CHAPTER 3: CIRCULATION

Circulation Element

The Circulation Element addresses multimodal transportation improvements to roads and infrastructure serving motorists, transit patrons, pedestrians, and bicyclists. Much of the information in this section is directly from the City of Coolidge Comprehensive Transportation Feasibility Study adopted by Coolidge City Council in June 2012.

Key objectives of this section include identifying and establishing a multimodal transportation plan that provides a vision that promotes community growth and economic development, accommodates anticipated local and regional travel demand, and supports regional multimodal initiatives in a manner that informs regional decision making. The recommendations and direction provided in this section is the first of several required steps to implementation. The Circulation Element provides the community vision for transportation investments.

The urbanization process and general population growth is expected to add significantly to the number of households in the study area through year 2040, and beyond. Household and employment growth will be further enhanced by the regional transportation investments being contemplated. Being directly between the two metropolitan areas of Phoenix and Tucson, Coolidge is situated to provide residents and businesses a great amount of flexibility and proximity to these two key established population and employment areas of Arizona, while providing the framework to grow jobs and households locally. At this regional level, Coolidge is also positioned to be a central hub to support regional travel demand and tie into other regional transportation investments such as a North-South Corridor and an Intercity Rail system.

Approximately 30% of the future primary roadway network is currently paved, but these paved roads are not in the form of an ultimate arterial or parkway standard. In addition, of the arterial network in place, more than half of that system needs major or significant maintenance. The strategy outlined in this element provides an approach to establish the critical transportation corridors in a phased manner so to maximize system mobility and connectivity while minimizing maintenance activity requirements.

REGIONAL COORDINATION

This plan worked closely with other regional stakeholders to ensure that plans were coordinated in an efficient manner. One of the key studies referenced throughout this work effort was the Pinal County Regionally Significant Routes for Safety and Mobility Study (RSRSM). The recommendations from the Circulation Element will inform and augment the County's Regionally Significant Routes (RSR) map (Figure 3.1). The significance of this map is that it illustrates those regional facilities designated for preservation through planning and access management applications. The principal arterials and parkway facilities illustrated in Figure 3.3 of this Plan should be integrated as Regionally Significant Routes for Pinal County.

There are three key multimodal parts of the Circulation Plan, including **Roadways**, **Transit**, and **Bicycle/Pedestrian**. Although described separately, they are all interrelated and must be implemented as a system.

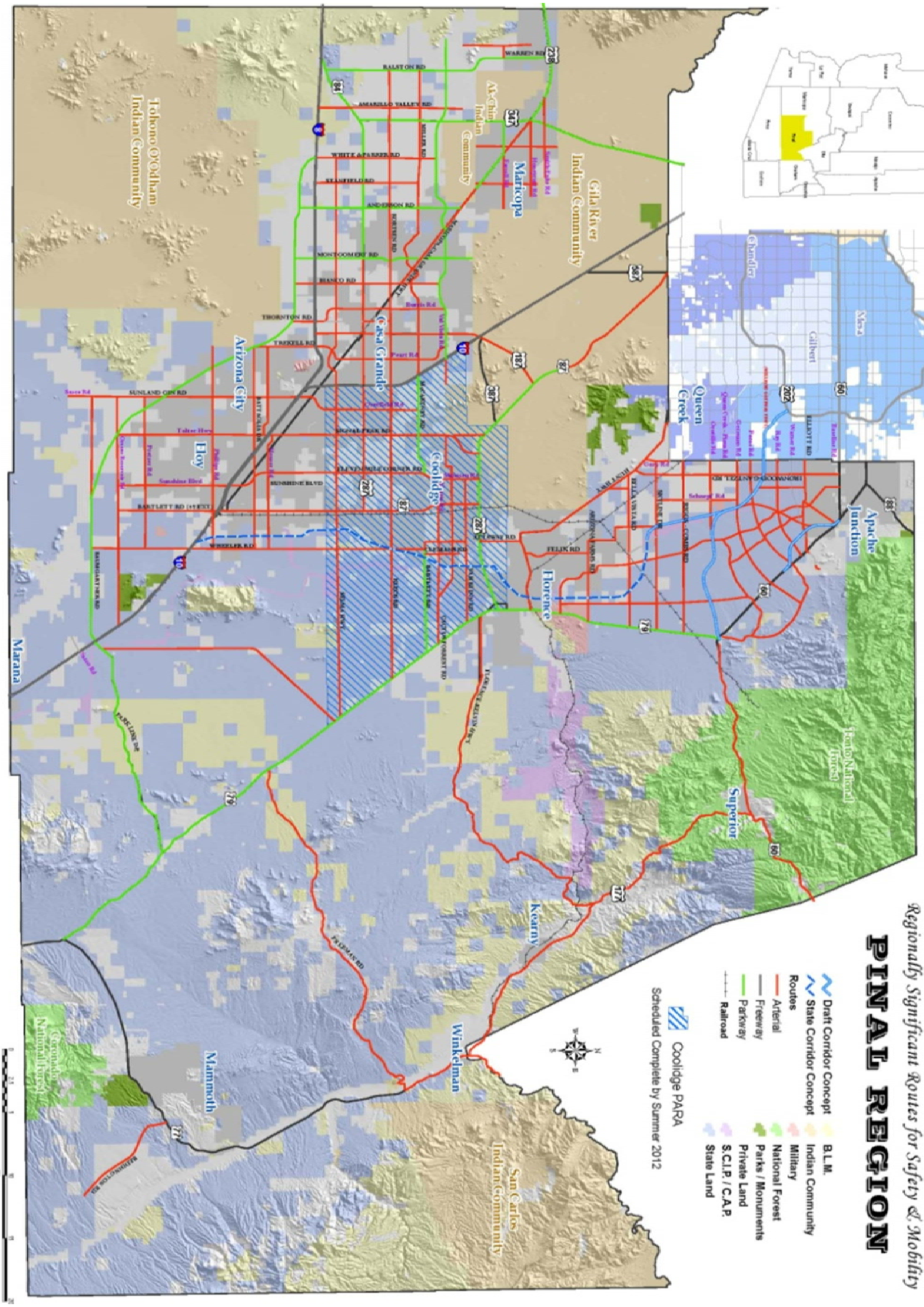


Figure 3.1 : Regionally Significant Routes

ROADWAYS

The future roadway facilities described herein are based on the existing and committed model network used for the North/South Corridor Study. The current travel demand model does not identify Principal Arterials versus Minor Arterials, and it does not differentiate between Major and Minor Collectors. The proposed changes, later described in this section, will correct these issues.

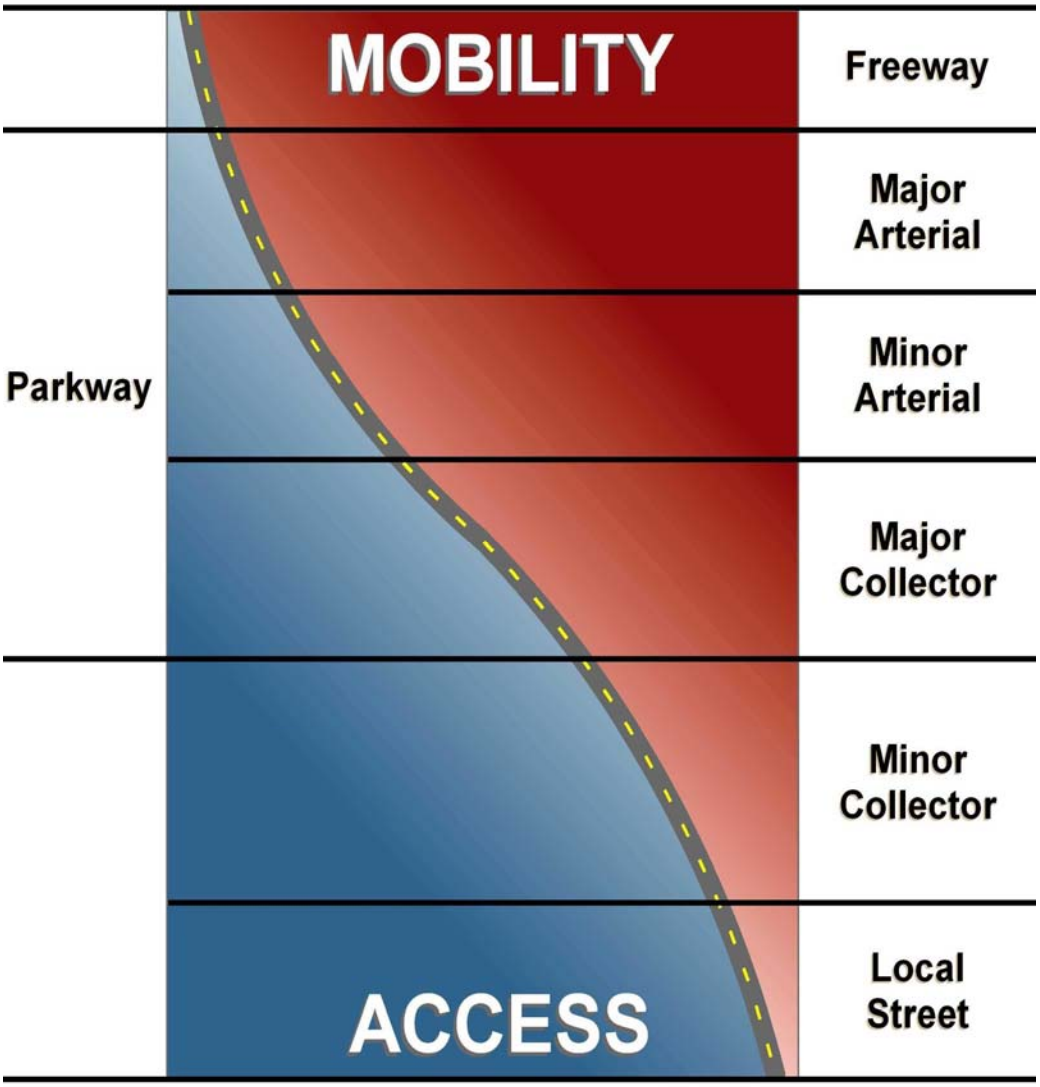
Roadway Functional Classification Roads are classified according to specific design and traffic characteristics. The functional classification process categorizes roads by how they perform in regard to providing access and mobility within the community. The region's roadway network includes five roadway functional classifications. The following roadway functional classifications are recommended to provide a sound transportation system for the City to accommodate local growth and regional transportation demands. The functional classification of the roadway network in Coolidge has been established in accordance with the definitions provided by ADOT and FHWA, as summarized below:

- **Freeway:** Multi-lane, high-speed, controlled access, divided roadway with the primary purpose of efficiently serving longer regional or interregional trips;
- **Parkway:** High capacity multi-lane, higher speed, controlled access, divided roadway with the primary purpose of efficiently and safely serving longer regional trips, major activity centers, providing access to freeways and arterials, and providing controlled access to abutting property owners;
- **Principal Arterial:** Higher speed, controlled access, divided roadway of two or more lanes in each direction, designed for efficient travel between major activity centers, providing access to freeways with limited access to/from abutting property;
- **Minor Arterial:** Higher speed, controlled access, divided roadway of two or more lanes in each direction connecting lower and higher functionally classified facilities as well as major activity centers, and facilitating access to and connectivity between larger land tracts and commercial developments;
- **Major Collector / Commerce Park Collector:** Two-lane roadway facilitating connectivity to the higher order arterial network, while providing direct access to the roadway network for larger commercial parcels and larger residential developments; and

- **Minor Collector / Residential Collector:** Two-lane roadway providing direct access to the roadway network for commercial parcels and multi-family residential developments via major collector and minor arterial roadways.

The Circulation Element graphically depicts all freeway, parkway, principal and minor arterial routes planned for the Coolidge Planning Area Boundary (Figure 3.3). The regional routes that include freeways, parkways and principal arterials facilitate regional travel and have the greatest amount of access control and management. These facilities should be integrated into the Pinal County Regionally Significant Routes system, the Sun Corridor MPO's Long Range Transportation Plan, and be part of the Regional Transportation Plan network. The major and minor collector facilities are not all identified as many of those facilities have the greatest potential for change as development occurs. Collectors that change cardinal direction should be discouraged as it creates out of direction travel and additional turning traffic movements, ultimately reducing capacity and decreasing intersection safety. As the functional classification transitions from arterial roadways to local roadways, the level of access increases, the capacity decreases, and the purpose of the roadway changes from efficiently moving vehicles to providing direct property access. This system of functional classifications is critical to provide a network capable of accommodating regional mobility and local property access.

Figure 3.2 : Access vs Mobility



ROADWAYS

FUNCTIONAL CLASSIFICATION CAPACITIES

Roadway capacity corresponds directly with roadway functional classification. In general, as the roadway classification is elevated, the roadway can handle higher traffic volumes. Factors such as level of access control, number of driveways, availability of left-turn lanes, and if the roadway is divided or undivided play a critical role in overall capacity.

Table 3a : Roadway Capacities (Daily Volume Threshold)

Functional Classification	Number of Lanes	Divided/ Undivided	Left-Turn Lane	Description	ADT Capacity Threshold (LOS D)
Freeway	4	Divided	n/a		101,600
	6	Divided	n/a		152,400
Arizona Parkway	4	Divided	ILT		60,000
	6	Divided	ILT		90,000
Principal Arterial	2	Undivided	Yes	State Class 1	15,500
	4	Undivided	No	Arterials	23,940
	4	Divided	Yes		34,200
	6	Divided	Yes		51,400
Minor Arterial	2	Undivided	No	State Class 2	11,600
	2	Undivided	Yes	Arterials	14,500
	4	Undivided	No		22,900
	4	Divided	Yes		30,600
Major Collector	2	Undivided	No		10,800
	2	Undivided	Yes		13,600
	3	Continuous LTL	Yes		15,000
	4	Undivided	No		15,200
Minor Collector	2	Undivided	No		7,500
	2	Undivided	Yes		9,400
	3	Continuous LTL	Yes		12,000

Source: Florida Department of Transportation *Quality Level of Service Handbook, 2002*

Table 3a above provides planning level capacities that should be considered as the transportation system is being phased and implemented. The capacities above also illustrate the significance of improved capacity for divided versus undivided roadways. Dividing the freeway, parkway, principal and minor arterial roadways with a raised median can provide approximately 40% additional capacity and greatly enhanced safety without a significant difference in investment costs.

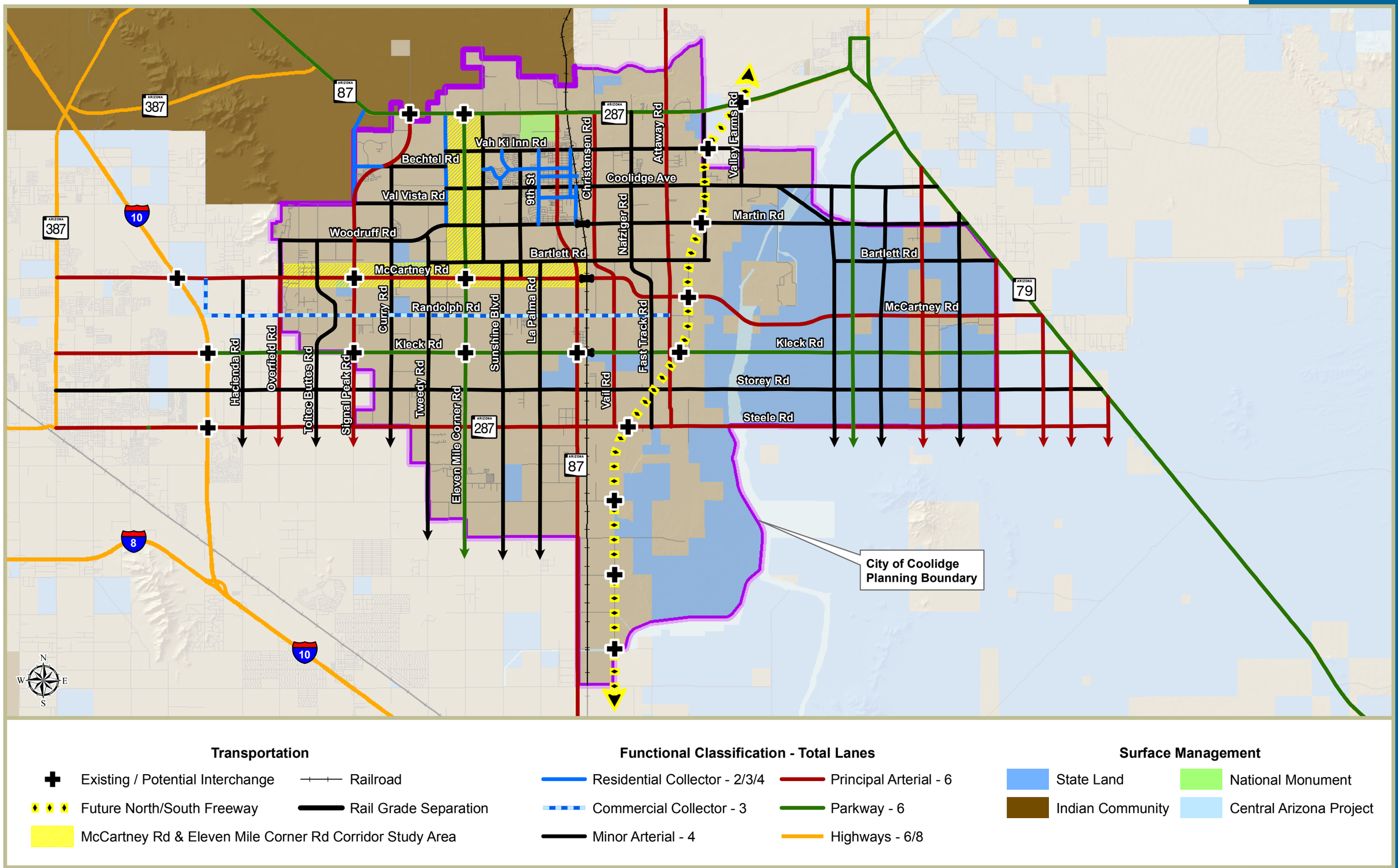


Figure 3.3 : Transportation Plan Map

All you need is the plan, the road map, and the courage to press on to your destination.

-Earl Nightingale

TRANSPORTATION PLAN & ACCESS MANAGEMENT

Table 3b below documents the roadway criteria and design standards including the applicable access management strategy for each cross section.

Table 3b : Access Management

Criteria	Functional Classification				
	Arizona Parkway	Principal/Major Arterial	Minor Arterial	Commerce Park Collector	Residential Collector
Road Purpose	Mobility	Mobility	Mobility/Access	Access	Access
Planning Average Daily Traffic	60,000 – 90,000	45,000 – 60,000	30,000	10,000	8,000
Design Standards					
Design Speed	55 mph	55 mph	45 mph	35 mph	35 mph
Right-of-Way Width	200'	130' - 150'	110'	80'	70'
Median	Divided	Divided	Divided	TWTL	NA
Number of Lanes	6	4 - 6	4 – 5	2 – 4	2 – 3
Left-turn Lanes	Indirect Left-Turn. Spacing at 1320' or 660' as permitted	1/4 - 1/2 mile	1/4 - 1/2 mile	At all locations where permitted	At all locations where permitted
Right-turn Lanes	At all locations where permitted and warranted	At all locations where permitted and warranted	At all locations where permitted and warranted	At all locations where permitted and warranted	At all locations where permitted and warranted
Access Management Guidelines					
Public Access	1/8 – 1/2 mile	1/8 – 1/2 mile	1/8 – 1/4 mile	1/8 – 1/4 mile	1/8 mile
Property Access	Right in/Right out	Right in/Right out. Full access where approved	Right in/Right out. Full access where approved	Full access where approved	Full access where approved
Traffic Signal Spacing	1 mile; 1/2 mile where warranted and permitted	Mile and 1/2 mile locations where warranted, fully coordinated and progressed	1/2 mile locations, 1/4 mile locations where warranted, fully coordinated and progressed	1/2 mile locations, 1/4 mile locations where warranted	NA
Typical Traffic Control	Signalized, two-way stop	Signalized, two-way stop (interim – roundabout allowed)	Signalized, two-way stop (interim – roundabout allowed)	Signalized, roundabout stop	Signalized, roundabout stop
Parking	Prohibited	Prohibited	Prohibited	Restricted	Restricted
Alternative Modes					
Transit	Bus pull-outs and queue jumpers where warranted	Bus pull-outs and queue jumpers where warranted	Bus pull-outs and queue jumpers where warranted	NA	NA
Bike Lanes	Yes	Yes	Yes	Share the Road	Share the Road
Multi-use Path	10'	10'	10'	NA	10'
Sidewalk	6'	6'	6'	5' (both sides)	5'

TWTL – Two-way Turning Lanes

ROADWAYS

CROSS SECTIONS

Roadway cross sections provide the framework for a community to understand how to move people from their travel origins to their destinations. Several factors are balanced when developing cross sections to best manage future traffic demand based on existing and future land uses, including:

- Amount of traffic (high-volume versus low-volume)
- Type of traffic (large vehicles, heavy vehicles, buses, cars)
- Level of pedestrian activity
- Level of bicyclist activity
- Density of driveways
- Turning traffic volume (driveways, street intersections, offset versus aligned intersections)
- Surrounding land uses (schools, residential, industrial, commercial)
- Regional mobility corridors (through route, established bicycle route)

In communities across the nation, transportation system investments have strived to better accommodate multiple travel modes through “Complete Streets” initiatives. Whether it is providing sidewalks for pedestrians, shared -use paths or shoulders for bicyclists, wide outside travel lanes to allow for a safe area for cyclists to ride either in the shoulder or in a signed bicycle lane, bus pull-outs for transit stops, or trails for equestrians, communities are making the investments to provide safe mobility options to their residents, employers and visitors. Many of the proposed cross sections include a shared-use path that would be wide enough for more than two people to walk side-by-side, bicycle use and/or equestrian use. Each cross section also includes a detached sidewalk that is at least five-feet wide, and is separated from the roadway by at least five feet as indicated in the Arizona Department of Transportation (ADOT) *Roadway Design Guidelines*. All roadways should be designed in a context-sensitive manner; meaning the roadway condition should be proportional in scale to the adjacent development. This is particularly true in the two collector cross-sections (Commerce Park and Residential), which should be designed according to their adjacent land uses. Figures 3.4 and 3.6 through 3.9 depict the typical cross sections for each functional classification, and Figure 3.5 illustrates an indirect left-turn lane treatment for Parkway functional classification roadways. Where approved by Growth Management and Public Works, modifications may be made to these cross sections as necessary and appropriate to provide enhanced safety, design, circulation, or streetscape.

Figure 3.4 : Arizona Parkway Typical 6-Lane Section

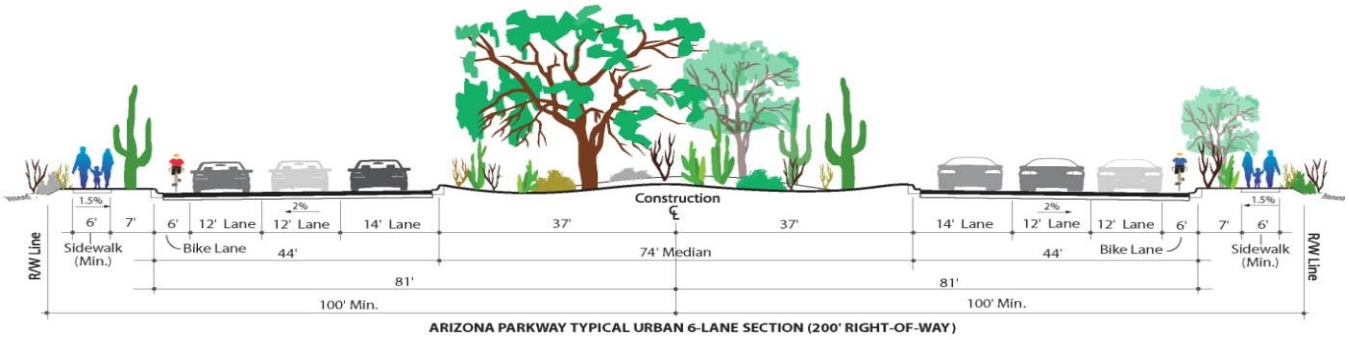


Figure 3.5 : Indirect Left-Turn Treatment

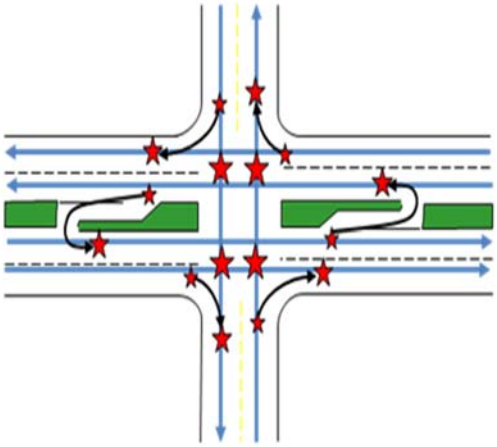


Figure 3.6 : Principal Arterial Typical Section

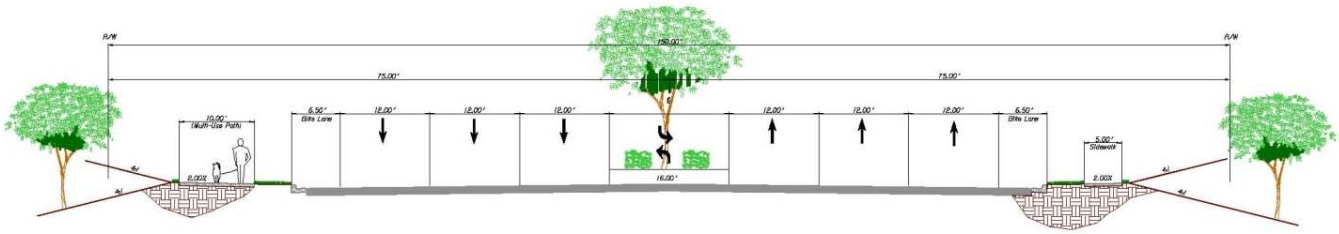


Figure 3.7 : Minor Arterial Typical Section

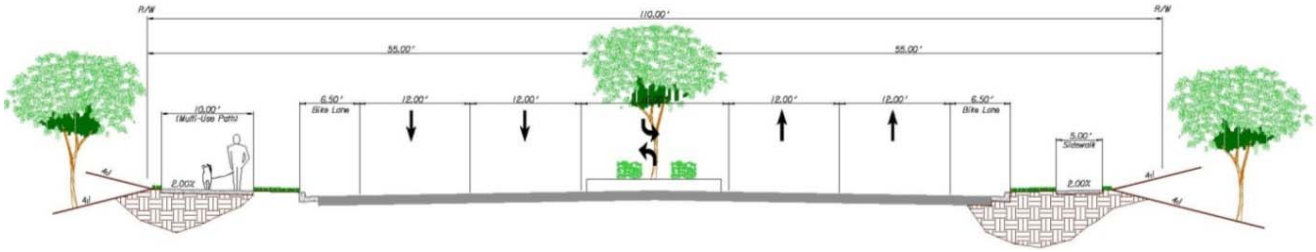


Figure 3.8 : Commerce Park Collector Typical Section

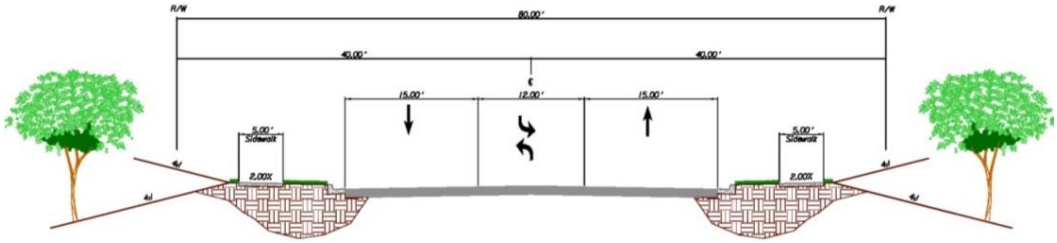
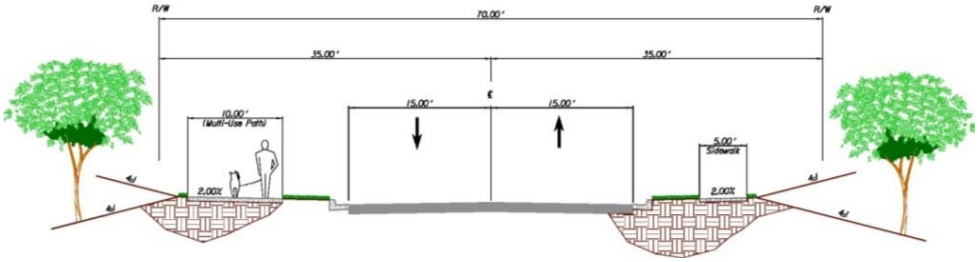


Figure 3.9 : Residential Collector Typical Section



TRANSIT

The provision of transit, both at a local level and at a regional level, is very important to the Coolidge community. Successful transit is a core component of a stable economic program to serve not only social service needs, but support and promote employer needs. Successful transit requires continued system investments that integrate transit into the framework of a community so as roads are improved, as developments are constructed and as new employment centers are attracted, transit can be a viable means of transportation for those patrons, visitors and employees. There are several key factors that directly apply for a transit provider to operate and manage a successful transit system. Seven key factors that relate to the City of Coolidge Cotton Express system success include:

1. **Reliability:** Reliable transit service is critical to ensure users that the bus will pick up patrons at a scheduled time.
2. **Predictability:** Predictable transit service is very important to those users that have to arrive at their destination at a certain time. For work, school and trips that involve a scheduled appointment, predictability of when the bus will arrive at the destination stop is critical.
3. **Cost Effectiveness:** Cost effective transit service is a balanced equation between the cost of attracting transit users and the expense to the users to make it a viable alternative to driving.
4. **Frequency/Headways:** Many systems have different needs during the morning and evening peak hours than during the mid-day or late evening travel periods. The frequency of service should be set in a manner that allows the user to have choices and flexibility regarding scheduled service. Service frequencies of less than 20 minutes by direction should be developed.
5. **Ties to Origins and Destinations:** Providing safe, direct and easy access for transit users to access the transit stop and providing safe direct easy mobility for transit users to reach their destination once they depart from the bus is critical for a successful transit system. When it is easy for users to access transit, the user identifies transit as a potential viable alternative to driving. Additionally, when the user can reach their destination safely and easily after being dropped off at a transit stop, that ease of making their complete trip is directly measured against the cost and ease of using other modes such as driving.
6. **Bus Stop Accessibility:** Due to the high degree of pedestrian and bicycle use to access transit, eliminating barriers transit patrons face as they arrive at / depart from transit stops is critical for the ultimate success of the transit system. Typically, the average transit user is willing to walk one-quarter mile to a station or stop, although external factors can affect this distance. There are both soft and hard factors that affect the experience of the pedestrian transit user. Hard factors include the street design, land use, and frequency of transit service. Soft factors include weather protection, landscaping, social experience, and personal safety.
7. **Trip Duration:** Minimizing the need to transfer ultimately reduces the amount of time dedicated to making the transit trip which therefore increases the potential reliability and predictability.

Providing transit services that incorporate the seven factors above will result in a successful and well used transit system.

In 2009, the **Cotton Express: City of Coolidge Five Year Transit Plan** was completed, which identified transit issues and suggested a simplified route be created along SR-87/Arizona Boulevard that would offer more frequent, 10-minute headways. This suggested route would improve transit access along the City's most heavily traveled commercial corridor. Additionally, the 2009 plan recommended an additional transit study to determine the feasibility of the SR-87 route including the need for bus bays (pull-outs). After further examining the potential improvement with the SR-87 route, the future transit recommendation includes a local circulator route to be created to improve transit service throughout the community. Similar to the SR-87 route, the local circulator route is recommended to have 10-minute headways but would connect Coolidge east-to-west (Figure 3.10). The local service would provide direct support for planned long-term regional transit services (Figure 3.11). In addition, ADOT is examining prospective regional intercity passenger rail services between Phoenix and Tucson. Cotton Express can actively support this with a potential passenger rail stop in Coolidge.

Figure 3.10 : Proposed Transit Service

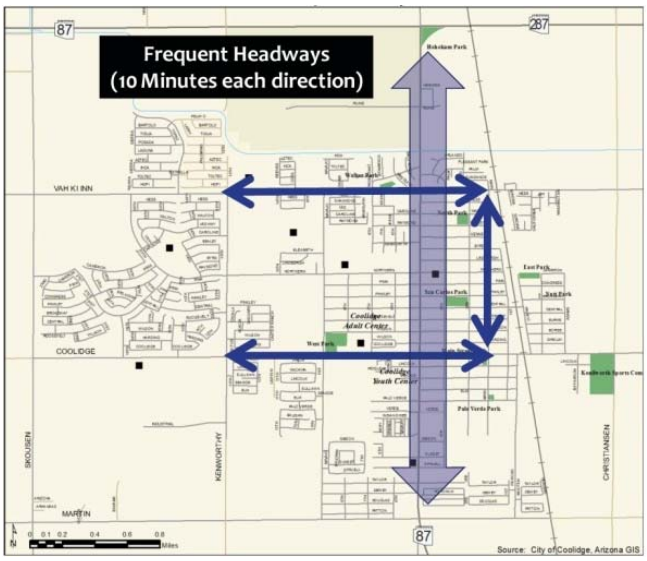
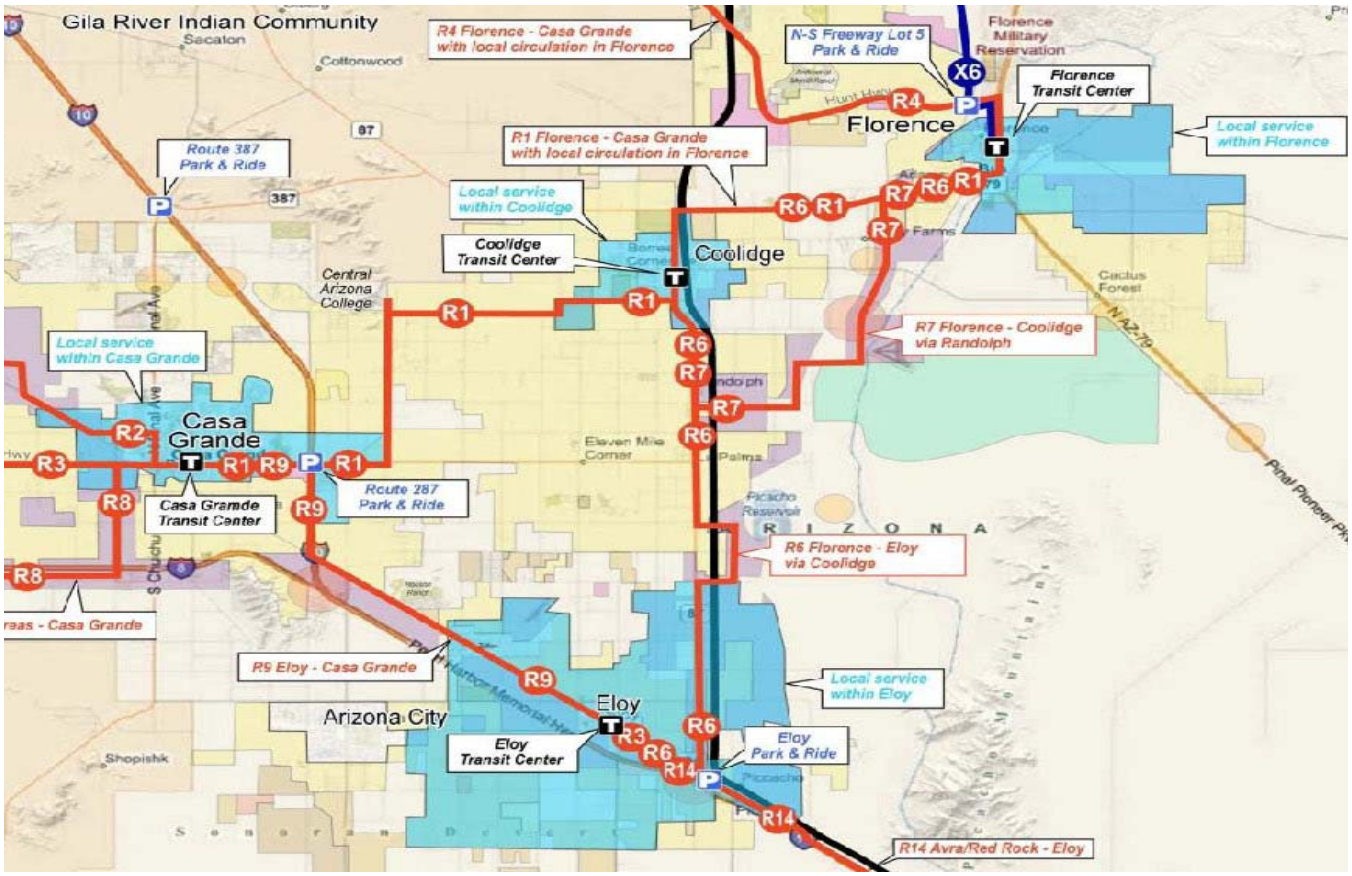


Figure 3.11 : Regional Long-Term Transit Improvements



BICYCLE/PEDESTRIAN

The City has an extensive local roadway network, and a developing collector and arterial network. Developing a network of sidewalks and paths within the community provides opportunities to walk or ride to a near-by destination instead of driving. Additionally, connecting key nodes in the City, such as schools, parks, and commercial centers are of utmost importance. The grid street pattern found in Coolidge helps to promote pedestrian mobility; however many of the existing roadways do not have sidewalks for pedestrians. The roadway cross sections included herein, when implemented, will provide a safe system of paths and detached walkways for non-motorized use. Within the built environment of the City, there are key corridors that should be improved to provide existing Coolidge residents, transit riders and activity center patrons safe corridors for pedestrian mobility. Figure 3.12 below shows the corridors where sidewalks should be constructed or continued as a priority.

Figure 3.12 : Priority Pedestrian Improvement Corridors

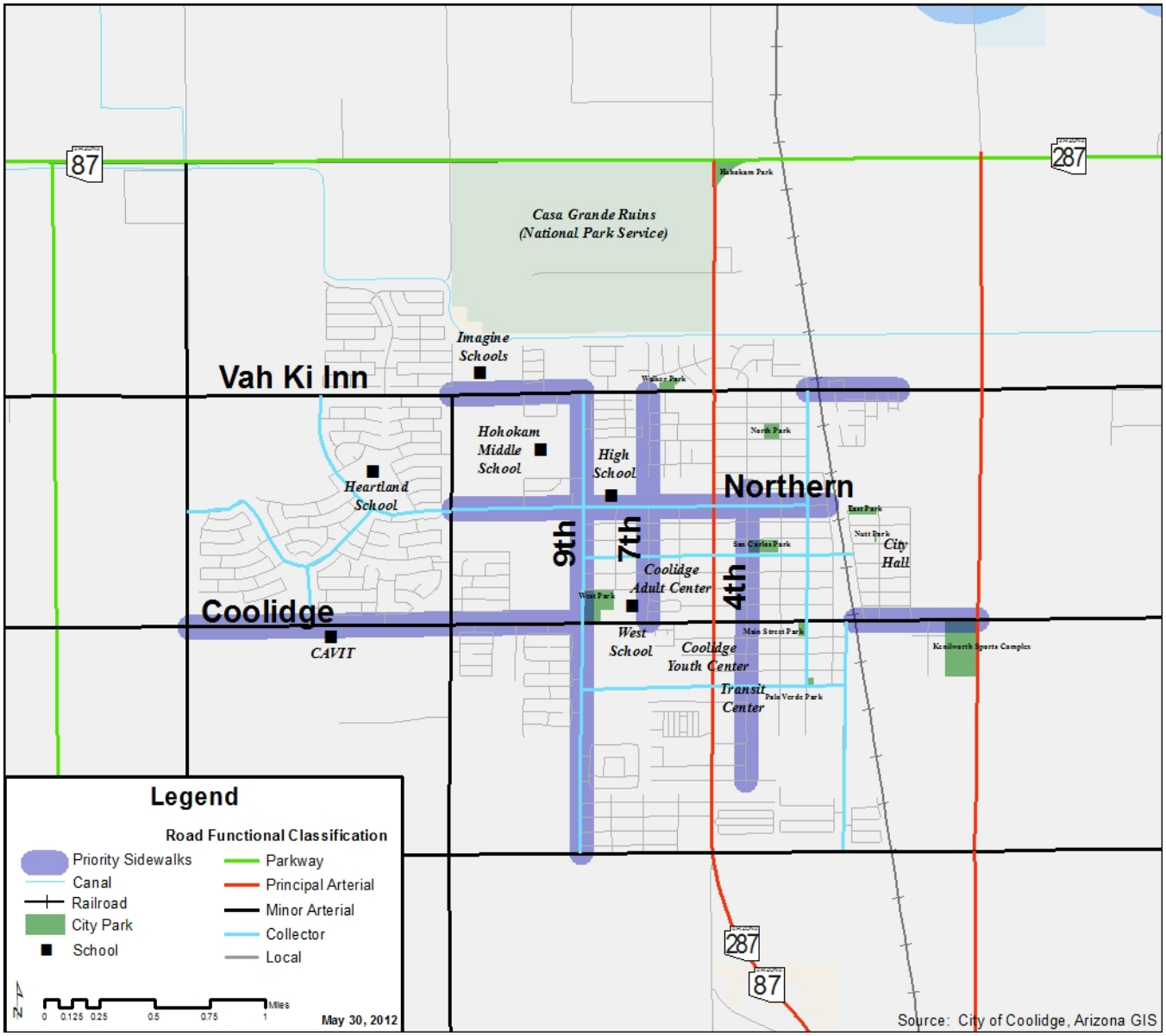


Figure 3.13 : Detached Sidewalk Layout

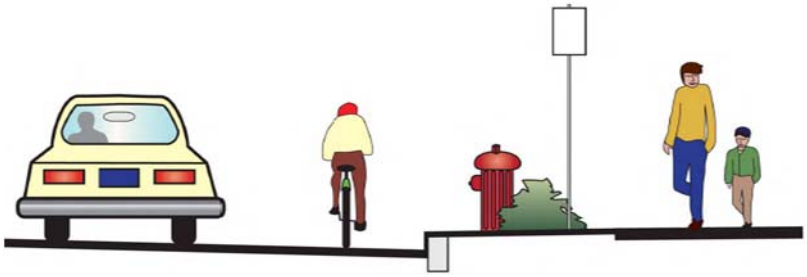


Figure 3.13 to the right shows a detached sidewalk with a defined curb and gutter, buffer zone, and sidewalk. Signs and other utilities are located in the buffer zone or in the area adjacent to the sidewalk so that pedestrians have a clear walking path along the sidewalk. This provides a defined zone or area to place items such as street signs, fire hydrants, light poles, street furnishings, utilities and greenery all while leaving the sidewalk free and clear of obstacles. This area can also be useful for future construction projects and updates since it is unlikely that additional right-of-way will be needed. A five-foot paved shoulder services the bicycle traffic and also provides an additional buffer between the pedestrians and the vehicles along the roadway. Detaching the sidewalk and path from the curb and gutter can offer several advantages, including:

- Increased safety for the pedestrian;
- Lower cost for maintenance since the sidewalk and curb/gutter are not monolithic;
- Pedestrians would potentially not be impacted by roadway and curb/gutter maintenance activities;
- Improved ability to maintain sidewalk use during maintenance activities; and
- Improved ADA accessibility, particularly during roadway maintenance activities.

MULTI-USE PATHS

Multi-use paths serve multiple users including pedestrians and bicyclists. They are generally 10-feet wide. Similar to sidewalks that cross over railroad crossings, paths also have limitations and design concerns at rail crossings, as described below.

Complete Streets: Integrating multi-modal elements in a community's transportation system is critical for the ultimate success of achieving community mobility. The movement of "Complete Streets" has been in motion for several years. Complete Streets are designed to serve everyone – pedestrians, bicyclists, transit riders and drivers. Complete Streets in communities improve safety and mobility for all regardless of age or special needs.

Canals: Land adjacent to canals is a great resource for a larger community or regional trail system. An added benefit of locating a multi-use path adjacent to a canal is the immediate water access which can be rare to find in Arizona. There are several canals that cross through the City. A 10-foot to 15-foot multi-use path adjacent to each of these canals would provide an excellent regional trail system.

Railroad Crossings: Railroad crossings can be dangerous for pedestrians, bicyclists, and especially wheelchair dependent pedestrians. There are several methods to reduce this hazard including approach treatments, signage, crosswalk design, additional warning mechanisms, and materials.

Planning is bringing the future into the present so that you can do something about it now.

-Alan Lakein