway Road to Guadalupe Road	Bike Lane	
27	One	Utah Canal Connection - Rio Salado Parkway to the West Mesa Connector	Shared-Use Path	
28	Five	Loop 202 Red Mountain /CAP - Power Road to McKellips Road	Shared-Use Path	
29	Three	Broadway Road - Dobson Road to West City Limit	Bike Lane	
30	One	Highline Trail - Gilbert Road to Val Vista Drive	Shared-Use Path	
31	Two	Highline SRP Powerline Easement	Shared-Use Path	
32	Two	RWCD/EMF - Southern Avenue to Baseline Road.	Shared-Use Path	Six
33	Four	Broadway Road - Country Club Drive to Gilbert Road	Bike Lane	
34	Four	Mesa Drive - Broadway Road to University Drive	Bike Lane	
35	Four	University Drive - Country Club Drive to Robson	Bike Lane	One
36	Three	Tempe Canal - University Drive to 8th Street	Shared-Use Path	
37	One	Eastern Canal Trail - Lindsay Road to University Drive	Shared-Use Path	
38	One	Salt River Basin - McKellips Road to Center Street	Shared-Use Path	
39	Three	Rio Salado - Longmore Road to Alma School Road	Bike Lane	One
40	Six	Powerline Easement - Ellsworth Road to Signal Butte Road	Bike Lane	

Figure 6

2.5.5 MESA'S BICYCLE PROGRAM NEEDS

In addition to the planned facilities, the plan proposes to expand programs as well. These include safety education for children, adults, bicyclists, and motorists; improving the existing Safe Routes to School Program within the Mesa Public Schools; reducing bicycle related citations through traffic diversion classes; establishing a viable media campaign to deliver bicycle related information to the public; and establishing a tourism campaign that will successfully promote Mesa as a bicycling destination and encourage travel to Mesa for bicycling.

6.0 IMPLEMENTATION, EVALUATION, AND FUNDING

The network segments were scored with a set of "implementation criteria" (qualitative) and "needs analysis" (quantitative). The combination score of the implementation criteria and the needs ranking results were then compiled in a priority list for segment projects citywide that would be used throughout the life of the plan when planning and competing for grant funding opportunities. Furthermore from that complete list of prioritized project a list of the top 40 prioritized projects were compiled and are listed on Table A within this element of the Mesa TMP40, as well as being shown graphically on "Top 40 Projects" Map (Figure 1) included in this document. Note that Table A includes cost data for all projects. These are planning level estimates that should be used mostly for a sense of general magnitude. Actual estimates will be developed during initial design. Finally, the Ultimate Bicycle Network Map on Figure 2 shows the ultimate future bike network that takes into consideration all existing facilities and all future facilities proposed in this plan.

Top 40 Featured Projects

Table A					GAP Evaluation	Implementation Criteria Score						
Priority	Project Location and Description	Facility Type	District	Length	Need Score	Criteria Total Score	Need + Criteria Score	Estimated Costs			Estimated ROW Costs	Estimated O&M Costs/yr
								Design	Construction	30% Contengency		
1	Riverview/Rio Salado Pathway - Wrigleyville West to Tempe Rio Salado Pathway	Shared-Use Path	2	0.9	2.0	7	9	$85,803	$858,025	$257,408	$0	$5,577
2	Loop 202 San Tan Freeway R.O.W. - Baseline Road to U.S. 60	Shared-Use Path	6	0.6	4.0	6	10	$61,905	$619,054	$185,716	$0	$4,024
3	Riverview/Rio Salado Pathway - Wrigleyville West to Dobson Road	Shared-Use Path	1	0.5	3.0	8	11	$48,603	$486,029	$145,809	$0	$3,159
4	West Mesa Connector - Center Street to Dobson Road	Shared-Use Path	1	2.0	2.0	9	11	$399,760	$3,997,601	$1,199,280	$0	$13,111
5	Main Street - Consolidated Canal to Power Road	Cycle Track	2	5.8	1.0	10	11	$720,029	$7,200,291	$2,160,087	$ 1,440,058	$37,442
6	US 60 R.O.W. - Lindsay Road to Recker Road	Shared-Use Path	2	4.0	2.0	10	12	$399,760	$3,997,601	$1,199,280	$0	$25,984
7	Porter Park Pathway - Mesa Drive to McKellips Road	Shared-Use Path	1	1.8	3.0	10	13	$181,392	$1,813,916	$544,175	$0	$11,790
8	Southern Avenue - West City Limit (Fiesta District) to Extension Road	Shared-Use Path	3	1.8	2.0	11	13	$180,000	$1,800,000	$540,000	$360,000	$11,700
9	Loop 202 San Tan Freeway - Power Road to Baseline Road (Gateway Shared-Use Pathway Project)	Shared-Use Path	6	5.6	2.0	11	13	$556,312	$5,563,116	$1,668,935	$0	$36,160
10	Main Street - Gilbert Road to the Consolidated Canal	Cycle Track	4	0.2	1.0	13	14	$29,386	$293,865	$88,159	$58,773	$1,528
11	Main Street - Power Road to Sossaman Road	Bike Lane	5	1.0	1.0	13	14	$24,728	$247,278	$74,184	$49,456	$6,429
12	Main Street - Sossaman Road to Ellsworth Road	Bike Lane	5	2.0	2.0	13	15	$50,447	$504,471	$151,341	$100,894	$13,116
13	Dobson Road - Broadway Road to Rio Salado Parkway/8th Street	Bike Lane	6	1.5	1.0	14	15	$65,000	$650,000	$195,000	$130,000	$9,786
14	Eastern Canal - University Drive to Broadway Road	Shared-Use Path	5	1.1	2.0	13	15	$114,812	$1,148,120	$344,436	$0	$7,463
15	US 60 R.O.W. - Gilbert Road to Lindsay Road	Shared-Use Path	6	1.0	2.0	13	15	$99,266	$992,663	$297,799	$0	$6,452

Marked out projects above have received funding and are currently awaiting design, being designed, or being constructed.

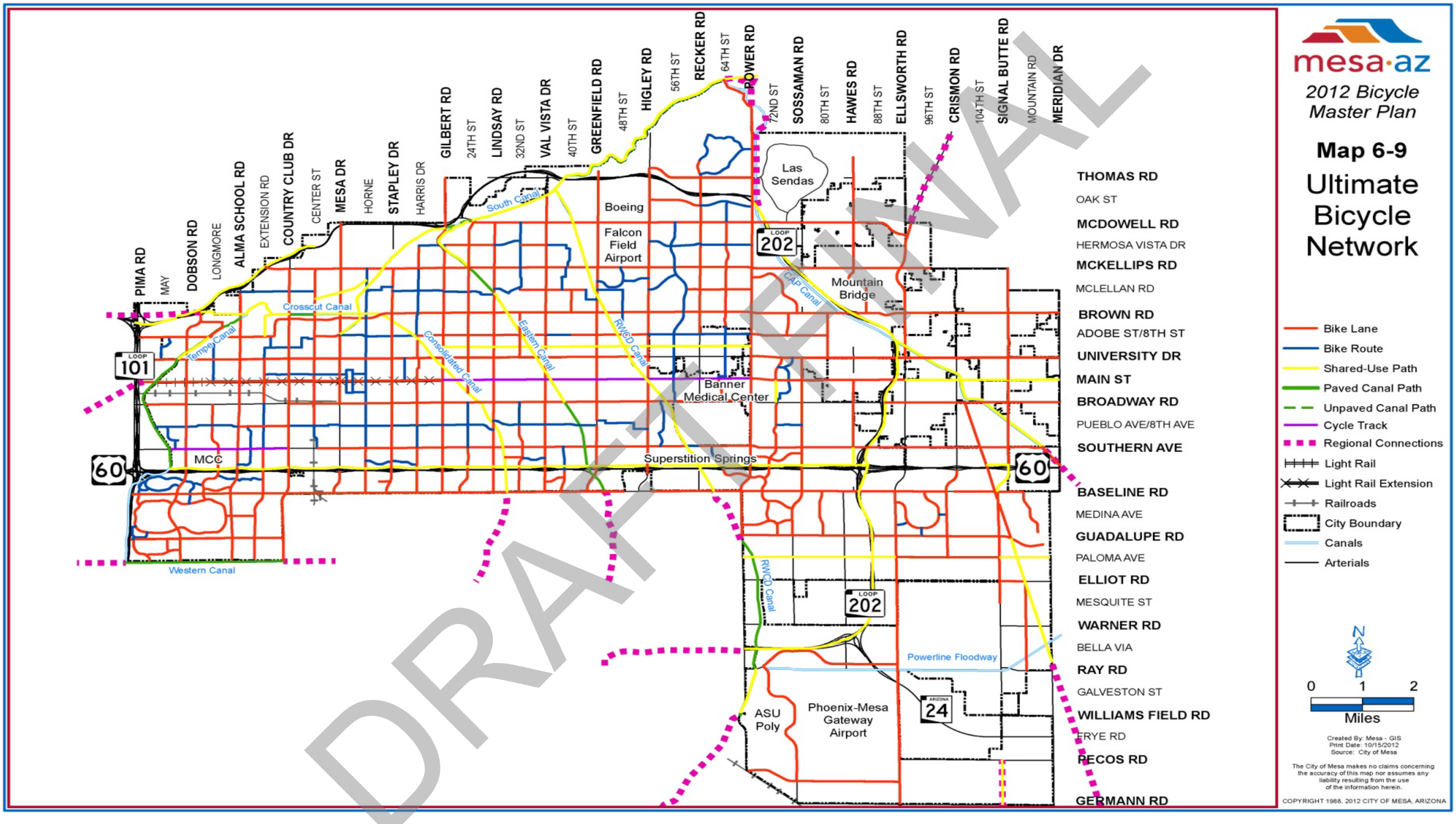
Top 40 Featured Projects

Table A					GAP Evaluation	Implementation Criteria Score						
Priority	Project Location and Description	Facility Type	District	Length	Need Score	Criteria Total Score	Need + Criteria Score	Estimated Costs: Design	Estimated Costs: Construction	Estimated Costs: 30% Contengency	Estimated ROW Costs	Estimated O&M Costs/yr
16	US 60 R.O.W. - Recker Road to the Loop 202 San Tan Freeway	Shared-Use Path	6	3.3	2.0	13	15	$330,668	$3,306,685	$992,005	$0	$21,493
17	Dobson Road - Rio Salado Parkway to the Loop 202 Red Mountain Freeway	Bike Lane	1	0.7	1.0	14	15	$17,221	$172,208	$51,662	$34,442	$4,477
18	RWCD/EMF - Broadway Road to Southern Avenue	Shared-Use Path	2	1.1	2.0	14	16	$143,000	$1,430,000	$429,000	$0	$6,967
19	Southern Avenue - Country Club Drive to Extension Road	Cycle Track	4	0.5	2.0	14	16	$61,938	$619,381	$185,814	$123,876	$3,221
20	University Drive - Country Club Drive to Robson	Bike Lane	1	0.2	1.0	15	16	$4,000	$40,000	$12,000	$10,000	$1,040
21	RWCD/EMF - Ray Road to Williams Field Road	Shared-Use Path	6	1.0	1.0	15	16	$103,190	$1,031,899	$309,570	$0	$6,707
22	RWCD Canal SUP - Brown Road to Broadway Road	Shared-Use Path	2	2.3	4.0	12	16	$231,781	$2,317,812	$695,344	$0	$15,066
23	US 60 R.O.W. - Country Club Drive to Gilbert Road	Shared-Use Path	4	3.0	3.0	13	16	$300,404	$3,004,039	$901,212	$0	$19,526
24	Loop 202 Red Mountain Freeway - McKellips Road to University Drive	Shared-Use Path	5	2.5	3.0	13	16	$253,832	$2,538,317	$761,495	$0	$16,499
25	Loop 202 Red Mountain Freeway - University Drive to Southern Avenue	Shared-Use Path	5	2.5	3.0	13	16	$253,978	$2,539,779	$761,934	$0	$16,509
26	Dobson Road - Broadway Road to Guadalupe Road	Bike Lane	3	3.1	2.0	14	16	$100,750	$1,007,500	$302,250	$201,500	$20,316
27	Utah Canal Connection - Rio Salado Parkway to the West Mesa Connector	Shared-Use Path	1	0.9	5.0	12	17	$68,857	$688,572	$206,572	$0	$5,968
28	Loop 202 Red Mountain/CAP - Power Road to McKellips Road	Shared-Use Path	5	1.7	3.0	14	17	$171,165	$1,711,652	$513,496	$0	$11,126
29	Broadway Road - Dobson Road to West City Limit	Bike Lane	3	0.8	2.0	15	17	$19,614	$196,137	$58,841	$39,227	$5,100
30	Highline Trail - Gilbert Road to Val Vista Drive	Shared-Use Path	1	2.0	5.0	13	18	$199,352	$1,993,518	$598,055	$0	$12,958
31	Highline SRP Powerline Easement - Val Vista Drive to Power Road	Shared-Use Path	2	4.0	5.0	13	18	$399,880	$3,998,799	$1,199,640	$0	$25,992
32	RWCD/EMF - Southern Avenue to Baseline Road	Shared-Use Path	2	1.2	3.0	15	18	$117,225	$1,172,254	$351,676	$0	$7,620

Top 40 Featured Projects

Table A

Priority	Project Location and Description	Facility Type	District	Length	GAP Evaluation: Need Score	Implementation Criteria Score: Criteria Total Score	Implementation Criteria Score: Need + Criteria Score	Estimated Costs: Design	Estimated Costs: Construction	Estimated Costs: 30% Contengency	Estimated ROW Costs	Estimated O&M Costs/yr
33	Broadway Road - Country Club Drive to Gilbert Road	Bike Lane	4	3.0	2.0	16	18	$74,762	$747,621	$224,286	$149,524	$19,438
34	Mesa Drive - Broadway Road to University Drive	Bike Lane	4	1.0	2.0	16	18	$25,124	$251,240	$75,372	$50,248	$6,532
35	University Drive - Robson to Macdonald	Bike Lane	4	0.2	1.0	17	18	$4,757	$47,566	$14,270	$9,513	$1,237
36	Tempe Canal - University Drive to Rio Salado Parkway/8th Street	Shared-Use Path	3	0.8	5.0	13	18	$77,804	$778,043	$233,413	$0	$5,057
37	Eastern Canal Trail - Lindsay Road to University Drive	Shared-Use Path	1	1.6	2.0	16	18	$143,000	$1,430,000	$429,000	$0	$10,719
38	Salt River Basin Shared-Use Path - McKellips Road to Center Street	Shared-Use Path	1	1.1	5.0	14	19	$143,000	$1,430,000	$429,000	$0	$7,208
39	Rio Salado Parkway/8th Street - Longmore to Alma School Road	Bike Lane	3	0.5	5.0	14	19	$12,646	$126,463	$37,939	$25,293	$3,288
40	Powerline Easement - Ellsworth Road to Signal Butte Road	Bike Lane	6	2.0	5.0	14	19	$50,450	$504,499	$151,350	$100,900	$13,117


mesa·az
2012 Bicycle Master Plan
Map 6-9
Ultimate Bicycle Network
PIMA RD
MAY
DOBSON RD
LONGMORE
ALMA SCHOOL RD
EXTENSION RD
COUNTRY CLUB DR
CENTER ST
MESA DR
HORNE
STAPLEY DR
HARRIS DR
GILBERT RD
24TH ST
LINDSAY RD
32ND ST
VAL VISTA DR
40TH ST
GREENFIELD RD
48TH ST
HIGLEY RD
56TH ST
RECKER RD
64TH ST
POWER RD
72ND ST
SOSSAMAN RD
80TH ST
HAWES RD
88TH ST
ELLSWORTH RD
96TH ST
CRISMON RD
104TH ST
SIGNAL BUTTE RD
MOUNTAIN RD
MERIDIAN DR
THOMAS RD
OAK ST
MCDOWELL RD
HERMOSA VISTA DR
MCKELLIPS RD
MCLELLAN RD
BROWN RD
ADOBE ST/8TH ST
UNIVERSITY DR
MAIN ST
BROADWAY RD
PUEBLO AVE/8TH AVE
SOUTHERN AVE
BASELINE RD
MEDINA AVE
GUADALUPE RD
PALOMA AVE
ELLIOT RD
MESQUITE ST
WARNER RD
BELLA VIA
RAY RD
GALVESTON ST
WILLIAMS FIELD RD
ERYE RD
PECOS RD
GERMANN RD
Las Sendas
Boeing
Falcon Field Airport
Mountain Bridge
Banner Medical Center
Superstition Springs
ASU Poly
Phoenix-Mesa Gateway Airport
South Canal
Crosscut Canal
Tempe Canal
Consolidated Canal
Eastern Canal
RWCD Canal
CAP Canal
Powerline Floodway
Western Canal
MCC
LOOP 101
LOOP 202
ARIZONA 24
60
Bike Lane
Bike Route
Shared-Use Path
Paved Canal Path
Unpaved Canal Path
Cycle Track
Regional Connections
Light Rail
Light Rail Extension
Railroads
City Boundary
Canals
Arterials
N
0 1 2
Miles
Created By: Mesa - GIS
Print Date: 10/15/2012
Source: City of Mesa
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AVIATION ELEMENT

2.6.0 INTRODUCTION

Commercial and general aviation make distinct contributions, as well as having particular impacts to the transportation system and the environment.

Airports in the U.S. are critical infrastructure assets that are vital components of the nation's transportation network. They improve the movement of individuals, goods and services, and personal property throughout the country and around the world, allowing the economy to function more effectively and efficiently.

This chapter provides an overview of Mesa's two airports—Falcon Field and Phoenix-Mesa Gateway— their current status and the future role of aviation in the City of Mesa and the State of Arizona.

2.6.1 MESA FALCON FIELD AIRPORT

Falcon Field encompasses a total of 784 acres owned by the City. The primary one-square-mile airport campus is located between Greenfield, Higley, and McDowell and McKellips roads in northeast Mesa.

Falcon Field is a general aviation (GA) reliever airport that serves civilian and military aviation uses such as business, recreation, and fixed-wing and helicopter flight training.

Air space around Falcon Field is managed by the Federal Aviation Administration (FAA). In 2011 there were more than 229,000 total aircraft operations (take-offs and landings) at the airport.

Falcon Field is one of the busiest general aviation airports in the United States. In 2011, it was the 5th busiest general aviation airport in the country and had over 699 based aircraft. More than 110 businesses call Falcon Field home, and they employ over 1,000 people. Each year over $2.3 billion is contributed to the local economy by the airport and its businesses. It is truly an economic engine for the community.

Falcon Field has land available for lease and offers competitive lease rates and terms for aviation businesses interested in locating on the airport. Falcon Field airport is committed to providing the public a valuable air transportation resource and enhancing the aeronautical industry in the community. Falcon Field is known throughout the country as a very safe, friendly airport.

Airport History

Groundbreaking ceremonies were conducted on the same day – July 16, –1941 – for both Falcon Field and Williams Field, both of which served as World War II pilot training bases and now serve Mesa and the East Valley in different capacities. Arizona's dry climate and open spaces made it an ideal choice for pilot training.

Falcon Field opened in September 1941 as a military airport to train British Royal Air Force and U.S. Army Air Force pilots. The first training flight

Falcon Field Circa 1941

was in an American-made Boeing PT-17 "Stearman" biplane. In 1948 the federal government deeded the property to the City of Mesa as a municipal airport. The City contracted daily operations through a private operator until 1968, when it assumed this responsibility. Falcon Field now operates as a fully functional General Aviation Airport.

Airport Administration

The City of Mesa employs a full-time airport Director, who reports to one of two Deputy City Managers. The airport also employs a full-time airport Projects Supervisor and airport Administrative Supervisor who report directly to the airport Director. In addition, there are seven full-time employees who serve in administrative, operational, and maintenance capacities. The airport staff maintains a presence on the airport seven days per week. The airport is an independent business department within the City and operates as an enterprise fund, meaning it is financially self-sufficient and does not require contributions from the City of Mesa's general fund.

Aircraft Activities

- Aircraft operations avg. 628/day *
- Local general aviation 51%
- Transient general aviation 47%
- Air taxi 1%
- Military 1%
- Commercial <1%

* For 12-month period ending 31 December 2012

Based Aircraft

The number of based aircraft is a very strong indicator of the general aviation demand for a particular airport or area. Falcon Field had 699 based aircraft as of August of 2013. This number has fluctuated in the recent years largely due to the rise and the fall of the economy, but historically has shown to stay relatively constant as depicted in Table 2.6.1.

Table 2.6.1
Based Aircraft History
Mesa-Falcon Field Airport

Year	Total of Based Aircraft
2002	917
2003	939
2004	922
2005	926
2006	919
2007	925
2008	873
2009	850
2010	800
2011	791
2012	743
2013	699*

Source: Mesa-Falcon Records as of *August 2013

The based aircraft statistics above are annual averages calculated from the Based Aircraft Report which Falcon Field submits quarterly to the Arizona Department of Transportation. The 2013 figure (699) is an average of the first two quarters (705 and 692).

Existing Airport Facilities – Airside

Runway Information:

Runway numbers and length at Mesa- Falcon Field Airport are as follows:

- Runway 4R/22L is 5,101 x 100 foot, 1555 x 30 m long
- Runway 4L/22R is 3,799 x 75 foot, 1158 x 23 m long

Helipad Information:

Mesa-Falcon Field airport has two designated helipads on the main apron area east of the air traffic control tower. These areas allow for segregated parking of helicopters from fixed-wing aircraft.

Existing Airport Facilities – Landside

Landside facilities are necessary for accommodating aircraft and passengers when on the ground. These facilities are an essential component of the interface between air and ground transportation operations. These facilities typically include the terminal building, fixed base operators (FBOs), aircraft storage hangars, aircraft maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking spaces, utilities, and aircraft rescue and firefighting.

Falcon Field, its aviation businesses and the surrounding industrial parks form an active, vibrant economic engine in Mesa. On-airport businesses provide the following services to support aviation operations:

- Aircraft manufacturing and fabrication
- Aircraft fueling
- Aircraft sales and rentals
- Aircraft charters
- Aircraft maintenance and repair
- Component and engine sales, maintenance, repairs, overhauls, modifications and installation
- Avionics installation and repairs
- Aircraft painting and detailing
- Aircraft interiors and upholstery
- Aircraft restorations and conversions
- Aircraft auctions
- Flight training
- Aerial photography and sightseeing flights
- Hangar sales and leasing
- Rental cars

The Boeing Company, Arizona's top-ranked aerospace/defense manufacturer, borders Falcon Field on the north. Boeing employs approximately 4,700 people at its Mesa facility. Its Apache Attack Helicopter and Unmanned Airborne Systems divisions are headquartered in Mesa, where the AH-64D Apache attack helicopters are built.
MD Helicopters is located on Falcon Field, where it manufactures its unique rotorcraft and employs approximately 300 people. The company deploys rotorcraft around the world for military, public safety, business and private use.

The Commemorative Air Force (CAF) Airbase Arizona displays military aircraft representing the eras of World War I through Vietnam, as well as an extensive array of exhibits, offering warbird rides, group tours, and private events.

Falcon Field has 60 acres of aeronautical land available for lease. Most parcels have direct runway/taxiway access for aviation businesses interested in locating on the airport. Hangar space and helipads at Falcon Field house a variety of aircraft and helicopter operations as well as for manufacturing.

In addition, 63 acres are available for non-aeronautical development to the west across Greenfield Road from the airport. This site, which is currently home to citrus orchards, provides space for future development and is, zoned Planned Employment Park (PEP). It is suitable for uses such as professional or medical office parks, research and development facilities, light manufacturing, data and information processing centers.

2009 Mesa-Falcon Field Airport Master Plan
In 2009 The City of Mesa contracted with Coffman Associates to update the Airport Master Plan that had last been updated in 1992. The primary objective of the Airport Master Plan was to produce a long-term development program which would yield a safe, efficient, economical and environmentally compliant air transportation facility. By achieving this objective the City of Mesa will

ensure that Falcon Field Airport will continue to be an economic asset and long lasting iconic landmark for the City. The majority of the information that is included in this section of the Aviation Element was taken directly from that plan.

Based Aircraft Forecast

The decline in the number of based aircraft in recent years reflects a national and state trend due largely to the residual effects of economic recession. According to ADOT's 2013 aviation economic impact report, "Similar trends are found throughout the country and reflect the impact of the recession on active aircraft numbers and operations. Even with this slowdown, the impact of general aviation and the associated airports is still positive."

Other factors causing based aircraft tallies to fall include increased costs for aircraft fuel, maintenance and repairs, and insurance; the aging pilot population; and high training costs resulting in a decline in the number of new student pilots and reduced training completion rates of student pilots.

Despite declining trends, Falcon Field's central location within the Phoenix metropolitan area, well-maintained and continuously upgraded facilities, and friendly customer service continues to result in a waiting list for aircraft hangars.

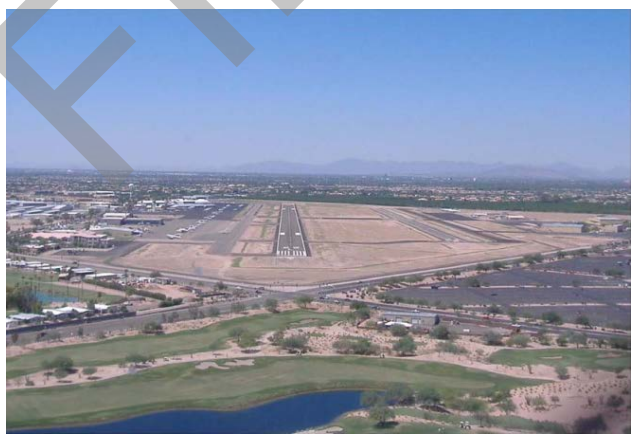
Operations Forecast

The level of aircraft activity at airports is measured in terms of operations. The FAA defines an operation as one takeoff or one landing. Table 2.6.2 below summarizes recent annual aircraft operations at Falcon Field airport.

Table 2.6.2
Annual Aircraft Operations
Mesa-Falcon Field Airport

Year	Operations
2007	314,129
2008	324,089
2009	265,310
2010	223,830
2011	229,430
2012	199,704

The decline from 2011 to 2012 was primarily due to closure of the main runway for five months in 2012 for a safety-related reconfiguration project. With the runway reopened and business flight activity increasing, operations are expected to increase in 2013.



2.6.2 FALCON FIELD AIRPORT PLANNED AREA DEVELOPMENT DESIGN STANDARDS

Character Areas

The evolution of the airport has created identifiable areas within the airport.

Zone 1 - Historic District

This zone is bordered by Greenfield and McKellips Roads and includes Falcon Field Park, West Falcon Drive, the City-owned aircraft hangars, the historic World War II hangars, the terminal building, the FAA air traffic control tower, and privately-

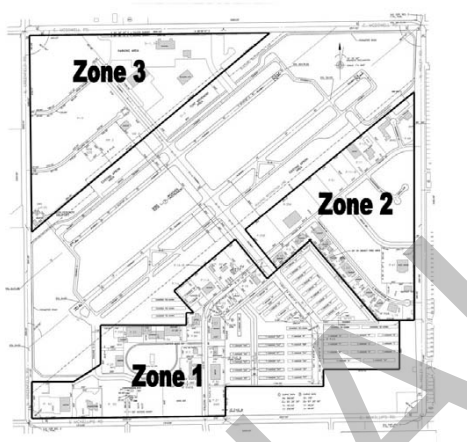
owned businesses. The theme of the area is focused on the airport's history with a retro look of airport architecture reminiscent of the 1940's and 50's. As the airport evolves, this will become a more inviting place where families can enjoy the public amenities that the airport has to offer.

Zone 2 - Eastside District

This district is bordered by Higley Road, privately-owned property adjacent to McKellips Road, and Zone 1. East Falcon Drive, Roadrunner Drive, and Eagle Drive are located in this zone. This zone contains existing business development with space for new aviation business development built around planned construction of a taxi lane across Roadrunner Drive. Currently a mixture of architectural themes, this zone will transform to a more modern theme as new buildings are constructed and existing ones are renovated. It is anticipated that this area will be more traditional in appearance with some modern, artistic enhancements added.

Zone 3 – Leading Edge (Northwest) District

Located in the northwest quadrant of the airport, this zone is bordered by Greenfield Road, McDowell Road, aircraft parking ramp, and taxiways. This zone contains MD Helicopters, privately-owned aircraft storage hangars, and vacant land for new aviation business development. New development will have modern, contemporary architectural design.



Falcon Field Airport

Multi-Modal Connections Design Standards
Connections encourage people to walk by providing safe, convenient, comfortable, and efficient sidewalks.

Falcon Field Planned Area Development Design

Standards direct developers to follow these standards:

- Sidewalks shall be designed to serve internal pedestrian circulation needs, including links to sidewalks within the development, along the street and transit stops.
- Sidewalks adjacent to streets shall comply with applicable City Standards.
- Sidewalks shall be installed along all streets located within the Airport. Sidewalks should be curvilinear, paved and have a minimum width of 5 feet. Sidewalks within the lease area shall be at least 4 feet in width and paved with a hard, durable surface. Where a sidewalk is parallel and adjacent to an auto travel lane, it must be raised and separated from the auto travel lane by a raised curb at least 6 inches high, decorative bollards or other physical barrier.
- Sidewalks within the lease area shall connect the primary entrance of each building or each

public entrance to a sidewalk adjacent to the street. Such walkway shall be provided along the shortest practical distance between the main building entry and public/private sidewalk.

- When crossing a drive aisle, a pedestrian path or sidewalk should be designated through use of a decorative material.

- At public entrances, pedestrian walkways shall be provided with weather protection such as canopies, awnings, arcades and trellises.

- Sidewalks shall be designed to be convenient and attractive. Sidewalks should be easily found by first-time visitors.

Vehicular Circulation

The roadway is responsible for the movement of goods, services, and personnel into and out of the Falcon Field Airport area. All roadways are owned and maintained by the City of Mesa. Unless approved by the Airport Director, City Engineer and City Traffic Engineer, all construction on the Airport shall comply with all applicable City standards for construction in a public right of way. Those City of Mesa Standards include:
Curb and gutter shall be installed on all streets, vehicular driveways and parking areas located within the Airport.
Driveways should be functional, attractive and should seamlessly connect public use areas. Private, secure areas should be clearly marked. Driveways should be sized to accommodate anticipated commercial traffic that requires a larger turning radius.

Capital Improvement Program

Falcon Field's current master plan takes a demand based approach when looking at the development of the surrounding facilities and property that fall within the Falcon Field planning area. The current Falcon Field Master Plan took a look at existing conditions to determine the needs and how those needs directly affected the operation of the airport. Once these needs were established, they were evaluated to determine a realistic capital improvement schedule, and then grouped by horizon year of: short term, intermediate term, and long term.

Falcon Field's annual Capital Improvement Program (CIP) guides the funding and scheduling of Airport improvements to enhance safety and improve infrastructure. The five-year plan for 2013-2017 encompasses over $19 million in airport improvements, which included projects like;

- Airport terminal building renovation
- Runway pavement overlay; and
- City-owned hangar improvements

2.6.3 PHOENIX-MESA GATEWAY AIRPORT

Airport History

The former Williams Air Force Base played a strategic role in America's aviation history.

Over a span of 52 years, more than 26,500 men and women earned their wings at Williams. Gearing up for the combat pilot demands of World War II, the Army Air Corps broke ground in Southeast Mesa, Arizona for its Advanced Flying School on July 16, 1941. In February 1942, the growing military base's name was changed to Williams Field to honor Charles Linton Williams, an Arizona-born pilot. The facility was re-designated as Williams Air Force Base (WAFB) in January 1948.

WAFB was the U. S. Air Force's foremost pilot training facility, graduating more student pilots and instructors than any other base in the country and supplying 25 percent of the Air Force's pilots annually. The Base was closed in 1993 and officially reopened as Williams Gateway airport in March 1994. In 2008, the name of the Airport was changed to Phoenix-Mesa Gateway Airport.

Airport Administration

Phoenix Mesa Gateway Airport is operated and maintained by the Williams Gateway Airport Authority (WGAA), a joint powers airport authority comprised of the cities of Mesa and Phoenix, the towns of Queen Creek and Gilbert, and the Gila River Indian Community. The WGAA was formed to develop, reuse, operate, and maintain the airport property and facilities at the former Williams Air force base.

Runway Information:

Phoenix-Mesa Gateway Airport runways are as follows:

Runway 12R/30L

10401 x 150 ft. / 3170 x 46 m long

Runway 4L/22R

3799 x 75 ft. / 1158 x 23 m long

Runway 12C/30C

10201 x 150 ft. / 3109 x 46 m long

Runway 12L/30R

3799 x 75 ft. / 1158 x 23 m long

Helipad Information:

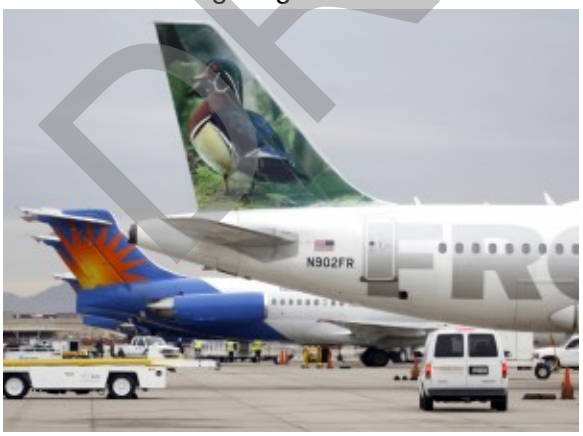
Phoenix-Mesa Gateway airport has two designated helipads on the main apron area west of the air traffic control tower. These areas allow for segregated parking of helicopters from fixed-wing aircraft. In addition to those designated helipads helicopter are also directed by tower staff to land on runways and aprons when appropriate.

Based Aircraft

Table 2.6.3 Based Aircraft History Phoenix - Mesa Gateway Airport	
Year	Total of Based Aircraft
2002	69
2003	71
2004	87
2005	109
2006	115
2007	112
2008	104
2009	123
2010	130
2011	118
2012	106
2013	*N/A
Source: Phoenix – Mesa Records as of *Not Available until January of 2014	

Existing Airport Facilities – Landside

Landside facilities are the ground based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the passenger terminal building, the general aviation service providers, aircraft storage hangars, aircraft maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking, roadway access, and aircraft rescue and firefighting.



Airport Businesses

The follow is a list of the current major airport businesses. This is not a complete list but does include all businesses with need for access to the runway and taxiway system:

- Advanced Training Systems International (ATSI)
- Air Evac Services
- Airline Transport Professionals
- Arizona Aircraft Accessories
- Arizona State University Polytechnic Campus – Flight Training
- ADI Shuttle Service, LLC.
- The Boeing Company
- Cessna Aircraft Company
- Chandler-Gilbert Community College
- Embraer
- Fighter Combat International
- Flight Deck Café
- Jetstrip, Inc.
- L-3 Communications
- Native American Air Services
- Ratts Air Service
- U.S. Customs and Border Protection
- U.S. Marshals Service
- Passenger Terminal Facility

From 1998 to 2001, a 23,800-square-foot building facing the middle apron was redeveloped into the passenger terminal building. This building was originally constructed in 1968. Since 2001 the airport has undergone a transformation that was urgently needed to accommodate the nearly 1.4 million annual passengers that it has served since the addition of airlines such as Allegiant, Frontier, and Spirit.

Fixed-Base Operations (FBO)

Gateway Aviation Services is the only FBO serving Phoenix-Mesa Gateway airport. It is owned and operated by the Phoenix-Mesa Gateway Airport Authority. Gateway Aviation Services provides essential services to the general aviation community.

Passenger Activity

Passenger activity since the introduction of commercial airline flights in 2008 has increased exponentially from 47,522 passengers in 2007 to nearly 1.4 million passengers in 2012. Passenger can now take advantage of flights to several locations throughout the United States without having to travel to Sky Harbor International Airport in Phoenix. Phoenix-Mesa Gateway airport has become an especially favored airport destination for winter visitors traveling to and from their primary residences in the Midwest and Canada. Table 2.6.4 below shows the growth that Phoenix-Mesa Gateway airport has experienced since 2007:

2009 Phoenix-Mesa Airport Master Plan

The master plan was intended to be a proactive document which identified planed future facility needs well in advance of the actual need for the facilities. This was done to ensure that the Williams Gateway Airport Authority (WGAA) could coordinate project approvals, design, financing, and construction that would avoid detrimental effects due to inadequate facilities.

Furthermore the plan identified and provided justification that reserved future land areas that were designated for future facility needs. The master plan provided a vision for the airport that would cover a 20 year planning horizon and, in some cases, beyond. With this vision, the WGAA would have advance notice of potential future airport funding needs to ensure that adequate funds were budgeted and planned for.

Airport Layout Plan (ALP)

An ALP drawing was developed for Phoenix-Mesa Gateway airport, which is shown in figure 1 on the following page. The ALP drawing graphically presents the existing and ultimate airport layout plan. The ALP drawing includes elements such as;

- Physical airport features,
- Wind data tabulation,
- Location of airfield facilities (i.e., runways, taxiways, and navigational aids),
- B-2 and existing general aviation development and commercial development for air carrier airports.

Also presented on the ALP are the runway safety areas, airport property boundary, and revenue support areas. The ALP is used by FAA to determine funding eligibility for future capital projects.

Table 2.6.4
Airline Passenger Totals

Year	Depart	Arrival	Total	Year to Year Change
2007	22,976	24,546	47,522	
2008	180,104	178,226	358,330	654%
2009	291,307	287,846	579,153	62%
2010	402,955	401,385	804,340	39%
2011	477,419	477,456	954,875	19%
2012	688,711	694,250	1,382,961	45%

Plan provides detailed information on existing and future facility layouts on multiple drawing layers that permit the user to focus on any section of the airport at a desired scale. The plan can be used as base information for design and can be easily updated in the future to reflect new development and more detail concerning existing conditions as made available through design surveys.

Capital Improvement Program

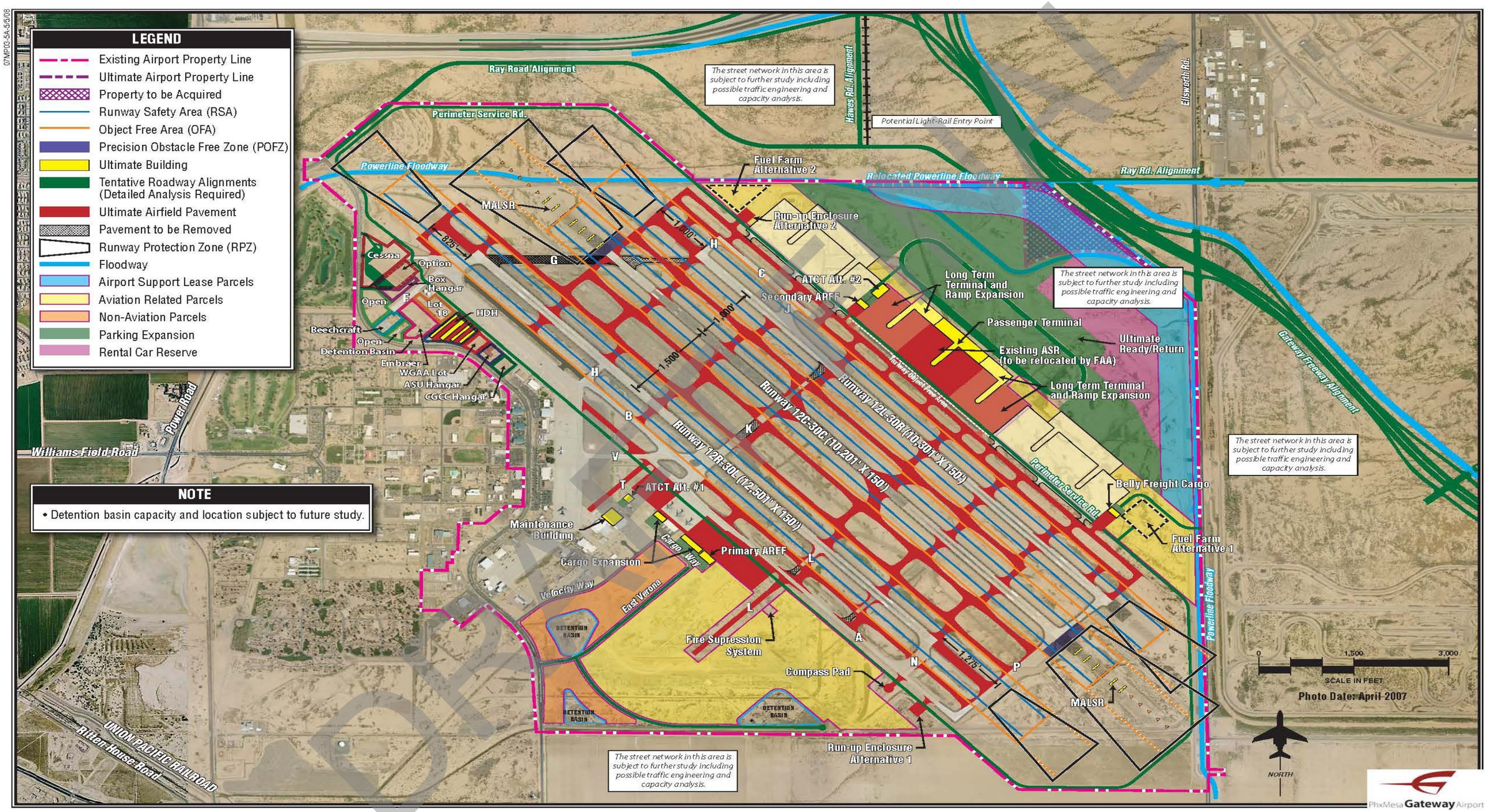
The current Financial Plan for Phoenix-Mesa Gateway airport is in the last year of its current short term CIP totaling $35,053,000. 2014 projects types include:

- East Terminal Building Phase 1 – Design
- East Terminal Roadways and Loop On-Airport – Design
- East Terminal Apron – Design
- Southwest Access Road -
- Runway 12L Extension – Design
- Taxiway C Extension Northwest – Design
- Taxiway L between Taxiway A and Runway 30L Rehabilitate; and
- Pavement Maintenance

Long term projects are estimated to total more than $259.3 million. Of this total, $135.3 million is FAA eligible, $3.6 million is ADOT eligible under their federal grant matching program. The remaining $120.4 million would be the responsibility of the local airport sponsors.

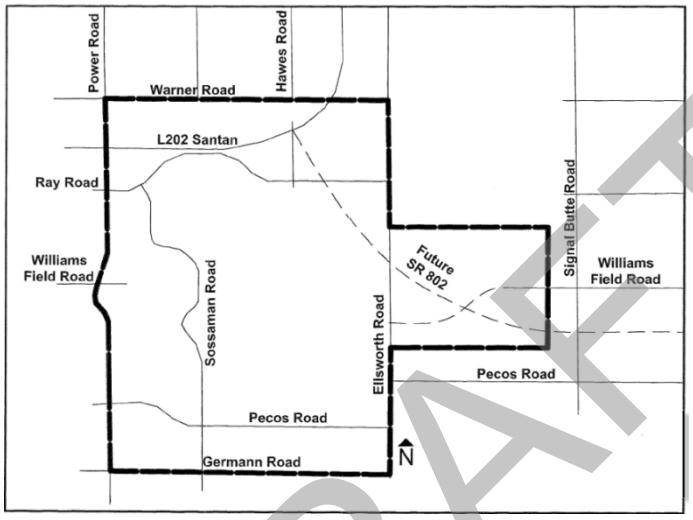
MESA 2040 Transportation Plan

Figure 1



Gateway 2030 Plan

In February 2010, the Northeast Area Development Plan (NADP) was scoped to provide findings and recommendations that would plan out a financially feasible strategy of development to keep pace with anticipated aeronautical growth, while being augmented and ultimately supported in part by on-airport, non-aeronautical commercial development.



Northeast Area Plan Study Area

The specific Goals and objectives were lined out and divided among four distinct categories:

- Surface Infrastructure
- Economic Development
- Aviation/ Airport Related
- Lifestyle Oriented

The NADP further defined those goals by identifying and evaluating the development alternatives by more clearly defining the future needs of various airport stakeholders. The objectives that were defined in each of the categories are as follows.

Surface Infrastructure (Transportation/Utilities)

- Provide balanced travel routes focused on primary services, for: internal trips, through travel, specific trips to the airport, and amenities.
- Ensure easy access w/ multiple layers of transportation access & modes.
- Multi-modal system establishment, that is pedestrian and bicycle friendly.
- Penetrate SR-24 corridor (no negative impacts on regional freeway system).
- Provide suitable Ray / Ellsworth area employment center connections to the airport.
- Adequately serve surrounding private properties.
- Easy / clear / communicative wayfinding & branding.
- Prioritized plan for infrastructure.
- Long-range utility planning.

Economic Development

- Proactive economic development efforts to maximize opportunities – both airport & private.
- Boundary-less growth that is flexible between airport and community.
- Quality, well-rounded destination development with convention facilities, hotels, multi-story offices, national attractions, and industry.
- Urban center - airport oriented employment villages that are pedestrian oriented.
- Premier / diverse job center for east valley with high wage strategy.
- High visibility w/ provisions for branding, special features & markers, corporate amenities.

- Sustainable concepts built into development (energy, e.g. Biofuel, solar).
- Industry leading site design & construction techniques encouraged for new development.
- Discourages residential development in proximity to the Airport.

Aviation / Airport Related

- Support and advance the vision for the Airport.
- Preserve the ultimate airport capacity.
- Appropriate non-aeronautical land uses that embrace aviation growth goals.
- Keep diverse travel profile in mind - leisure primary & business secondary.
- Integrated parking solutions that maximize revenue and accommodate peak periods.
- Sound implementation plan supporting staged growth.
- Pursue myriad funding sources, including Public/Private Partnership (PPP).
  Lifestyle Oriented
- Clear, strong identity – a positive sense of place & community.
- Stress free, comfortable, non-intimidating, fun place to come.
- Livable community that is a vibrant, active hub of activity.
- Development that places value on green space and water features.
- Ensure that collaboration between communities & Airport continues.
- Remain cognizant of aviation noise impacts on community.
- ASU plans integrated into region and business development plan.

Northeast Area Development Plan (NADP)

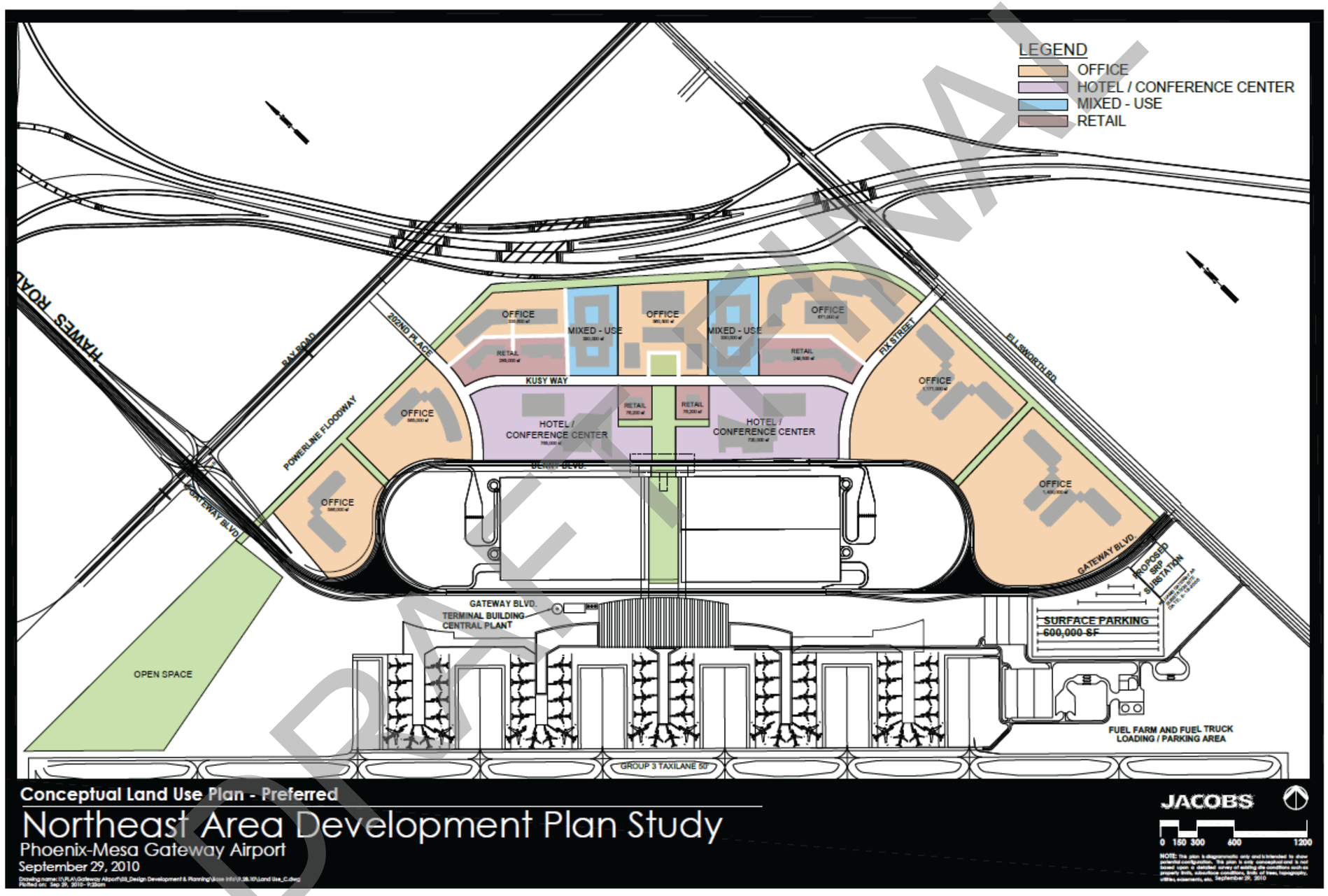
Nine schemes were developed through an alternatives analysis in order to determine the most feasible land use and terminal options for the area north and east of the current runways.

These nine schemes were evaluated and ranked through set criteria that focused on:

- Safety & Industry/FAA Design Standards
- Operational Efficiency
- Capacity
- Functionality & Flexibility
- Economic Development

While none of the schemes scored a perfect score, three stood out and were reviewed in further detail. From these three, one rose to the top, which brought the best land use, circulation patterns, and access to the new terminal area. This is shown on Figure 2.

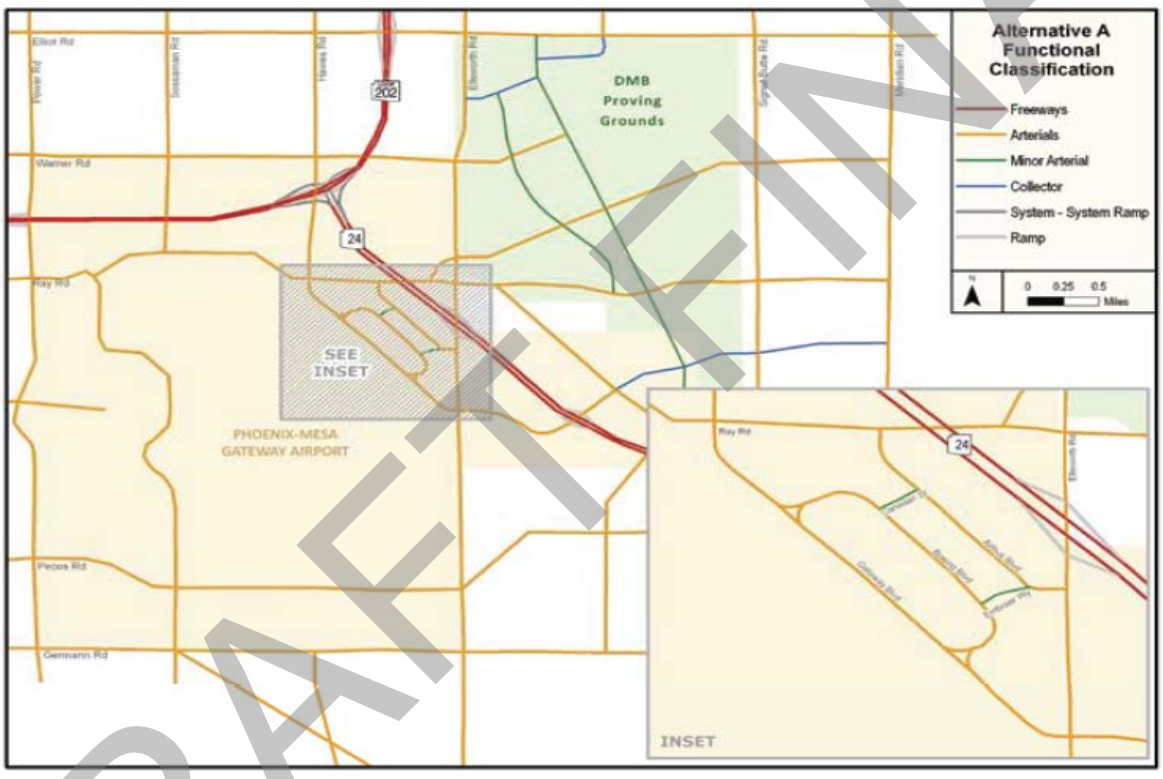
Figure 2



Numerous roadway improvements are planned to accommodate the growth in this area, some of which are included in the MAG Regional Transportation Plan (RTP) and the City of Mesa's Capital Improvement Plan (CIP).

The major roadways that border the NADP study area include Ray Road, Hawes Road, Williams Field Road, Ellsworth Road and L202 Santan Freeway and SR-24 Gateway Freeway.

Mesa Northeast Area Plan – Perferred Concept



These roadways will be part of the critical infrastructure needed to feed the airport and the surrounding development. The L202 Santan Freeway provides regional access to the airport. Ellsworth Road borders the development to the east and is a north-south arterial, the ultimate configurations for Hawes Road and Ray Road will be six-lane arterial streets in accordance with Mesa's Transportation Improvement Program. The NADP foresees this configuration remaining adequate for circulation until 2030.

On-Airport Roadway Network

Hawes Road, south of Ray Road will be labeled Gateway Boulevard and will be the main access to the Airport from the north. As Gateway Boulevard approaches the airport proper the street will split into a one-way configuration with the southbound traffic becoming the access to the terminal for arrivals and departures and the northbound is the airport return to the north and the northern exit from the site.

The Gateway Boulevard roadway will depart the terminal and join northbound Gateway Boulevard from the Williams Field Road intersection. Additionally, the on-airport improvements shown in the concept are required to maintain peak hour volume flows and to ensure a safe movement environment for motorists, cyclists and pedestrians.

Airfield Modifications

There will need to be key adjustments to the airfield at PMGA in order to accommodate the movement of the passenger terminal from its current location on the southwest to the northeast side of the airfield, mostly related to the taxiway along the northeast section of the airfield.

The approved master plan concept was developed in conjunction with airport management and various airport stakeholders, and is designed to assist in making decisions on future development and growth of the Phoenix-Mesa Gateway airport.

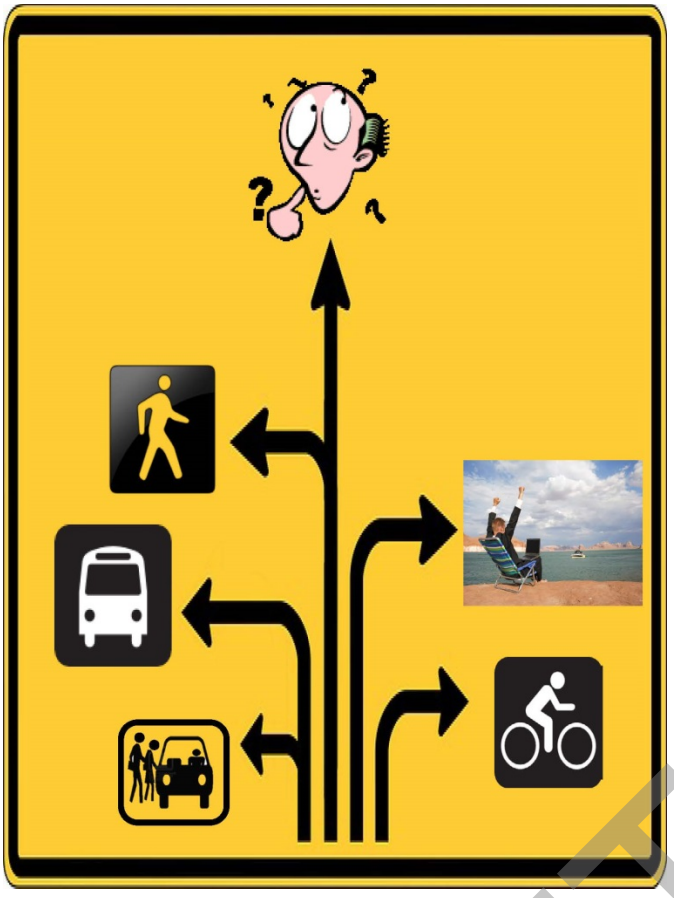
The plan provides the necessary development to accommodate and satisfy forecast demand over the 20 year life span of the plan. Flexibility was very important to future development at the airport and activity that was projected over the 20 years may not occur as predicted. The plan attempted to consider demands that may be placed on the airport even beyond the 20-year planning horizon to ensure that the facility will be capable of handling a wide range of circumstances.

The plan provides the airport stakeholders with a general guide that, if followed, would maintain the airport's long term viability and allow the airport to continue to provide air transportation service to the region.

2.6.4 Summary

Consistent with the City of Mesa General Plan, the northeast area plan, Southeast Mesa Area Plan, Falcon Field Master Plan and the Citrus Sub Area Plan the airfields and commuter airports will continue to be the basis of the social fabric in those areas. Integrating all modes of transportation together and providing symbiotic unions between the aviation community and those neighborhoods and activity centers that surround them is paramount.

Mesa will continue to encourage this integration of all modes of transportation, both on the ground and in the air, being mindful of the importance of proper circulation in and around airport facilities. Coordination between these connections with the intent that roadways that serve these areas not only provide internal connections to and from businesses, neighborhoods and services, but also connect to the surrounding area, the region and wherever our residents may live, work or fly.



2.7.0 Travel Demand Management Element

2.7.1 INTRODUCTION

Transportation Demand Management (TDM) (also known as Mobility Management) is a general term for various strategies that increase transportation system efficiency. TDM treats mobility as a means to an end, rather than an end in itself. It emphasizes the movement of people and goods, rather than motor vehicles, and so gives priority to more efficient modes (such as walking, cycling, ridesharing, public transit, alternative fueled vehicles and telework), particularly under congested conditions.

Travel demand management (TDM) includes a variety of strategies to encourage more efficient use of existing transportation systems. TDM measures affect the demand side of transportation as opposed to the capacity. TDM programs are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel. To accomplish these types of changes, TDM programs must rely on incentives or disincentives to make these shifts in behavior attractive.

TDM can provide multiple benefits, including reduced traffic congestion, road and parking facility cost savings, user financial savings, increased road safety, increased travel choice (especially for non-drivers), increased equity, reduced pollution, and energy savings. TDM includes strategies that increase the quantity of travel alternatives such as transit, ridesharing, walking, bicycling, telecommuting and use of alternative fuel vehicles; strategies that reduce the need for travel by creating more efficient land use; and strategies to reward consumers for using the travel option that is most cost effective overall.

Why Manage Transportation Demand?

Transportation Demand Management is being used more and more to address a variety of problems. Several trends are increasing the value of TDM, particularly as an alternative to the costly expansion of roadways and parking.

During the Twentieth Century most developed countries created extensive roadway networks. These systems are now established, allowing motorists to drive to most places with relative ease. The major transportation problems facing most communities are traffic and parking congestion, inadequate mobility for non-divers, and various economic, social and environmental costs associated with high levels of automobile travel; all problems that can be addressed by TDM.
The value of TDM is further enhanced by the following trends:

- **Rising facility costs:** The costs of expanding highways and parking facilities are increasing. In many cases it is more cost effective to manage demand than to continue expanding supply.

- **Increased urbanization:** In most developed countries the majority (typically 80-90%) of people and jobs are located in urban areas; therefore, traffic and parking problems are substantial.

- **Demographics:** The population is aging, increasing the importance of providing quality travel options for non-drivers.

- **Energy Costs:** Vehicle fuel costs are projected to increase in the future due to depletion of oil supplies and environmental constraints. Fuel prices play a huge part in people's choice to use an alternative mode of travel or not. When gas prices spike, so does public transit use, bicycle use, carpooling, etc.

- **Consumer preferences and market trends:** Many consumers want to live in more multi-modal communities where it is possible to walk and bicycle, use neighborhood services, and have easy and affordable access to quality public transportation.

- **Environmental/Health concerns:** Concerns over air pollution, sprawl and other environmental impacts are motivating policy changes to encourage more efficient transportation. It is documented that the number of emergency room visits on high pollution advisory days triples compared to an average day without the pollution advisory.[12] This greatly impacts health care costs, especially for elderly, and children with chronic conditions like asthma.

The next major breakthrough to improve transportation system quality may simply consist of management strategies that result in more efficient use of existing transportation resources.

Maricopa County Requirements

Trip reduction is a requirement for major employers located in air quality non-attainment areas. The original Maricopa County Trip Reduction Ordinance (TRO) was written in 1989, and amended May 26, 1994 by the Maricopa County Board of Supervisors, setting an annual goal of reducing single occupancy vehicle (SOV) trips by 10% per year for the first five years, and then a 5% reduction per year for the following three years. There are 8 major employers in the City including the City of Mesa (many with multiple work sites) that are required to submit trip reduction plans to the County under the TRO.

[12] Centers for Disease Control, "Populations at Risk from Air Pollution - United States, 1991," Morbidity and Mortality Weekly Report, vol. 42, no. 16, April 30, 1993.

These companies are:

Company	Mesa-Based Employees
Banner Health Systems	8,287
Mesa Public Schools	8,049
The Boeing Company	4,700
City of Mesa	3,657
Maricopa County Community College	1,951
Gilbert Unified School District	1,230
West Direct II Inc	800
Empire Southwest	573
Mountain Vista Medical Center	530
Veolia Transportation	504
SRP	494
Community Bridges, Inc.	450
Special Devices Inc.	376

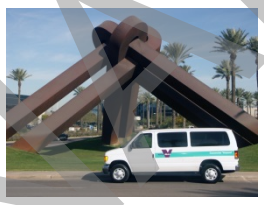
According to the Maricopa County Rideshare Coordinator for the Mesa area, only a small percentage of those sites have reached their target goals. Currently, there are no direct penalties for not reaching trip reduction targets for the City, other major employers, or their employees.

TDM Strategies

TDM strategies can be grouped into three categories: alternatives to the single occupant vehicle (SOV), incentives and disincentives, and alternative work arrangements. TDM strategies can have a significant impact on travel behavior, system efficiency, and SOV rates. TDM programs are usually implemented by public agencies, employers, or via public private partnerships. The strategies that can be applied on a local level are described below.

Ridesharing: Carpools and Vanpools

Carpooling is the sharing of rides in a private vehicle among two or more individuals. Vanpooling is a similar sharing of rides but uses a different type of vehicle. Carpooling programs exist at many employment sites throughout the Valley. Vanpools are supported by some employers and are provided by Valley Metro Regional Public Transportation Agency (RPTA).



HOV Lanes

While high occupancy vehicle (HOV) lanes are part of the supply side of the transportation system, they also affect the demand. The use of the lanes is restricted to vehicles with two or more people. The advantage to the users is travel time savings. The advantage to the system is higher vehicle occupancies and fewer vehicles using a facility. Currently, there are HOV lanes on Loop 202 from I-10 in central Phoenix to Gilbert Road in Mesa. HOV lanes on US 60 extend from I-10 to Ellsworth Road.

Telecommuting

Telecommuting is broadly defined as using communications technology to replace commuting. It typically means that employers allow certain employees to work at home or at a local workstation either part- or full-time. It often requires at least some additional equipment, although as computers and communications equipment become more common and portable, incremental costs decline. A telecommuter is an individual who works from his or her home, full or part time, as an employee for a public institution or corporation.

Alternative Work Hours

Flexible work hours ("flextime") can reduce peak period congestion directly, and employees often report that rigid schedules (such as needing to punch a time clock at a particular time) are a barrier to rideshare and transit use. Compressed workweeks, such as four workdays of ten hours (a "4/40" schedule) like the one adopted by the City of Mesa in 2009, reduce commuting trips by 20%, although it can increase non-work, off-peak automobile trips. These scheduling options tend to be valued by employees.

Parking Management

Parking Management is a general term for strategies that encourage more efficient use of existing parking, reducing the demand for parking and shifting travel choice to non-SOV means. Managing parking helps to reduce the impacts of parking demand and helps to ensure access to retail businesses. It provides access for visitors to regional and neighborhood activity centers, supporting and promoting neighborhood vitality. The supply of free parking at activity center destinations has shown to be a key decision factor mentioned for selecting to drive a SOV rather than taking a bus, biking, walking or carpooling. When free or low-cost parking is accessible, it leads to overuse, often by long-term or all-day parkers who occupy valuable spaces at the expense of short-term parkers, limiting access to retail businesses and service industries catering to short-term users.

Employer Programs

A deterrent to some TDM strategies is the need for a vehicle during the workday. Some people may be reluctant to carpool if they have midday trips to make. They may also be concerned about getting home in an emergency. Employers can provide programs for midday and emergency transportation that would eliminate employees' needs for their own vehicles during the day. This would then make ridesharing a reasonable alternative. Employers can also provide financial subsidies for transit riders that would encourage its use.

Higher Density/Mixed Use/Growth Areas

Increased residential and employment densities, mixed land use, and jobs-housing balance can reduce total vehicle travel as common destinations (stores, services, jobs) become closer together. This is called "access by proximity." These benefits occur in both urban and suburban areas. For example, a household in a low density, auto-oriented suburb will make, on average, 7.7 vehicle trips per day, while the same household in a higher density, transit-oriented suburb will make 6.05 vehicle trips per day, a 21% reduction in personal travel. A variety of specific land use strategies can help reduce vehicle travel. The United Kingdom is using land use management as a key strategy in reducing transportation carbon emissions and other environmental impacts.

Neo-traditional Neighborhoods and Transit-Oriented Development

Neo-traditional neighborhood design emphasizes small-scale blocks, an interconnected street network, good pedestrian and bicycle facilities, and moderate to high density mixed land use. Research indicates that residents in such neighborhoods have significantly fewer automobile trips than residents in automobile dependent areas.

Transit oriented design places higher density development within reasonable walking distance of high quality transit service and includes design features to support a variety of modes. Services frequently used by commuters should be located at transit and employment centers, including childcare, cafés, and shops.

Potential Travel Reduction

The development of a TDM program can involve a combination of strategies. The strategies, when applied together, are complementary actions. For example, a ridesharing program can be more

effective if there is preferential treatment provided en route (HOV lanes) and/or at the destination such as designated preferential or subsidized parking. A TDM program should be a package of strategies that complement one another.

The potential impact of some strategies, based on experience in other areas, is noted below. The combination of strategies does not result in an additive reduction in drive-alone trips.

TABLE 1
POTENTIAL TRAVEL REDUCTIONS

STRATEGY	REDUCTION
Employer paid parking	2-12%
Financial subsidy for transit	2-8%
Provide midday transportation	2%
Emergency ride home program	4%
Walk accessible services	3%
Preferential parking for HOV's	1%

Maricopa County Trip Reduction Program

The Trip Reduction Program (TRP) began in the late 1980s as part of the State of Arizona's response to a court ruling requiring greater efforts to reduce air pollution. One outcome of the ruling was the passage of Travel Reduction Program state statutes that focus on employers and schools, because the approximately 80 million commuter miles driven each weekday are a significant contributor to regional air pollution (carbon monoxide, ozone, particulate matter). Subsequent revisions to the statute and related Maricopa County ordinance (P-7) require participation by employers with 50 or more employees at a site.

The goals of this program asked employers and schools to reduce single occupant vehicle (SOV) trips and/or miles traveled to the work site by 10 percent for a total of five years, and then 5 percent for three additional years, or until a 60 percent rate of SOV travel is reached. Progress is tracked through an annual commuter survey of employer/school sites. The results of the survey are used to develop an annual plan that commits the employer / school to implementing and documenting various strategies to reduce SOV trips or miles.

The Trip Reduction Program helps an employer or school with compliance through a series of tasks such as:

- Providing questionnaires for the commute survey
- Generating a commute analysis for each site surveyed
- Reviewing plans submitted by employers/schools
- Recommending approval/rejection of plans
- Monitoring implementation of approved plans
- Reporting on the costs of implementing plans
- Generating an annual report on commute-related emissions

2.7.2 Innovation in Travel Demand Management and Trip Reduction

Car Share

The principle of car sharing is simple: individuals gain the benefits of a private car without the costs and responsibilities associated with ownership. Instead a household has the ability to access a fleet of vehicles on an as-needed basis. Car sharing may be thought of as organized short-term car rental. Car sharing has sprung up in different parts

of the world and is operated in many different ways. Sizes of organizations vary from one shared car and only a handful of sharers to organizations that serve a complete urban area.

Car sharing differs from traditional car rentals in the following ways:

- Car sharing is not limited by office hours.
- Reservation, pickup, and return is all self-service.
- Vehicles can be rented by the minute, by the hour, as well as by the day.
- Users are members and have been pre-approved to drive (background driving checks have been performed and a payment mechanism has been established).
- Vehicle locations are distributed throughout the service area, and often located for access by public transport.
- Insurance: state minimum liability insurance, comprehensive and collision insurance are provided as part of the service. They usually do not provide uninsured, under-insured or personal injury protection insurance.
- Fuel costs are included in the rates.

Car Share can provide numerous transportation, land use, and environmental benefits. The fact that only a certain number of cars can be in use at any one time may reduce traffic congestion at peak times.

Bike Share

Bike share is a service in which bicycles are made available for shared use to persons on a very short term basis. The main purpose is transportation: bike share allows people to depart from point "A" and arrive at point "B" free from the worries of ownership.

Bike-share has seen rapid global growth over recent years. As of April 2013 there were around 535 bike-sharing programs around the world, made of an estimated fleet of 517,000 bicycles. In May 2011 there were around 375 systems comprising of236,000 bikes.[13] So those two years saw a doubling of bike share globally.

Many bike-share systems offer annual subscriptions that make the first 30-45 minutes of use free, encouraging their use as transportation. Bike-share use is made more predictable now with smartphone mapping apps which show where nearby stations are and how many bikes are available at each station. This is also important for riders looking to return a bike; they need to know if there is a dock open at a certain station, since stations can fill up with bikes. So using bike-share to get around a city is made far easier with real-time, GPS-based smartphone apps with bike-share station information overlaid on a city map.

GR:D Bike Share

The Mesa, Phoenix, and Tempe grid transportation system is the inspiration behind the name of its new regional bike share program.

GR:D -- a.k.a. 'Grid' – Launched in Spring 2014 with 1000 bikes distributed through Mesa, Phoenix, and Tempe.

[13] Bike-Sharing Programs Hit the Streets in Over 500 Cities Worldwide; Earth Policy Institute; Larsen, Janet; 25 April 2013

Docking stations are located near transit light rail stations, as well as being dispersed through the community within a three mile radius of those light rail stations. Grid bikes are unlike current traditional bike share services offered throughout the United States where bicycles must be returned to a station in order to stop the checkout time. Grid bicycles are equipped with solar-powered, GPS-enabled U-locks that can be parked at any bike rack in the service area.

Grid will help to attract high-wage employers and bright, educated young workers who want livable cities and multiple transit options. Grid will continue to grow and is governed by a regional committee, which will continue to ensure that the regionalism of the system continues throughout all Valley Cities.
Guaranteed Ride Home

The Mesa Guaranteed Ride Home (GRH) program provides an occasional subsidized ride to commuters who use alternative modes (*for example, if a bus rider must return home in an emergency or a car pooler must stay at work later than expected*). GRH addresses a common objection to the use of alternative modes. GRH programs may use taxies, company vehicles or rental cars.

Benefits of GRH include increased commuter security, flexibility (employees who use alternative modes can stay late when they are needed at work, which addresses a common employer concern), and participation in Commute Trip Reduction programs. By supporting use of alternative modes, GRH helps achieve all TDM objectives.

2.8.0 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) ELEMENT

The purpose of this chapter is to address Intelligent Transportation Systems (ITS) and their application and function throughout the City of Mesa. This chapter will assess the existing ITS infrastructure, and will consider future requirements to meet the needs and demands of an expanding transportation network. The City of Mesa's ITS network consists of a Traffic Management Center (TMC), an array of field devices, and a communications network that allows the TMC to communicate with the field devices in order to facilitate traffic operations.

The term *Intelligent Transportation Systems* (ITS) refers to the application of information and communication technology to improve the overall operations of the City's transportation system. A functional ITS involves the monitoring of real-time traffic flows and conditions, ITS technology utilizes computers, modern communications and control technologies in an effort to improve safety, reduce traffic delays, and enhance travel times. It works to increase the efficiencies of roadway travel to maximize the efficiency of the City's transportation network by assessing and providing information on congestion, construction delays, and incidents, such as crashes, disabled vehicles, blocked roads, planned special events, hazards, or any other conditions that create unusual traffic conditions. A comprehensive, coordinated and efficient ITS program is crucial to the City's daily traffic operations and to maximize the use of the existing transportation road network into the future.

The following sections of this chapter will review previous ITS planning efforts, provide an overview of the ITS communication system, and address the existing ITS infrastructure, which consists of the Mesa TMC and field devices such as traffic signals, closed-circuit television cameras (CCTV), dynamic message signs, video image detection, in-ground detection loops, and driver speed feedback signs. Information will be provided on Mesa's recent efforts pertaining to real time adaptive control systems.

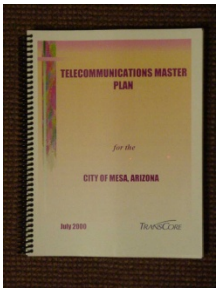
This chapter will also address the future ITS network through 2040, including future ITS needs, upgrades to Mesa's Traffic Management Center, the communication network, future field devices, and identify current and future capital ITS project needs.

2.8.1 PREVIOUS PLANNING EFFORTS

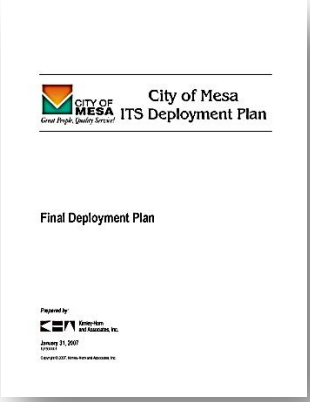
Telecommunications Master Plan (2000)

Completed during July of 2000, the Telecommunications Master Plan assessed the communications systems that were used for the City's traffic management system, which focused upon information sources related to data, video, and voice communication. The plan reviewed existing conditions, identified communications requirements throughout the City, identified feasible communication technologies, recommended a logical communications architecture, provided recommendations for implementation, and provided an overall cost summary for the development of a communications network for the City of Mesa's traffic management system. The plan thoroughly assessed existing conditions and reviewed the City's existing ITS infrastructure, and identified the communications requirements that were necessary in order to have a fully functional ITS element to accommodate traffic. It also provided recommendations for operations and maintenance of the proposed communications network.

City of Mesa ITS Strategic Plan (2005)



The City of Mesa completed the ITS Strategic Plan during September of 2005 as part of a comprehensive analysis of the City's ITS network. The ITS Strategic Plan served as a guide for the development and integration of ITS strategies with consideration of cost effective, high impact, priority focus areas within the City's transportation network. The plan provided a thorough needs assessment and established goals and objectives for ITS, and provided an overview of service area prioritization. It addressed transportation services and provided a "high level" description of current and forecasted ITS components for the City of Mesa. The ITS Strategic Plan also addressed hours of operation for the traffic management center, reviewed projected operations and systems staffing requirements, addressed budgeting and operational concepts, and provided performance measures.



ITS Deployment Plan (2007)

The City of Mesa ITS Deployment Plan was completed during January of 2007, and represented a detailed overview of how to implement the services that were identified in the 2005 ITS Strategic Plan. The ITS Deployment Plan conducted a thorough ITS infrastructure

assessment of the City, and discussed traffic signals, closed circuit television cameras (CCTV), video detection and radar speed feedback signs. It also discussed the overall communication system that provided field communications between the Mesa TMC and the devices located throughout the roadway network. The ITS Deployment Plan considered the City's needs, goals and available resources as described in the ITS Strategic Plan and identified proposed ITS field devices, communication needs, and strategies to link the City's ITS network and provide for future needs associated with growth and development. This resulted in a list of projects that were developed in an effort to deploy, operate and maintain the City's ITS network incrementally over time. ITS projects were recommended between the years of 2006 to 2016, and were identified to occur throughout six phases of development.

2.8.2 SYSTEM COMMUNICATION OVERVIEW

The City of Mesa's ITS communications system is a critical component of the ITS network, and is solely responsible for facilitating interaction between the ITS field devices and the Traffic Management Center. The City of Mesa's ITS communications media consists of a combination of single mode fiber optic (SMFO) cable and wireless radios. SMFO is the dominant media and is preferred for its reliability and high speeds. However, this media's initial development costs are typically higher than wireless communications.

Radios are an inexpensive option to provide wireless communications on a temporary basis, or to provide communications to locations that are not in close proximity to the fiber optic infrastructure. But radios are not intended to provide a wireless link between an ITS field device and the Mesa TMC, since radios have limited range. They are primarily used to bridge the gap between a fiber connection and a field location. Radios have also been used to provide network connectivity for field technicians so they do not have to return to the office to access computer resources. Radio devices are supported by numerous radio towers that are strategically positioned throughout the City.

Field devices throughout the City communicate using Ethernet protocol, which is the primary cabling and data delivery technology used for local area networks. In some cases, devices directly support Ethernet, while others communicate serially. Serial devices are converted to Ethernet by using a media converter, which in turn enables accessibility to the Ethernet network. Figure x-x located on Page X displays a typical communications setup for ITS field devices commonly used throughout the City of Mesa.

TRAFFIC MANAGEMENT CENTER (TMC)

The Traffic Management Center (TMC) functions as the "nerve center" for the City's ITS network. The TMC is the central location to which field devices throughout the City report, and is the location from which field devices can be viewed, controlled and adjusted. The most noticeable feature of the TMC is the video wall, which displays video from CCTV cameras throughout the City, displays the intersection status from the central traffic signal system, and displays other useful information to an ITS operator. From the TMC, operators can also control and view field devices from individual computer work stations, which allows for an

operator to implement changes throughout the City without leaving their desk. In effect, it allows one person to be at multiple places at the same time. Operators frequently view video from numerous CCTV cameras to monitor traffic, construction zones, and areas of the City where complaints have been received from citizens.

The TMC is staffed from 6AM to 6PM Monday through Thursday, although timing for after-hour events can easily be programmed as needed. More information pertaining to field devices controlled from the TMC is provided in the next section.

2.8.3 EXISTING ITS FIELD DEVICES

This section will address the existing ITS field devices used within the City of Mesa. The City's field devices are used for traffic monitoring, detection, control, management, traveler information, and are generally the most visible component of the citywide ITS program. This section will provide an overview of traffic signals, CCTV cameras, dynamic message signs, video image detectors, in-ground detection loops, driver speed feedback signs, and emergency vehicle preemption.

Traffic Signals

Traffic signals are electronic signaling devices that are positioned at roadway intersections, fire station driveways, freeway interchanges, and pedestrian crossings to assign right-of-way to competing flows of traffic. The majority of traffic signals in Mesa are on the arterial and collector roadway networks.

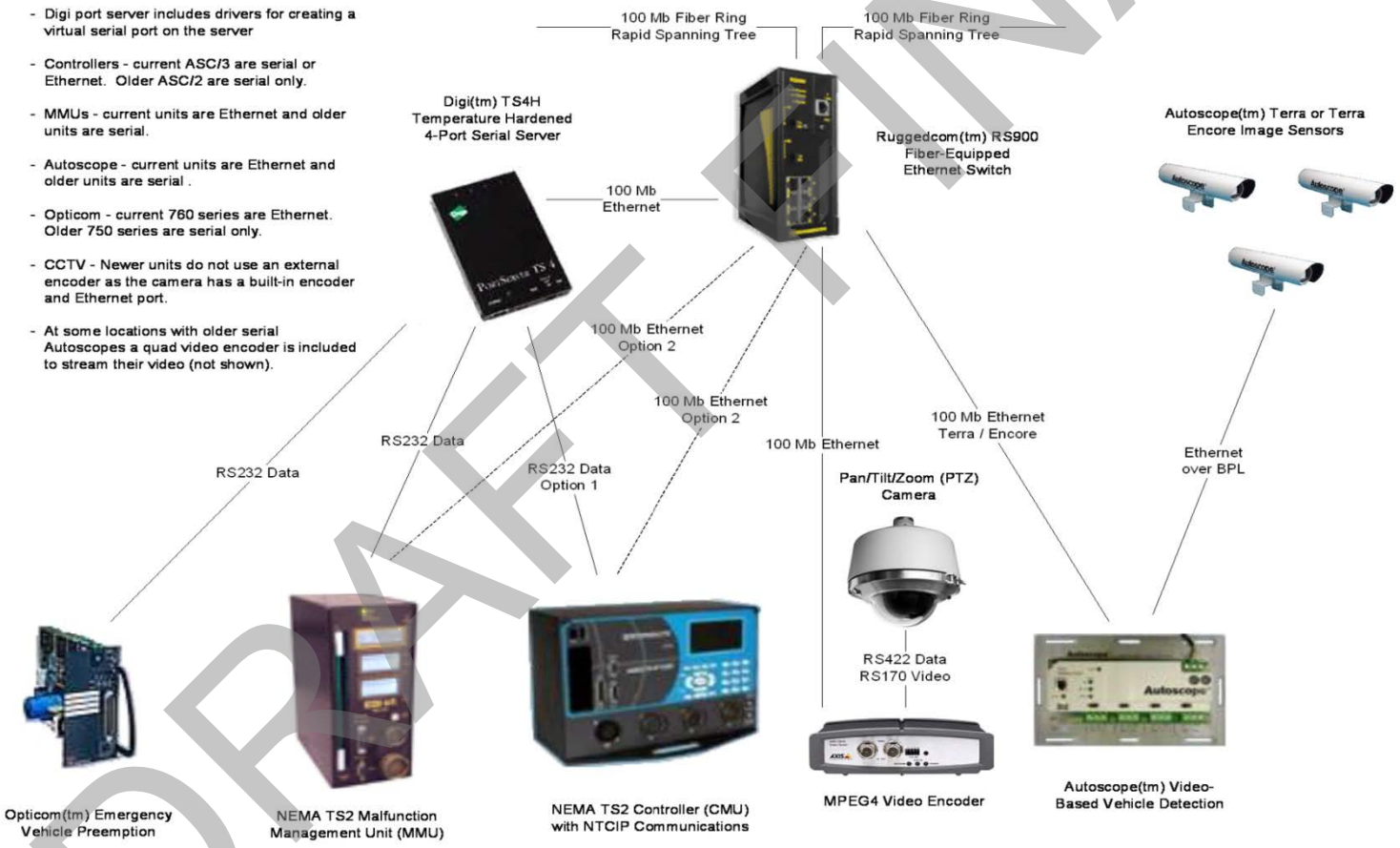
Traffic signals are also very helpful in the accommodation of pedestrians and bicyclists. Aside from providing for the orderly movement of traffic, traffic signals can assist in the reduction of certain types of vehicular crashes, and can increase the traffic handling capacity of an intersection with proper design features and control measures. They are placed at a number of fire stations to accommodate emergency vehicles.

FIGURE 7-1

Application

- Subring (100Mb) node
- Location may warrant serial data security of Digi TS4H port server
- Digi port server includes drivers for creating a virtual serial port on the server
- Controllers - current ASC/3 are serial or Ethernet. Older ASC/2 are serial only.
- MMUs - current units are Ethernet and older units are serial.
- Autoscope - current units are Ethernet and older units are serial .
- Opticom - current 760 series are Ethernet. Older 750 series are serial only.
- CCTV - Newer units do not use an external encoder as the camera has a built-in encoder and Ethernet port.
- At some locations with older serial Autoscopes a quad video encoder is included to stream their video (not shown).

ITS Signal Cabinet Equpment and Connections



Since the early 1970s, the City of Mesa has maintained an integrated traffic signal system along many of the community's arterial and collector roadways, and has utilized a number of traffic equipment vendors throughout the years. As displayed on Map Number 7-1, Mesa operates and maintains 421 traffic signals throughout the City. The City uses CENTRACS, an integrated central traffic signal management system that is a product of *Econolite Control Products, Inc*.

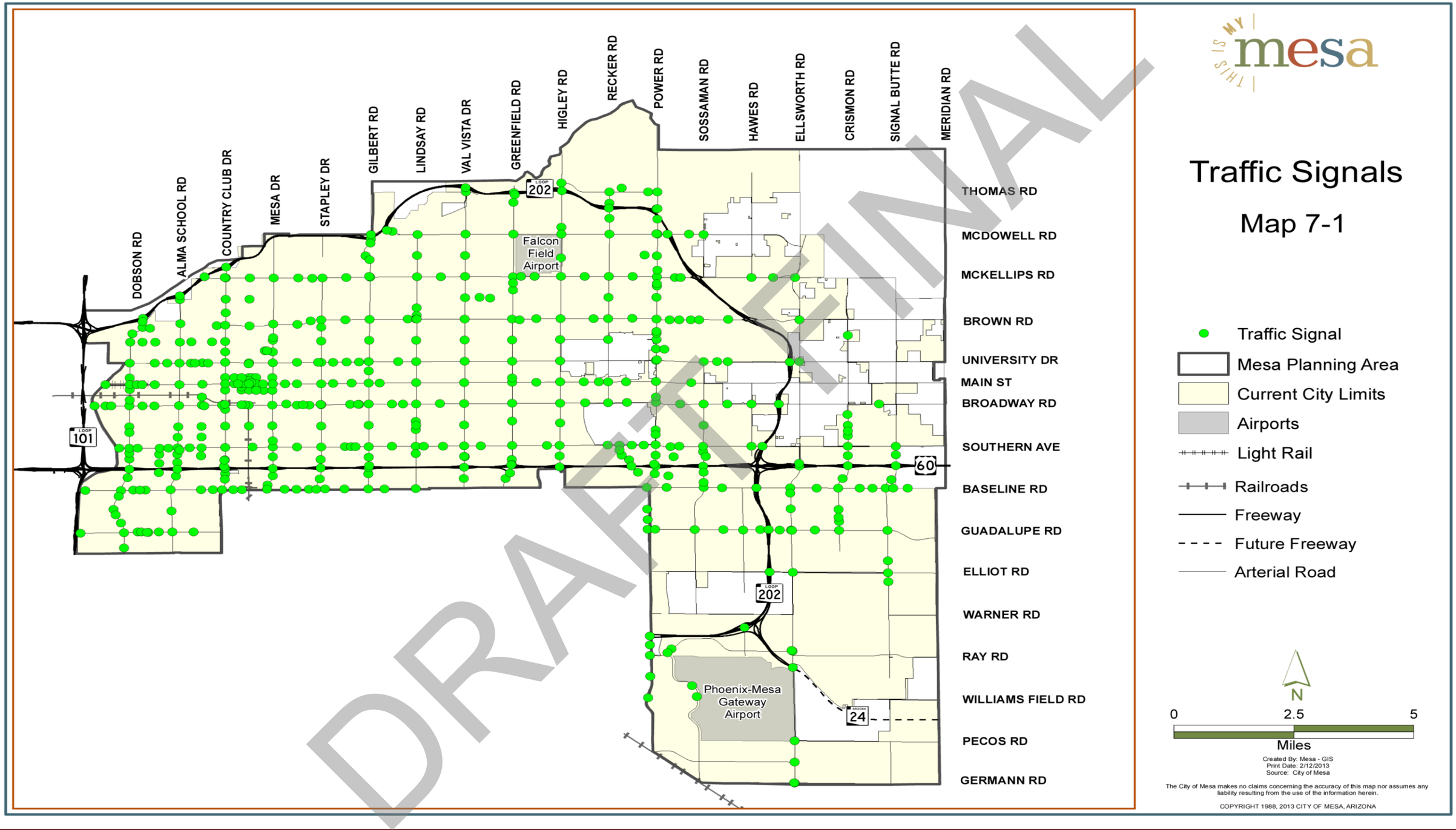
Light Emitting Diodes (LED) is the light source of all traffic signal indications in Mesa. This technology is very efficient, as LED sources use considerably less power and last longer than incandescent lamps. All traffic signal have 12-inch diameter lenses for vehicle indications.

LED Signal Indications

Pedestrian signal indications also use LED technology. Newer pedestrian signal head indications provide a countdown feature, which displays the number of seconds that are remaining in the flashing "Don't Walk" or pedestrian clearance interval.

The City uses a number of signal timing techniques in an effort to efficiently accommodate specific traffic conditions at a given location. These include extending green light intervals for certain movements, adjusting pedestrian walk and clearance intervals to accommodate high pedestrian volumes or slower crossing times, and green times for bicycles at locations that have bicycle detection, or that are located along bike routes. Other techniques include adjusting vehicle permissive period times to improve how quickly signals respond to traffic, adjusting signal cycle times and phase sequences by time of day, and implementing real time adaptive signal operation. In addition, the City provides Mesa specific ITS and traffic signal standards and a traffic signal design guide.

At present, the City of Mesa operates and maintains over 400 traffic signals. As the City continues to grow and the roadway network expands, new signals will be added as needed.


DOBSON RD
ALMA SCHOOL RD
COUNTRY CLUB DR
MESA DR
STAPLEY DR
GILBERT RD
LINDSAY RD
VAL VISTA DR
GREENFIELD RD
HIGLEY RD
RECKER RD
POWER RD
SOSSAMAN RD
HAWES RD
ELLSWORTH RD
CRISMON RD
SIGNAL BUTTE RD
MERIDIAN RD
THOMAS RD
MCDOWELL RD
MCKELLIPS RD
BROWN RD
UNIVERSITY DR
MAIN ST
BROADWAY RD
SOUTHERN AVE
BASELINE RD
GUADALUPE RD
ELLIOT RD
WARNER RD
RAY RD
WILLIAMS FIELD RD
PECOS RD
GERMANN RD
Falcon Field Airport
Phoenix-Mesa Gateway Airport
LOOP 101
LOOP 202
60
24
Traffic Signals
Map 7-1
Traffic Signal
Mesa Planning Area
Current City Limits
Airports
Light Rail
Railroads
Freeway
Future Freeway
Arterial Road
N
0
2.5
5
Miles
Created By: Mesa - GIS
Print Date: 2/12/2013
Source: City of Mesa
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DRAFT
FINAL

Signal Timing/Progression

Signal timing is completed at both a local level and on a network level. At the local level, example signal timing parameters include yellow change times, minimum green times, maximum times, vehicle extension times, all red times, pedestrian walk times, and pedestrian clearance times. Yellow and red clearance times are set using a City of Mesa policy based upon a recommended practice published by the Institute of Transportation Engineers. Minimum green times and pedestrian times are also set based on written policies by the City of Mesa. Other values may vary based on specific conditions at an intersection.

Additionally, coordination timing is done at the network level. Coordination timing parameters are designed to synchronize multiple signals together, so that a platoon of vehicles successfully passes through as many green signals as possible. This is typically done on arterial roadways where large volumes of vehicles are anticipated on a regular basis.

Signal timing must be continually updated in an effort to conform to new standards, and respond to new traffic patterns. The City of Mesa audits basic signal timing parameters at approximately 200 signals per year. Additionally, coordination plans along a corridor are routinely reevaluated on a three year rotation.

Uninterruptible Power Supply (UPS)

When there is an electricity outage from the source providing power to a traffic signal, the signal itself will go dark. While this is inevitable, it is not a particularly desirable situation, especially at large or busy intersections. For this reason, the City of Mesa deploys uninterruptible power supplies (UPS) at most major intersections and interchanges. Functionally, the UPS is essentially a battery backup system that keeps the signal running in the case of a power outage. Typically, a UPS can provide at least three hours of normal signal run time and an additional two hours of flash operation. A flashing signal takes approximately half the power as a fully functioning signal, and is better than a dark signal, since the flashing indications are more likely to grab a driver's attention.

Closed Circuit Television (CCTV) Cameras

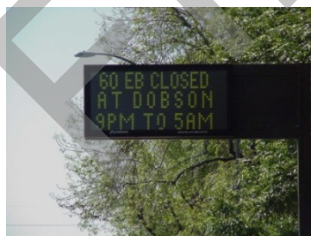
Closed circuit television (CCTV) cameras are used to transmit video from the field back to the Mesa Traffic Management Center (TMC) in the Transportation Building. CCTV cameras are typically used for monitoring traffic, incident detection and verification, and are generally located at major intersections. Remotely observing traffic from the TMC allows the operator to observe traffic in real time and make signal timing adjustments accordingly. Although ITS staff regularly assess conditions in the field, using CCTV cameras is extremely efficient, because an intersection can be observed throughout the day without sending a person into the field to do on-site observations. It also allows for an operator to be in many locations at one time, because there are many available monitors in the TMC. This capability allows for staff to proactively and quickly respond to incidents on the City's roadway network. The CCTV cameras are especially helpful with monitoring construction zones.

During the late 1990s, the first CCTV camera was installed at the intersection of McKellips Road and Stapley Drive, and was connected to the Mesa TMC via a microwave link. In 2007, there were a total of 12 cameras that were primarily located at the US 60 Superstition Freeway interchanges. Additional locations were identified in the 2005 ITS Strategic Plan Update and subsequently included in the 2007 ITS Deployment Plan. As displayed on Map Number 7-2, as of 2012 there are over 140 CCTVs located throughout the City, with most of

them at arterial-to-arterial roadway intersections. CCTV cameras are typically mounted near the top of a traffic signal pole, at a distance of approximately thirty feet above the ground. From the TMC, an operator can remotely pan, tilt and zoom (PTZ) a CCTV camera. Although video is not recorded on a regular basis, the capability exists to record video on an as needed basis. This is typically done for a specific traffic study, to perform a specific analysis, or to capture information on traffic patterns after normal business hours. Most of the City's CCTV cameras are connected directly to their localized signal cabinet at an intersection, where in turn, they are connected to the City's ITS network. Some CCTV cameras are deployed as portable units, which can be mounted on any pole with a photocell tap. These are typically connected wirelessly to a nearby traffic signal cabinet (usually less than a half-mile away), where they in turn are connected to the ITS network. The video is decoded and displayed on desktop computers, or displayed directly onto the TMC's video wall for monitoring and analysis purposes.

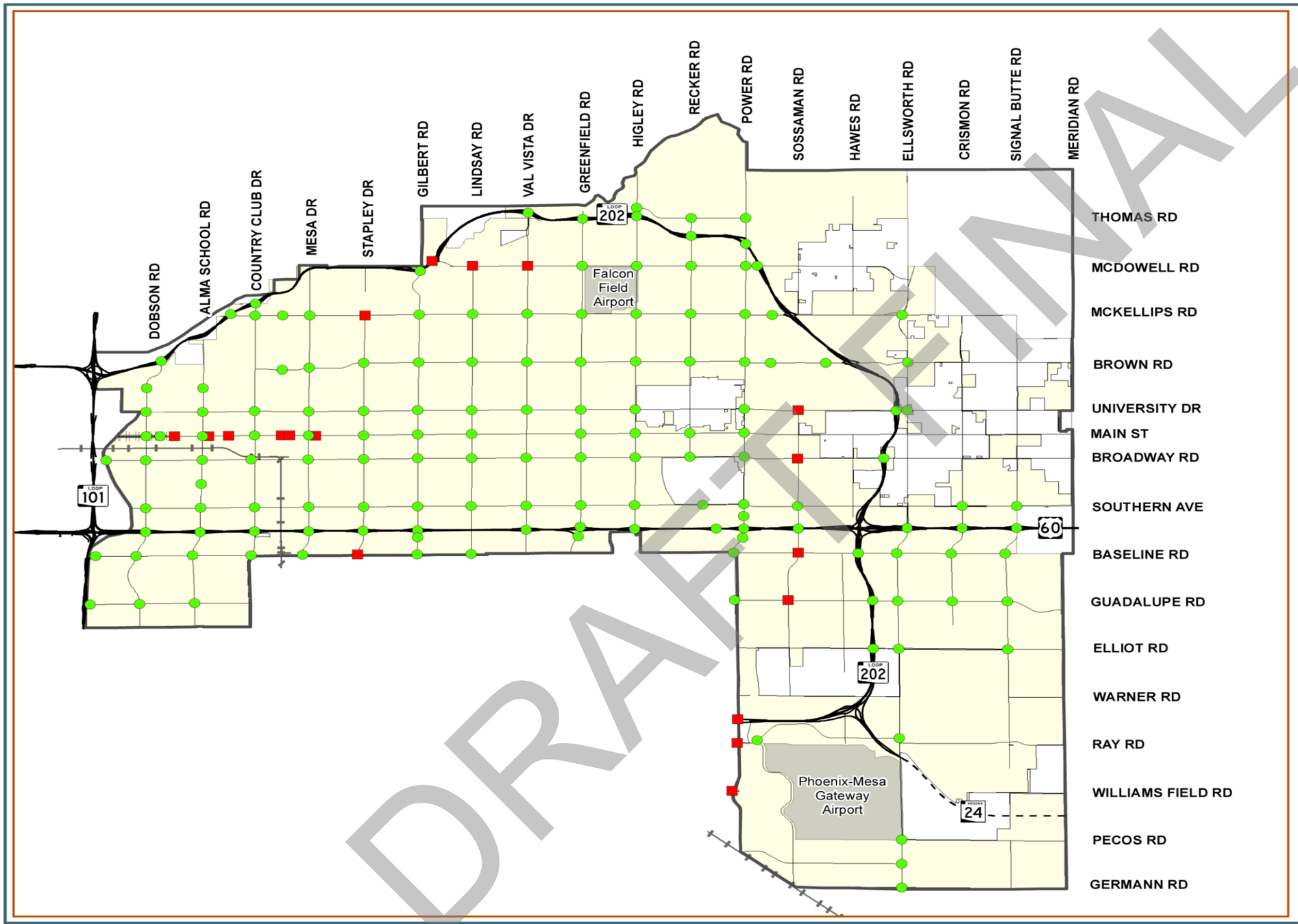
The Transportation Department has also experimented with 360 degree cameras that can view an entire intersection at all times from one camera. However, these 360-degree cameras are limited in their ability to view farther down an arterial roadway and away from the intersection, as compared to a PTZ CCTV. Widespread use of 360-degree cameras would create "blind spots" along a corridor. As Mesa advances toward having a CCTV camera installed at each arterial-to-arterial intersection, there will be a need to investigate blind spots within the arterial transportation network. With a clear line of sight (meaning an absence of trees and a straight roadway), it is possible to see up to one half mile down a road; however, at locations with obstructions it may be necessary to deploy CCTV cameras at intermediate locations along the arterial roadway grid to ensure full coverage in the future.

The City of Mesa will continue to work toward the full implementation of CCTV cameras along Mesa's arterial network. The focus will center upon expanding the existing network to accommodate increased traffic and the City's future growth and development. The City has also determined that the useful life cycle of a CCTV camera currently ranges from eight to twelve years. Cameras will need to be replaced as they reach the end of their lives. As older equipment is replaced, Mesa will continue to explore the newest and most appropriate technologies available.



Dynamic Message Signs

Dynamic Message Signs are electronic traffic signs that are used to provide information to motorists who are driving down a particular corridor. These signs provide motorists with information pertaining to items such as traffic congestion, crashes and traffic incidents, construction zones, potential delays, speed limits, traffic restrictions, unique driving conditions, maintenance activities, alerts, public messages, or special events that may affect traffic conditions. Dynamic message signs primarily draw attention to a particular problem or incident, tell motorists precisely where the problem is located, and indicate what the potential effect may be on traffic conditions or the action drivers should take. The signs are typically affixed to a pole on the side of the roadway, or mounted above the roadway. As of 2012, the City of Mesa has two dynamic message signs that are located along the Power Road Corridor.



Closed Circuit Television (CCTV) Cameras

Map 7-2

- Existing CCTV Camera
- Future CCTV Camera
- Mesa Planning Area
- Current City Limits
- Airports
- Light Rail
- Railroads
- Freeway
- Future Freeway
- Arterial Road

N

0 2.5 5

Miles

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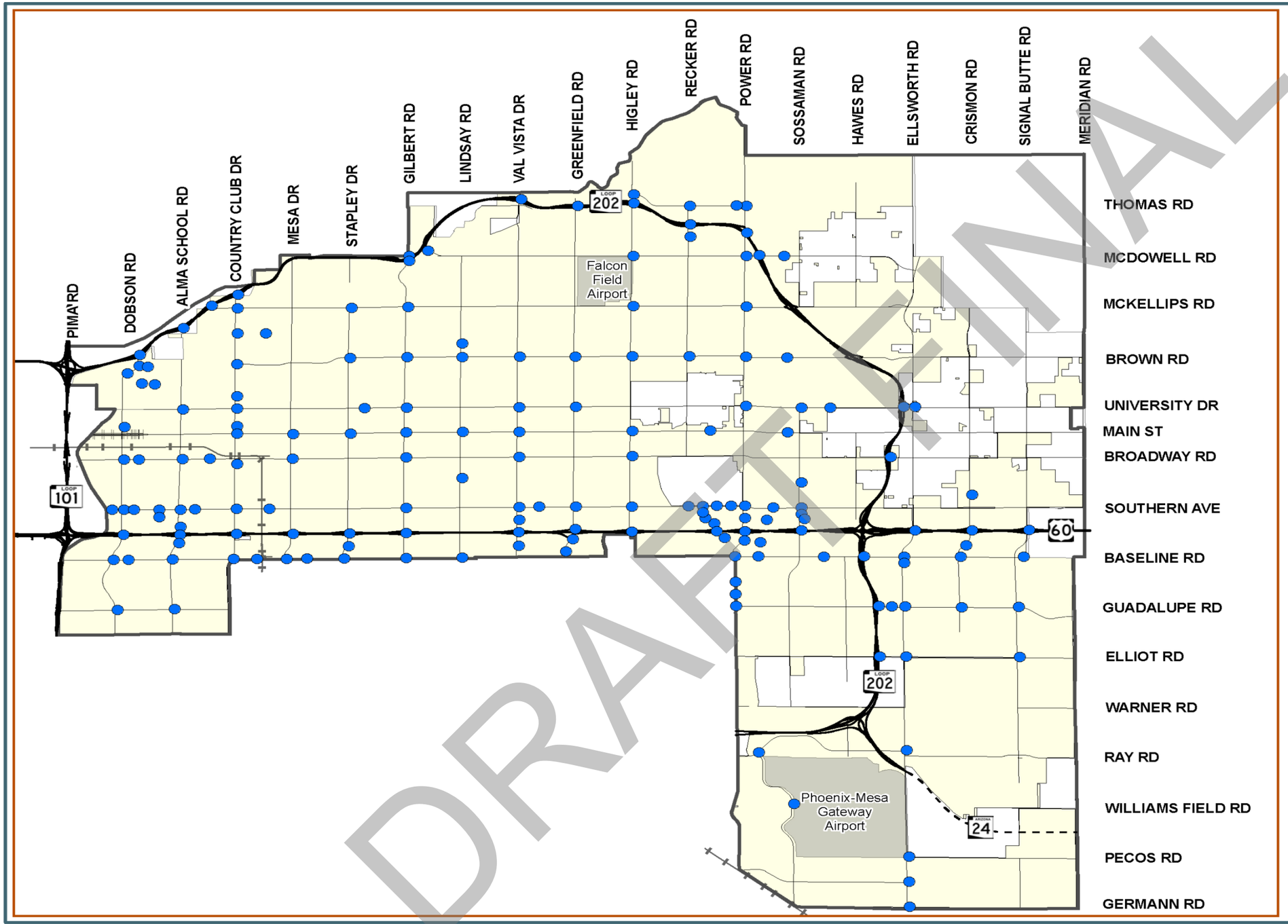
Print Date: 4/3/2013
Source: City of Mesa

Video Image Detection at Intersections

A video image detector (VID), or video detection system (VDS), is utilized to detect the presence of vehicles at an intersection, and to provide the best distribution of green time based on traffic demand. This technology works by processing a video image of waiting vehicles at an intersection and detecting changes in user settable detection zones. When a vehicle approaches an intersection, it enters into a detectable zone where it is detected by the VID, which in turn sends a signal to the intersection's traffic signal controller indicating that a vehicle is present and requesting a green light in order to proceed.

Video detection cameras can detect bicycles as well as motor vehicles. VID technology can also be used to conduct vehicle and bicycle counts at intersections. VIDs are considered to be cost-effective replacements when replacing a large number of in-ground induction loops, which are cut directly into the pavement. VIDs are also advantageous at locations with decorative pavement, or at an intersection approach located on private property, where it is undesirable to cut into the pavement to install in-pavement loops.

In 1996, the first video-based detection system in the City of Mesa was deployed at the intersection of University Drive and Alma School Road. Since then, there have been many technological advances and the use of video detection has spread throughout the City. As displayed on Map 7-3, as of 2012 there were a total of over 300 VID cameras monitoring intersection approaches throughout the City. In the future, video detection cameras will continue to change with each successive wave of technology, and electronics and software will constantly be updated. The City will continue to use this available technology in the future, and will continue to assess ongoing technological advances and evaluate the need to add cameras at future intersections on a case-by-case basis.



Video Image Detection (VID) Cameras

Map 7-3

- VID Camera
- Light Rail
- Railroads
- Freeway
- Future Freeway
- Arterial Road

N

0 2.5 5

Miles

Created By: Mesa - GIS
Print Date: 4/3/2013
Source: City of Mesa

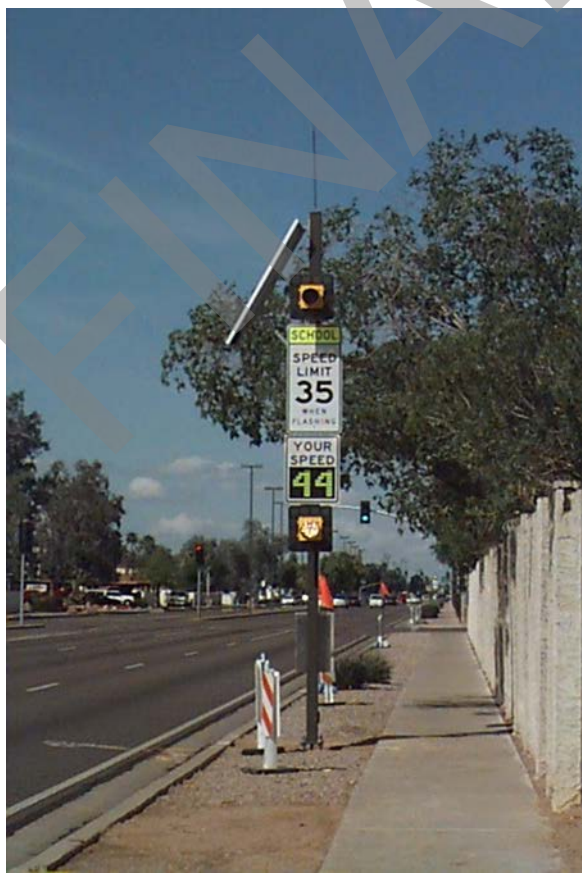
In-Pavement Detection Loops

An in-pavement detection loop consists of a looped wire installed directly into slots cut into the pavement, or placed in or on the pavement base prior to surface paving. The loop works by using a small amount of electricity to create an electro-magnetic field. When a vehicle moves over the roadway pavement, it disturbs the electromagnetic field and there is a change in inductance, which signals the controller that a vehicle is present and is requesting green time at the intersection. As a result, in-pavement detection loops place a call to the traffic signal controller at an intersection, so that a particular vehicle movement may be served.

Loop detectors are most cost effective when there are only a small number required at an intersection. Although they do not provide the visual feedback that a video detector provides, they are more reliable for detecting vehicles. One drawback to in-pavement detection loops is the fact that they are often impacted by construction projects, and must be completely replaced when they are affected by construction. They also do not detect bicycles as well as video detection. In-pavement detection loops do not communicate directly with the Mesa TMC. Instead, they provide input to the local traffic signal controller, which in turn relays detector information back to the TMC.

Driver Speed Feedback Signs

Driver speed feedback signs are specifically designed to measure the speed of approaching vehicles on a roadway, and in turn, "feed," or display this information back to individual drivers by informing them of their vehicle's speed. They provide a real time display of a driver's speed at a particular site. These traffic control devices measure the speed of an approaching vehicle by using radar transceivers embedded in the signs. By displaying this information to the driver in real time via a dynamic message display, they are effectively bringing the driver's attention to their speed in relationship to the posted speed limit of a particular roadway.



Driver speed feedback signs are typically installed near schools for safety purposes, and at particular roadway locations that are experiencing higher vehicle speeds than the posted speed limit. Such signs may be installed for a specific corridor, area, or neighborhood. They are most effective at the first point of motorist visibility and for a short distance beyond a particular sign site. Driver speed feedback signs were first introduced during the 1990s. Throughout the 1990s and 2000s, they were often used on a trial basis as temporary traffic

control measures. Today, they are used more routinely to encourage compliance with posted speed limits.

Although complete safety can never be guaranteed, the signs are often used in school speed zones in conjunction with a school zone flasher in an effort to provide a safer environment for students. The City of Mesa has used this technology at several school sites, and will continue to assess and use the signs at locations where they may be helpful.

Although these signs have been successful at school sites, their use at other locations throughout the City was first introduced when the City of Mesa conducted a pilot program for Driver Speed Feedback Signs between January of 2010 and September of 2011, and placed the signs along several neighborhood collectors located within the north-central section of the City. This pilot program was the first time permanent signs were installed within a neighborhood. The request for these signs came from residents concerned about speeding along neighborhood streets. Although the pilot program determined that the placement of the signs has decreased vehicle speeds, it has yet to be determined whether such signs will be routinely installed in other neighborhoods.

EMERGENCY VEHICLE PREEMPTION

Emergency vehicle preemption is a system that gives priority to emergency vehicles at signalized intersections. When a preemption call is received from an emergency vehicle, the traffic signal enters a sequence to either hold a green for the emergency vehicle or terminate the existing phases so that a green can be displayed to an emergency vehicle as soon as possible. The City of Mesa uses a coded system to ensure that unauthorized emitters are not used on the system. Emergency vehicle preemption is currently used at almost 85% of the intersections in the City.

2.8.4 REAL TIME ADAPTIVE CONTROL SYSTEM

The term *Real-Time Adaptive Signal Control System* refers to a system that adapts to traffic by developing signal timing in real time. Traditional signal timing relies on time-of-Day (TOD) programs that do not alter timing in response to measured travel demand, but rather run a uniform timing pattern at the same time each day based on historical traffic patterns. Although a well-timed TOD system can operate as efficiently as an adaptive system, it requires more staff time to maintain and is at a disadvantage as traffic volumes change in response to short term events (such as an automobile crash) or longer term events (such as the holiday shopping season). A real-time adaptive control system can be more responsive because it changes signal timing, or adapts, in response to the traffic demand conditions at the current time. At present, the City of Mesa has deployed a real-time adaptive control system around the Superstition Springs Mall area on the east side of Mesa, located near US 60 Superstition Freeway and Power Road. The City also plans to expand adaptive control to the Fiesta District on the west side of Mesa by 2014. This area is located along US 60 Superstition Freeway and Southern Avenue, between Alma School and Dobson roads.

2.8.5 CURRENT AND FUTURE ITS NEEDS

The City of Mesa operates and maintains an established ITS system, which was developed by Transportation Department staff with the support of elected officials in an effort to provide the maximum mobility to the public from the street system. While there is not a considerable amount of ITS infrastructure remaining to be built, the ITS system will need to expand into new areas of the City and to new signalized intersections, where development occurs in the future. The Mesa ITS Group will need to focus on operating the existing system,

upgrading equipment as it becomes obsolete or reaches the end of its life and exploring new technologies as they become available. The following pages of this section will address a list of current and ongoing needs for ITS.

Dynamic Message Signs (DMS)

Currently, there are only two Dynamic Message Signs located in the City, and both are on Power Road on the east side of Mesa. Due to the infrequent use of the existing signs, there are currently no plans to further deploy dynamic message signs on other roadways throughout the City. There is currently national interest in using DMS to post travel times. This would require a system to provide accurate travel times to be displayed. While such a system does not currently exist, the City has a Federal Highway Administration funded project underway to create a system that will determine and monitor arterial street travel times. Depending on the success of this type of project, travel times could be posted on the existing signs on Power Road. Another way to increase the potential usage of the signs is to share control with the Arizona Department of Transportation (ADOT) or with the Maricopa County Department of Transportation (MCDOT) in the future, so that messages can be posted in the case of freeway closures or other events within their jurisdictions.

Closed Circuit Televisions

Over the past seven years, the City has deployed an extensive CCTV system. The majority of CCTV cameras have been placed at arterial to arterial intersections. CCTVs should continue to be deployed at arterial to arterial intersections, but should also be considered at some of the City's other intersections that are not visible from the arterial to arterial roadway cameras. Newer technology is also developing quickly in this area. Originally the City deployed analog cameras with the video encoded in the traffic signal cabinet. Current options allow video to be encoded directly in the camera, thereby eliminating the need for a piece of hardware in the cabinet.

CCTVs are expected to have a service life of approximately eight to twelve years. The majority of CCTVs that are currently in the system are approximately three to four years old. As this equipment ages and needs to be replaced, the latest technologies should be explored. Whatever technology is chosen in the future, it should be compatible with existing systems.

Vehicle Detection

The City of Mesa currently uses both video detection and loop detectors to detect the presence of vehicles at an intersection. Video detection cameras are projected to have a service life of approximately ten years. As this equipment ages and fails, the City will continue to invest in replacement equipment, taking advantage of improvements in video detection technology and hardware. In some cases, loop detectors are a more appropriate technology. They are typically less expensive when compared to video in locations where there are only a few detection zones needed. Mesa should continue to use both technologies and choose whichever one is the most effective and cost effective for the intended use.

Detector data is currently being logged into a system called DCMS.2. This software package was recently integrated into the Centracs Central Signal System. The growing complex of detection and the data management needs may be considered during evaluations of staffing if there is a desire to make full use of this information.

Driver Feedback Signs

Although existing driver speed feedback signs throughout the City have functioned well, future consideration should be given to "full matrix signs." While these signs are more expensive than the existing driver speed feedback signs, they allow for additional messages, such as "SLOW DOWN" to

be displayed. Communication to the signs should also be considered, which will allow staff to check the health of the signs and upload or download data and configuration settings from the TMC.

Traffic Signals/Traffic Signal Controllers/Malfunction Management Units (MMUs)

Traffic signal technology will continue to evolve, and the Mesa ITS Group should be prepared to install newer technology as it becomes available and existing equipment needs to be replaced. Updated traffic signal controllers frequently have new features that allow for more innovative traffic signal timing to be deployed. Traffic signal cabinet technology will also likely evolve over time toward more reliable and cheaper technologies.

Pre-Emption

To date, installation and upgrade of pre-emption systems have been funded by and installed on behalf of the Fire Department. The Mesa ITS Group is tasked with installing and maintaining the pre-emption equipment at traffic signals, since it directly interfaces with the traffic signal equipment and impacts the traffic signal timing. If supported by the Mesa Fire Department, the Mesa ITS Group should consider improving the pre-emption maintenance program, which would allow for routine maintenance and system health checks on the equipment rather than waiting for an external complaint indicating that the pre-emption equipment is not working. Also, the Mesa ITS Group should continue to work with the Mesa Fire Department and neighboring agencies to ensure that pre-emption is deployed consistently on a regional basis. It is important to consider new technology options such as GPS (Global Positioning Systems) pre-emption, as they become more widely available in the future.

Other Equipment

Other types of equipment that the Mesa ITS Group will continue to maintain and upgrade as new technologies emerge include Uninterruptable Power Supplies (UPS), traffic signal structures such as mast arms and poles, signal heads and pedestrian heads, and accessible pedestrian signals. Recent standards for accessible pedestrian signals were published in the 2009 Manual on Uniform Traffic Control Devices (MUTCD), which is issued by the Federal Highway Administration and adopted by the State of Arizona. The City of Mesa should continue to install these devices on a request basis and with new construction or improvement projects.

The City of Mesa recently began an inventory management system to consolidate and automate some of the record keeping tasks associated with traffic signal maintenance and operation. This new program will allow technicians to keep electronic logs, and will consolidate many inventory items that are currently spread among numerous databases. The software package is currently being customized and programmed for the City. The City should continue to invest in this product to keep it an up to date and valuable tool.

Communications

Center to Center: The Mesa ITS Group will continue to coordinate with regional partners to maintain the connection to the Regional Community Network (RCN). The RCN is a public agency communications network utilized to facilitate video sharing, video conferencing and other data across public agencies.

Center to Field Devices: New communication infrastructure will need to be constructed as new signalized intersections are developed. Additionally, fiber infill projects may be needed to remove existing signals from wireless communications, and to improve redundancy in the system.

Equipment Upgrades: As Ethernet has emerged as the dominant communications standard, more devices throughout the industry are now using this method of communication. The existing field switches are quickly running out of available Ethernet ports. Switches with additional Ethernet ports will be required at many locations.

Node cabinets must be added in the immediate and long term future in order to support the large communications network. Critical network switches (such as at the TMC and node cabinets) will need to be replaced as they reach the end of their useful life.

Interdepartmental Data Sharing: Sharing traffic surveillance video feeds with the Mesa Police and Fire Departments can be facilitated through the RCN connection that is now in place.

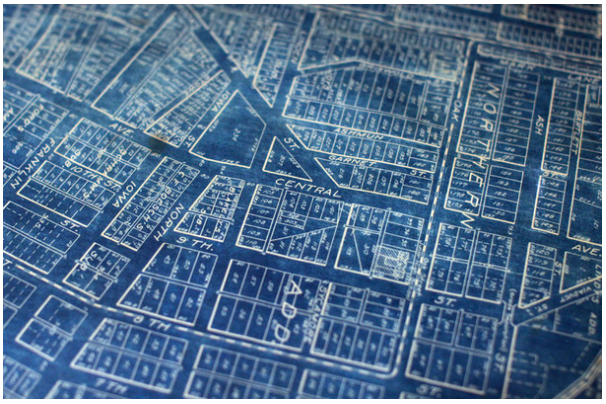
Public Data Sharing: An emphasis should be placed on improving the amount of traffic information that is shared with the traveling public. The Mesa ITS Group is pursuing a project to measure and display travel times along arterial streets in real time. Color coded travel time maps can be shared with motorists via a public website. Snapshot images or even live video feeds of traffic surveillance cameras could also be shared with the public through the web.

2.8.6 Traffic Management Center and Staffing

A backup facility in another area of the City should be considered to complement the existing Traffic Management Center. A proposed off-site facility could serve as a backup TMC, an alternate work site for staff, and an off-site location to backup critical data.

As the City continues to experience further growth and development, and the number of traffic signals increases, additional ITS technician positions may be created to an approximate ratio of one technician per 50 traffic signals. Also, an additional Operations Foreman may become necessary for the southeast section of the City as growth continues. Growth will eventually necessitate the hiring of ITS Analysts and Communications Technicians or contracting for more services as more specialized ITS systems and devices come on line, including adaptive control, Bluetooth readers, driver feedback signs, CCTVs and other technologically advanced systems.

PART 3.0



3.0.0 Mesa's Circulation Blueprint

As Mesa's population grows, shifts, and diversifies, and its economy evolves in the coming decades, the Transportation Department will be faced with challenges. The Department will need to build and maintain an integrated multi-modal transportation system supporting Mesa's economic potential.

The projected increase in demand for transportation services warrants not only increasing the amount of service, but also improving the quality of service provided. Public input for the Mesa 2040 Transportation Plan found that Mesa residents wish to travel through their city by various modes.

Part III will consider all available materials, identified infrastructure and facility needs, and public input that has been gathered. These considerations will help to achieve the goals and objectives that have been outlined in the plan for implementation through the planning horizon year. Although it is not the intent of this planning document to identify and prioritize specific projects to be built, it will be necessary to establish an implementation strategy for programming projects and taking advantage of any future grant funding opportunities.

3.1.1 Mesa's Goals and Objectives to support Future Mobility

Mobility matters throughout our lives. Each day, the residents of our community, from the school student to retiree, from the office worker to soccer mom or dad, from the retail salesperson to truck driver and everyone in between, all need an integrated and multi-modal transportation system that they can rely on today, tomorrow and in the future.

Transportation also affects the character of our community and the quality of our lives. We want our transportation to be safe and convenient, not dangerous or frustrating. We want accessibility provided to the numerous activities that make up our lives. These activities are different for every person and change over time in each person's life.

Through the goals and objectives of the Mesa 2040 Transportation Plan, a blueprint was developed to help the community move forward towards an integrated, multi-modal transportation system that will serve all residents and makes our community a better place to live.

These goals and objectives were created to paint a picture of how the transportation system of the City of Mesa should develop into the future, and provide the necessary component objectives that are needed to accomplish each goal.

Those key components that ensure the Mesa 2040 Transportation Plan will contribute to our transportation future include:

• A broad public involvement program to determine needs and issues.

• Commitment to delivering projects and honoring past commitments, including securing additional funding as needed for Capital Improvement Projects.

• Proper funding for system maintenance.

• Increased funding for alternate mode improvements.

• Roadway improvements that focus on key mobility corridors and specific needs.

• More transportation options for all segments of the population, including transit dependent and low income groups.

• Enhanced travel demand management activities.

• Green solutions and context sensitive design.

• Development of design implementation strategies to guide the vision of this plan.

Future safety and mobility needs, as well as infrastructure requirements needed for ongoing economic development and well-being of the City will be satisfied if the innovation embraced in this plan is realized.

3.1.2 Land Use & Transportation Integration

Integrating transportation and land use planning is essential to meet the ever growing needs of Mesa. Land use development patterns influence transportation choices. Traditional ways of land use planning require expansive spaces and create a host of public and private costs and impacts on our economy, environment, infrastructure and society. Compact, mixed-use infill development with streets designed to prioritize transit, walking and bicycling can meet multiple quality of life objectives. Improved land use planning can help to reduce transportation emissions and noise, improve efficiency, and improve public health by facilitating more active lifestyles while minimizing traffic related fatalities and injuries.

While this type of land use development helps to ensure that many destinations can be reached through walking, public transit, car-sharing and bicycling, strategic investments will be needed to build a transportation network that can meet this demand. Locating new housing and employment centers along transit corridors is only the first step; creating partnerships that identify and provide the needed tools to make these plans and projects successful is vital. Desirable outcomes include increased transit peak-period capacity and reliability;

improved walking and bicycling safety and comfort, and increased use of alternatives such as bicycling and car sharing.

By coordinating land-use and transportation planning early in the design stage, we can create better outcomes that meet Mesa's overall quality of life goals.

Mesa Plan Hierarchy

Integration of all planning documents is a critical part of the success of Mesa's effort to ensure that a balance of travel mode options is available for people when deciding how they will travel throughout the City. Developers, businesses, and residents take these modal choices into consideration when making critical decisions.

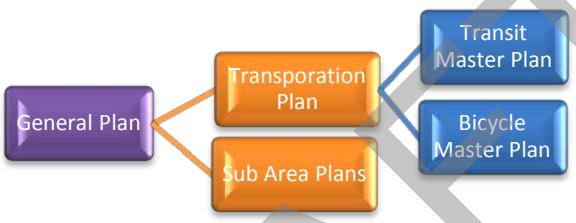


Figure 3.1.1

Mesa's General Plan Document is the document that holds the information of how the residents, elected officials and staff vision the expansion and redevelopment of underutilized areas evolving in the future. Figure 3.3.1 above shows the relationship hierarchy between plans that work together to ensure integration of all modes of transportation in Mesa.

These planning documents and activities overlap and influence each other in various ways. Some of these integrations include:

- The bicycle plan can influence where the general plan positions certain land uses due to denser patterns, or trails nearby. A more bikeable area will influence the nature of a complete street design as outlined within this plan. It can also provide ideas on places with greater mode choice. Where transit and bike infrastructure come together, intermodal connectivity needs to be considered.

- Similarly, the transit plan works with the general plan to identify land use by coordinating population and employment centers with transit infrastructure or route location. Streets will need to be planned and designed accordingly for transit oriented corridors.

- Sub-area plans help to define land use as well within the general plan. Additionally, the sub-area plans will help to create the context for street character and the degree of complete street elements. Sub-areas, similar to square-mile neighborhoods, can be developed with an eye on the respective infrastructure proposed in the bicycle and transit plans.

- The transportation plan works hand in hand with the general plan. Land use is largely driven by the type of street network available. Land planning directly involves the context of an area, and in turn, the aesthetic approach to a complete street. The transportation plan combines all the elements of the transportation realm, such as bicycle and transit, and proposes an overall approach to provide each mode in an integrated way. Proper integration will

allow a choice of mode, as well as mode transfer, for residents.

- The larger concepts for future land use in the general plan help to inform the transportation plan when considering future streets. Locations for new streets and numbers of lanes must be appropriate for the land use to come. Similar to the sub-area plans, the general plan helps to define the context of the areas of the City. This, in turn, helps with the needs for a complete street design. Transit corridors and bicycle paths need to serve those areas where land use will be more dense, or where multiple mode use will be more typical. These will help with locating activity centers with adequate mode transfer opportunities.

- A guiding principle in the general plan is to create and maintain a variety of great neighborhoods. A significant component of a neighborhood is the street and sidewalk network that links residents to each other, to parks and schools, work, and shopping. The design and condition of the area within the right-of-way plays a big role in the livability of a neighborhood. The transportation plan provides the framework and direction for the creation and maintenance of the street network that then impacts the health of neighborhoods.

- For Mesa to continue to evolve from a bedroom community to a more complete and recognizable city as envisioned in the General Plan, we must grow our employment opportunities. To attract and retain employment we must have a multi-modal transportation system that provides for the needs of employers and employees. The Transportation Plan is linked with the General Plan in providing the direction for continued development of the needed transportation system to meet the needs of continued industrial development.

By increasing active transportation and the understanding of the significance of integrating all modes of transportation, Mesa will be a stronger and smarter city. Mesa has committed to developing a finely woven transportation network that provides a balanced, integrated and inviting transportation system for residents with convenient, safe options that are well designed with all modes in mind. Through cost-effective investments, Mesa will build out the needed parts of our transportation network to create an integrated, active transportation system that will connect homes, workplaces, schools, shops and recreation.

3.1.3 Mesa Maturing and Becoming a Recognizable City

The future as envisioned by this Plan will offer Mesa residents a community where they can age in place, and where they can work, live, and relax without having to leave their neighborhoods or travel long distances to do so. This scenario lends itself to an integrated and highly diverse area where people can get the services they need easily.

In order to meet this vision, the City of Mesa transportation system needs to focus on integration of all transportation modes and connectivity of all land-uses.

According to the United States Census, there will be a spike in the population over the age of 60 from 43,043,000 in 2005 to 73,769,000 in 2020. This change represents an increase of 71 percent. As this spike in aging occurs so will the inherent necessity for livable, walkable communities. These folks will need communities where they can live, work and age comfortably.

These ideas and concepts are not only unique to the aging population of Mesa. The workday has begun to change to one where more people can telework on a flexible schedule. These workers are looking for the same types of infrastructure and amenities as the aging population.

The City of Mesa transportation network will fit both those classes, and all classes in between by continually working to ensure that each element is balanced and that needs are identified and addressed early. The needs that have emerged in each of the elements are identified in the following section of this Plan, listed by element, so we can better understand and categorize them to be used when identifying future projects.

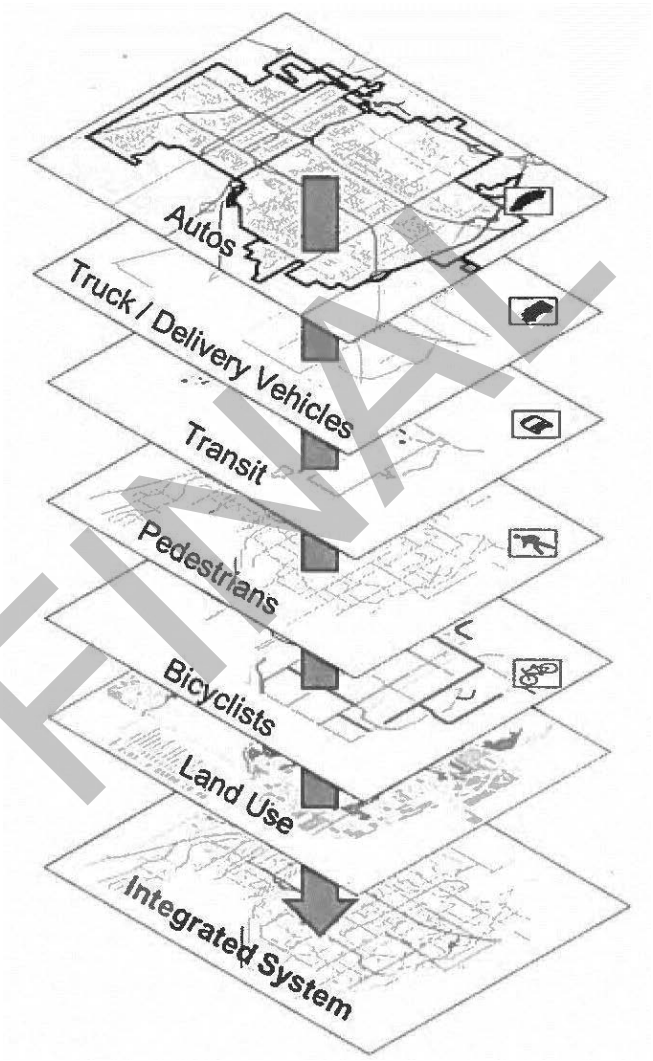


Figure 3.1.2 – Layered Roadway Networks
Source: LSL Planning, Inc., 2010

3.1.4 Mesa's Element Needs

When discussing the needs of the roadways in Mesa we must first go back to the Goals and Objectives as they were defined in Part One. Each element discussed in this Plan offers a unique set of needs that are recommended in order to best accommodate all modes of transportation. These individual elements must be examined as a whole to determine the integration and seamless union of each transportation option, as illustrated in figure 3.1.2.

These needs, as discussed below, are intended to give staff a road map when moving towards becoming a more mature and recognizable City. However, these needs are fluid and need to be approached in small, short-term phases in order to remain relevant to the changing needs of Mesa's residents and economic climate.

Complete Street Needs.

The Complete Streets Element of this plan has shown that the City will:

- Implement a Complete Streets planning process, which will ultimately lead to Complete Street Standards and Guidelines to be used in all future reconstruction projects and new street construction projects.

- Work to adopt the National Association of Transportation Officials (NACTO) Urban Streets Design Guidelines as a basis for a Mesa street design guide. The NACTO guide will be amended as appropriate for City of Mesa conditions.

- Incorporate performance measures will be developed to determine the overall effectiveness and success of Complete Streets improvements.

- Conduct a periodic review of Complete Streets that will assist in evaluating the ongoing effectiveness of policies, recommendations, project development, design guidelines and planning activities.

Roadway Needs

The future roadway system of the City of Mesa has various needs:

- Roadways need to be useful for travel by various modes.

  Roads must connect Activity Centers for all modes.

- Roads need to be designed to provide adequate space for these various modes.
  If space is not available within the roadway right-of-way for alternate modes such as bicyclists and pedestrians, alternate paths need to be built.

- Roadway planning needs to focus on connecting activity centers and mode transfer points.

Gaps in roadways need to be connected in order to provide access to activity centers, provide sidewalks to pedestrians, and allow ways to get around barriers.

Transit Needs

Needs identified through Mesa's Transit Master Plan provide for expansion in service and facilities in the context of future funding constraints that are being experienced in the region with regards to transit service.

The Transit Master Plan provides an activity center-based approach that identifies priority corridors and multi-modal connections within the City of Mesa. Needs and implementation strategies addressed within the Transit element of the plan are in direct alignment with regional needs and vision for transit services in the greater Phoenix area.

Mesa's Transit needs identified through the plan include:

- Connecting activity centers using transit
- Identification of transit priority corridors

- Increase in service frequency and coverage
- Regional transit cohesion
- Integration of transit connection with other multi-modal networks
- Creation of a long term sustainable transit system

Pedestrian Needs

The Pedestrian Element of this plan has identified that the City needs to ensure:

- All future pedestrian planning efforts are well connected and accessible.
- All pedestrian facilities are complete.
- The pedestrian facilities network has clearly defined routes connecting origins to the many destinations in Mesa without requiring travel out of the way due to barriers or gaps in the system.
- All current gaps in the arterial and collector pedestrian network will be eliminated with future reconditioning and reconstruction projects.

Along with the needs identified through the pedestrian element listed above, the City of Mesa has identified the need for an ADA compliance audit to be performed in order to best provide accommodations that address the mobility needs of persons with disabilities. This ADA compliance audit will help the City to prioritize future projects and to provide direction when retrofitting areas of the City that are due for rehabilitation efforts.

Bicycle Needs

The bicycle element is a unique element as it is an executive summary of the existing City of Mesa Bicycle Master Plan that has laid out a very extensive and priority defined list of projects that the Bicycle and Pedestrian Program will look to complete during the lifespan of the plan. The Bicycle Master Plan has created a framework to accomplish the following infrastructure and program needs:

- Comprehensive list of projects that were identified through the planning process, which include a list of the City's Top 40 projects that will be targeted to be built during the life of the plan.
- Programs were identified through the League of American Bicyclists – Bicycle Friendly Communities (BFC) application process. Programs that are needed to progress to the targeted Platinum status will be instituted through the planning horizon year and will include programs that target; education, encouragement, enforcement, and evaluation of infrastructure and non-infrastructure elements.

Aviation Needs

The summary of each of Mesa's airports; Phoenix Mesa Gateway and Falcon Field in the Aviation Element of this plan have forecasted the need to provide accommodations to satisfy increasing forecast demand up to and including the time of build-out of Mesa.

The Falcon Field Plan takes a demand-based approach when looking at the development of the surrounding facilities and property that fall within the Falcon Field planning area. The current Falcon Field Master Plan looks at existing conditions to determine the needs and how those needs directly affect the operation of the airport. Once these needs were established, they were evaluated to determine a realistic capital improvement schedule, and then grouped by horizon year of: short term, intermediate term, and long term.

Phoenix Mesa Gateway produced the Northeast Area Development Plan (NADP) to provide findings and recommendations. These would include a financially feasible strategy of development to keep pace with anticipated aeronautical growth, while being augmented and ultimately supported in part by on-airport, non-aeronautical commercial development. The NADP further defined development alternatives and future needs of various airport stakeholders.

The main facet of each airport's plan was the need to continually adapt and grow with the surrounding community and frequently evaluate and adjust according to travel demand needs.

Mesa will continue to encourage this integration of all modes of transportation, being mindful of the importance of proper circulation and access in and around airport facilities.

Travel Demand Management (TDM) Needs

Travel Demand needs in the City of Mesa are a constant and continual evaluation of the programs offered and the current trends of the movement of people and goods by more efficient modes such as:

- Walking
- Cycling
- Ridesharing
- public transit
- Alternative fueled vehicles and
- Telework/ Telecommute

The City of Mesa will continue to evaluate the needs of its workers and continue to incorporate the programs needed to remain compliant with the Maricopa County Trip Reduction Program (MCTRP).

Mesa will moving forward in a regional effort to incorporate bike share as part of its travel demand management strategy and incentives as well as working as a regional partner to ensure that MCTRP compliance is achieved through:

- Community Surveys
- Alternative modes at end of line facilities
- Zoning Ordinances focusing on alternative mode amenities and facilities

- Encouragement programs that offer incentives to alternate modes of travel to school and the workplace

Intelligent Transportation System (ITS) Needs

While there is not a considerable amount of ITS infrastructure remaining to be built, the ITS system will need to expand into new areas of the City and to newly signalized intersections, as development occurs in the future. The Mesa ITS Group will need to focus on operating the existing system, upgrading equipment as it becomes obsolete or reaches the end of its life, and exploring new technologies as they become available.

The following needs will be the focus of the ITS group during the planning horizon of this plan:

- Expand Dynamic Message Signs (DMS) deployment throughout the City.
- Replace aging Closed Circuit Televisions.
- Update and replace aging video and loop detection as well as further integration into the Centracs Central Signal System.
- Future consideration should be given to updating current Driver Feedback signs with "full matrix signs." While these signs are more expensive than the existing driver speed feedback signs, they allow for additional messages, such as "SLOW DOWN" to be displayed.
- Install newer traffic signals, traffic signal controllers, and Malfunction Management Units (MMUs) technology as it becomes available and existing equipment needs to be replaced.
- Continue to work with the Mesa Fire Department and neighboring agencies to ensure that pre-emption is deployed consistently on a regional basis. It is important to consider new technology options such as GPS (Global Positioning Systems) pre-emption, as they become more widely available in the future.

Providing a backup Traffic Management Center facility in another area of the City should be considered to complement the existing Traffic Management Center.

3.1.5 A Vision for the Future

As we move through the process of defining Mesa as a recognizable City, the Transportation Department will continue to work towards the vision established within this Plan, as well as working along with the General Plan's vision to achieve the "Sense of Place" that Mesa residents are looking for. Residents are envisioning "This Is My Mesa" as someplace where they will experience:

- Recognizable Neighborhoods
- Innovative Jobs
- Memorable Public Spaces

Planning staff developed a series of fundamental vision statements that are in alignment with this Plan's Goals and Objectives as well as with input received through the "This is My Mesa" campaign.

The following statements are a representation of the overall direction the citizens of Mesa want to go as a community.

As reflected in the General Plan in 2040, Mesa is a recognizable City with a great sense of place where:

- Neighborhood and village centers, of appropriate scale and in appropriate locations, have replaced auto-dominant suburban sprawl to create stronger neighborhoods with a greater sense of place.

- The downtown area, Mesa's primary urban core, is energized with a variety of dynamic and vibrant activities including an active night life, frequent community events, higher education campuses, and an active arts community.

- Existing neighborhoods are well maintained and appropriate infill and redevelopment is encouraged.

- Changes in the form of buildings and neighborhoods have provided the opportunity to reduce auto travel and energy usage and responds appropriately to our desert environment.

- Innovation, creativity in entrepreneurship, job creation, and workforce education has provided a strong economic base and has propelled the City forward in the global market.

- Mesa's built environment sets a standard of quality which is the envy of other communities.

- We support investment in quality of life assets including education, arts, culture, and recreation opportunities.

- There are efficient, multi-modal transportation and transit systems that provide for the movement of goods and people, whether it is around the corner or around the world.

- Residents of all ages take pride in their neighborhoods and enjoy safe, clean, and healthy living environments.

- Residents feel a sense of inclusion and ownership in their community and a connection to each other through such things as innovative use of technology; participatory government; high degrees of volunteerism; and, community events.

- We appreciate and celebrate our roots while embracing the changes in demographics and cultures that help make this an exciting and dynamic place to live and work.

- We have choice in a variety of environments from rural to urban; low rise to high-rise; passive to active to meet the needs and desires of all residents.

Transportation's Role in Creating a Recognizable City

In understanding and executing Transportation's role in creating a recognizable City, we should first return to the fundamental Goals and Objectives of this Plan.

Each of the three goals that support the over-arching vision of the Transportation Plan were formed and developed to assist in the support of the three guiding principles found in the General Plan.

The Transportation Plan's first goal,

"Develop a safe and efficient transportation system that provides access to all public places by multiple modes of travel and various users."

supports the General Plan's commitment to replace auto dominate roadways with a more efficient, multi-modal transportation system that will address the needs of all users.

The second Transportation goal as defined in this Plan is,

"Develop inviting streets that identify with the context of the surrounding neighborhood and help to create a sense of community and vibrant public space."

This goal supports the General Plan's pledge to develop neighborhood and village centers, of appropriate scale and in appropriate locations, and reduce suburban sprawl to create stronger neighborhoods with a greater sense of place.

The third Transportation goal that is defined is,

"Develop a transportation network concentrated around activity centers that encourage dense, diverse public places and fosters economic growth."

directly supports the development of the downtown area, Mesa's primary urban core. This goal also supports appropriate infill and redevelopment, which encourages investment in quality of life assets such as education, arts, culture, and entertainment.

By addressing the needs as identified in each of the elements within this Plan, Transportation will continue to work towards the realization of the vision established in the Transportation and General Plans.

In order to better visualize the role of the transportation system within the vision of the General Plan we took a look at a snap shot of a study area along Southern Avenue in the Fiesta District, between Dobson Road and Alma School Road. It is the goal of this illustration to show the study area in its present day configuration and then illustrate what that same area would look like when it accommodates all modes of transportation.

3.1.6 Fiesta District Cumulative Concept Illustration

When one looks at great cities around the world, patterns emerge that influence and contribute to generating that greatness. All great cities have great streets, and all great streets have great destinations along those streets.

Designing roadways intended to reduce congestion may increase the isolation of people living along the road. This sense of isolation on the roadway contributes to a lack of pedestrian culture to stimulate street life. With no street life or pedestrian culture, opportunities for people to engage each other and create neighborhood unity are non-existent. Furthermore, areas that do not offer walkable environments are destined to lose economic development opportunities and result in people traveling to other areas that offer livable amenities. Mesa's creative class and millennial generation seek great street life, as well as useful, safe, comfortable, and interesting walkable places to live.

Looking at the Fiesta District offers a prime example of that lack of pedestrian culture and the degradation of an area because of the lack of street life. The Fiesta District offers an area where thousands of young millennial students reside and learn. The Fiesta District also offers a regional medical center and regional commercial district that should be booming with creative class professionals, yet has no street life or pedestrian culture.

As illustrated in Figure 3.1.3 and also listed below, when taking a closer look at a section of Southern Avenue within the Fiesta District as it appears today we see the following current conditions:

- A six-lane arterial road
- Daily traffic volumes of 35,000
- Auto-dominant travel
- Attached sidewalk with no buffer
- Long unprotected crossings with no refuge at intersections
- Unused parking and vacant businesses
- Very little shade

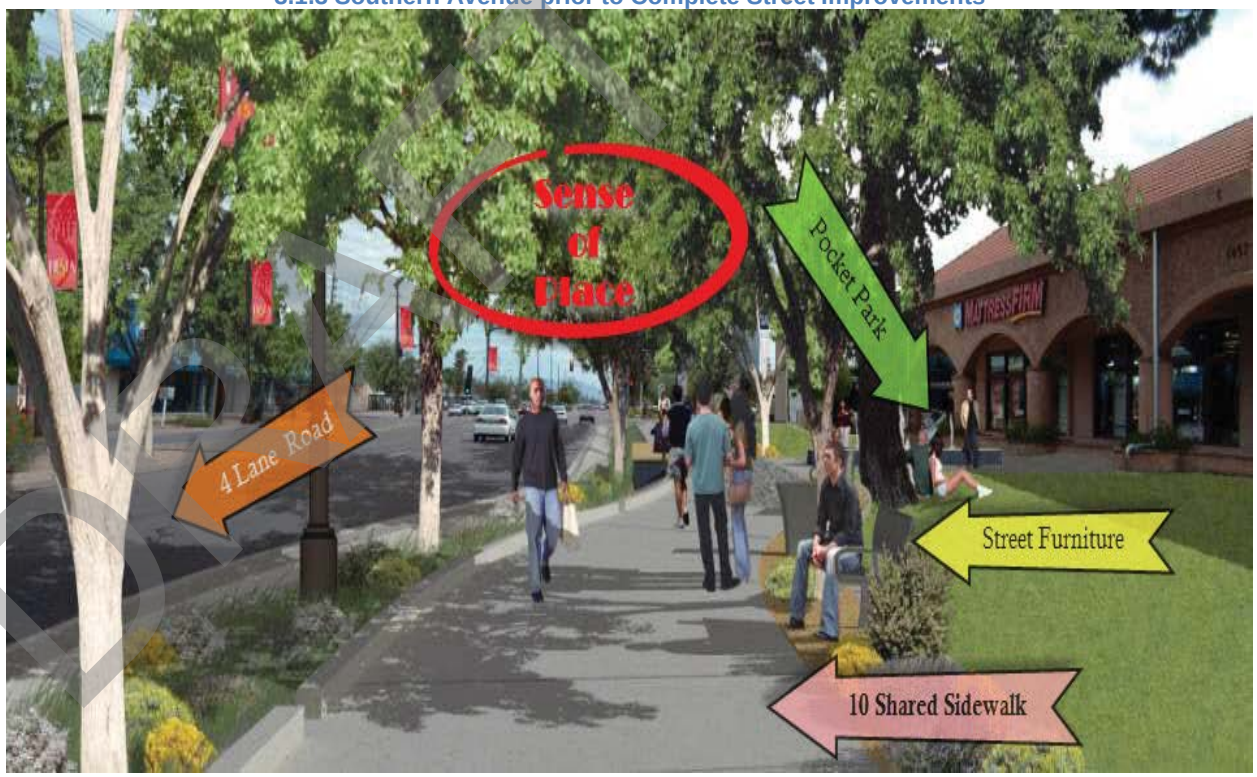
All of these factors create conditions that are uncomfortable to modes other than the automobile, which highly discourage any sort of street life. By having conditions that are intimidating to other modes, the street's design is creating a hostile environment for those more vulnerable users trying to navigate a street meant for automobiles. Creating the conditions that are discouraging to people who are trying to walk, bike, and socially interact with one another will also discourage developers looking to redevelop the area.

Next, the Plan illustrates in Figure 3.1.4 that same stretch of road along Southern Avenue re-imagined as a complete street encouraging pedestrian culture and street life. The modifications create an environment that connects users to mixed-use businesses, residential infill development, and one another by providing:

- Narrower 4 lane roads
- Lowered daily traffic volumes in the 10,000 -15,000 range
- Shaded 10-foot sidewalks
- Street furniture and pocket parks
- Land use building redevelopment
- Canopy clad stores
- Places to congregate

These elements together encourage an environment where people can live, work and play without having to travel outside of their immediate neighborhood. Together with the changes to the public space, built environment, and the creation of a sense of place for residents that live there, residential and business development will infill, create jobs, and improve the overall quality of life for the community.

3.1.3 Southern Avenue prior to Complete Street Improvements



3.1.4 Southern Avenue with Complete Street Improvements

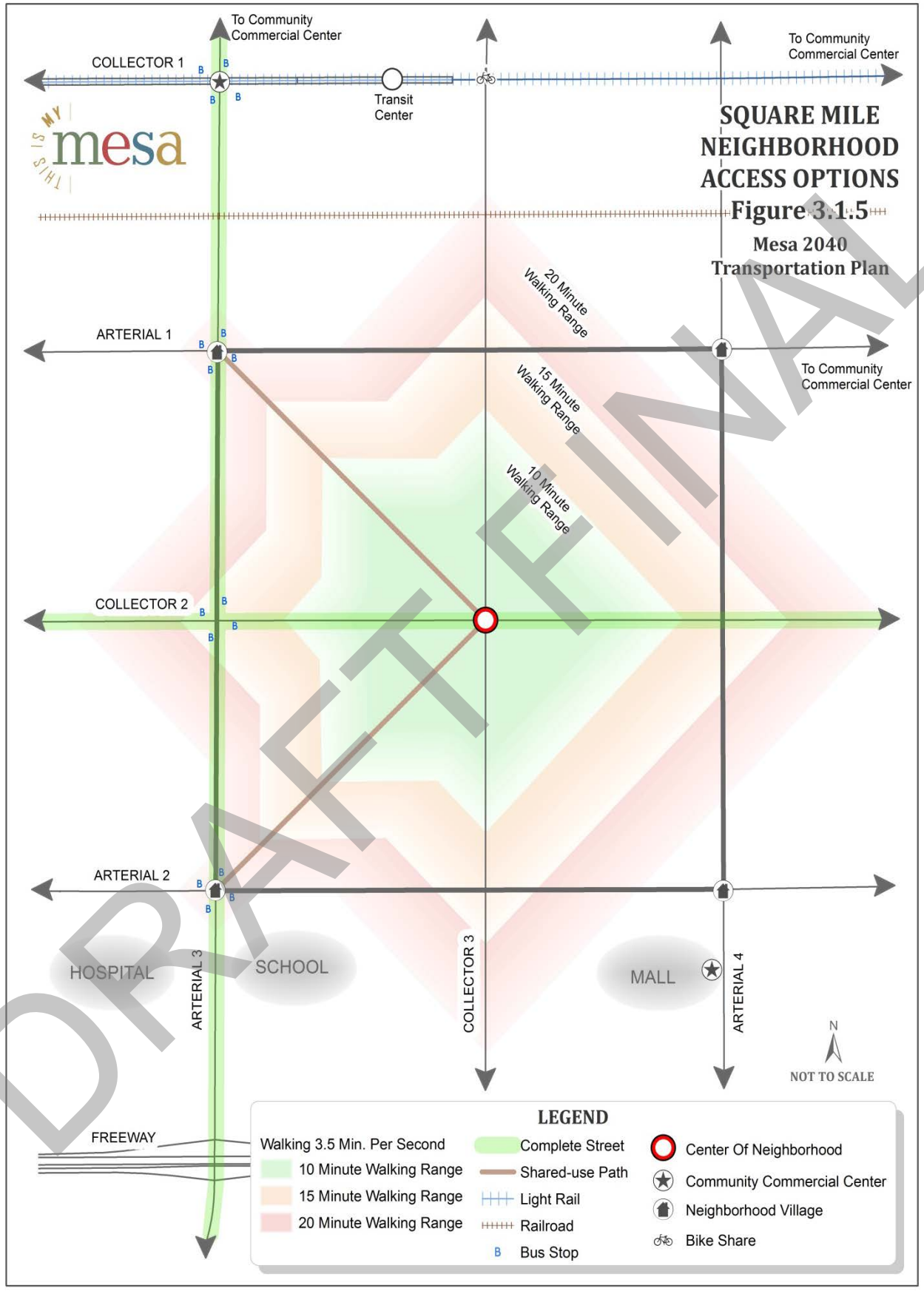
Looking at a focus area cross section provides a great prospective of enhancements that could be applied to a street to provide comfort and balance for all modes, as well as creating the pedestrian culture needed to thrive. As both Plans indicated, there is a need for Mesa's transportation network to provide infrastructure that gives people travel mode choices, whether by walking, riding a bicycle, driving an automobile, or riding transit.

In Figure 3.1.5, the concepts from the Transportation and General Plans are used to illustrate the relationship between the overall transportation network, activity centers, neighborhood village centers, and employment centers. Figure 3.1.5 exhibits some of the ideas that emerged from both Plans allowing them to overlap and come together in many ways. Coordinating land-use and transportation planning helps to support a community that is easily navigated to reach destinations or transit options within a 10, 15, and 20-minute walk from a square mile neighborhood. These walk-times are shown as range areas on Figure 3.1.5.

Figure 3.1.5 shows an idealized square-mile neighborhood with transportation options to access nearby destinations. Running through the center of the neighborhood are the typical half-mile collector streets, one which is a Complete Street. Additionally, the west half of the square mile shows simplified versions of shared-use paths running from the center to the corners. The square-mile is bounded by arterial roadways, and the majority of Village Centers are located at arterial intersections according to the General Plan. Arterial Three is also a Complete Street with bus service. This neighborhood arrangement then provides comfortable, multi-modal access from the center of the neighborhood by either shared-use paths, or Complete Streets to the Village Centers.

Access to an arterial Complete Street allows additional travel options for farther destinations. Transit, bicycle or walking capabilities along the Complete Street of Arterial Three provide service to the larger activity center to the south, or the transit center and light-rail line to the north. The light-rail line then continues access to more regional destinations.

As square-mile neighborhoods continue to be built, or rebuilt, the concepts shown in this illustration, and found in this plan, should be used to provide greater access. Better access helps to create a more efficient transportation system that can be enjoyed by all users, regardless of travel mode choice. These concepts promote Complete Streets, and streets that can enhance a neighborhood. Attractive street spaces encourage residents to be there, interacting with other people. Developing our streets as great public places helps to stimulate surrounding activity centers, leading to more jobs and a better economy.


To Community Commercial Center
COLLECTOR 1
Transit Center
To Community Commercial Center
SQUARE MILE NEIGHBORHOOD ACCESS OPTIONS
Figure 3.1.5
Mesa 2040 Transportation Plan
20 Minute Walking Range
ARTERIAL 1
15 Minute Walking Range
To Community Commercial Center
10 Minute Walking Range
COLLECTOR 2
ARTERIAL 2
HOSPITAL
SCHOOL
ARTERIAL 3
COLLECTOR 3
MALL
ARTERIAL 4
N
NOT TO SCALE
FREEWAY
LEGEND
Walking 3.5 Min. Per Second
10 Minute Walking Range
15 Minute Walking Range
20 Minute Walking Range
Complete Street
Shared-use Path
Light Rail
Railroad
Bus Stop
Center Of Neighborhood
Community Commercial Center
Neighborhood Village
Bike Share