

MARICOPA ASSOCIATION OF GOVERNMENTS

# COMPLETE STREETS GUIDE

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2011

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# EXECUTIVE SUMMARY



*A complete street in Scottsdale. Photo credit: Sylvia Mousseux.*

# EXECUTIVE SUMMARY

**THE COMPLETE STREETS GUIDE** is a resource ensuring that facilities for bicycles, pedestrians and transit are recognized as integral to a properly designed and functioning street. They are as important to mobility, health, and safety as a vehicular travel lane. With the implementation of Complete Streets, nonmotorized, and public transportation facilities will be considered on the same basis as institutionalized components of streets.

**THIS GUIDE CONTAINS COMPLETE STREETS GOALS, STRATEGIES, AND A PLANNING PROCESS** that could result in every street in the MAG region becoming as complete as possible. In other words, all streets should be safe and include facilities for bicycles, pedestrians, and motorized transportation. Some streets in the region may offer more mobility choices than others, due to funding, adjacent land use, and other opportunities.



*Sidewalk landscaping in Downtown Mesa. Photo credit: Dan Burden.*



*Crosswalk in Peoria. Photo Credit: Brandon Forrey.*

**COMPLETE STREETS CONTRIBUTE** to the overall capacity of a street, an increase in property values, the health of individuals and the environment by creating a sense of place.

## **THE COMPLETE STREETS STRATEGIES**

- Support implementation of the guide
- Encourage quality complete streets design
- Educate the community and transportation professionals about the benefits of Complete Streets.

## THE COMPLETE STREETS PLANNING PROCESS

The process includes six simple steps. The Guide includes best practices and design examples for each step of the planning process. The Complete Streets Planning Process is:

### 1. Determine the Transportation Context

The context of a street is a key factor in determining the number of lanes and transportation facilities (truck, auto, bus, transit) in addition to those for bicycles and pedestrians. Context is directly related to traffic volumes. This Guide identifies six types of Complete Street contexts that exemplify development within the region, described below:

- High Density/High Intensity—Suburban
- High Density/High Intensity—Urban
- Low Density/Low to Medium Intensity—Suburban
- Low to Medium Density/Low Intensity—Residential
- Low Density/Low Intensity—Internal Neighborhood.
- Low Density/Low Intensity—Industrial

### 2. Identify Current Transportation Modes and Facilities

This step includes inventorying existing travel facilities and determining their adequacy.

### 3. Identify the Complete Streets Gaps

Identify and select the facilities necessary for a Complete Street. For example, are the sidewalks



*Generous sidewalks, on-street parking, and shade provide a rich pedestrian environment in Catlin Court Historic District in Glendale. Photo credit: PLAN\*et.*

wide enough to accommodate the pedestrian traffic anticipated in this context? Are the transit and bicycle facilities appropriate to the context? Are mid-block crossings or medians needed to make the area safer?

### 4. Determine Other Priorities

In addition to providing mobility, Complete Streets serve other functions. Retrofitted or new streets also serve as gateways. A rich

pedestrian environment can create and enhance a downtown or neighborhood. In this step, elements that move forward other priorities such as Green Streets, economic development, and historic preservation are identified.

### 5. Determine the Right-of-Way and Number of Lanes

A Complete Street includes many types of traffic and traffic lanes. Bicycle lanes, vehicular lanes,

parking, and pedestrian (e.g. sidewalk) lanes are all possible components of a Complete Street. In this step, the design process is challenged to fit all the necessary components of a Complete Street into an existing right-of-way or a right-of-way appropriate to the context.

## 6. Select Other Complete Street Elements

In addition to roadway or modal elements, Complete Streets include elements and facilities such as lighting, shade, signing, and facilities for people with disabilities. In this step, facilities that

enhance the pedestrian environment and other components are selected and included in the Complete Street Design.

### COMPLETE STREETS EXAMPLE OUTCOMES

are provided for the narrowest rights-of-way generally found in each Complete Streets Context and for an intersection. The rights-of-way were determined based on a facilities study of all MAG region jurisdictions that was completed as part of the process used to develop this Guide. For each outcome, the Guide explains how the

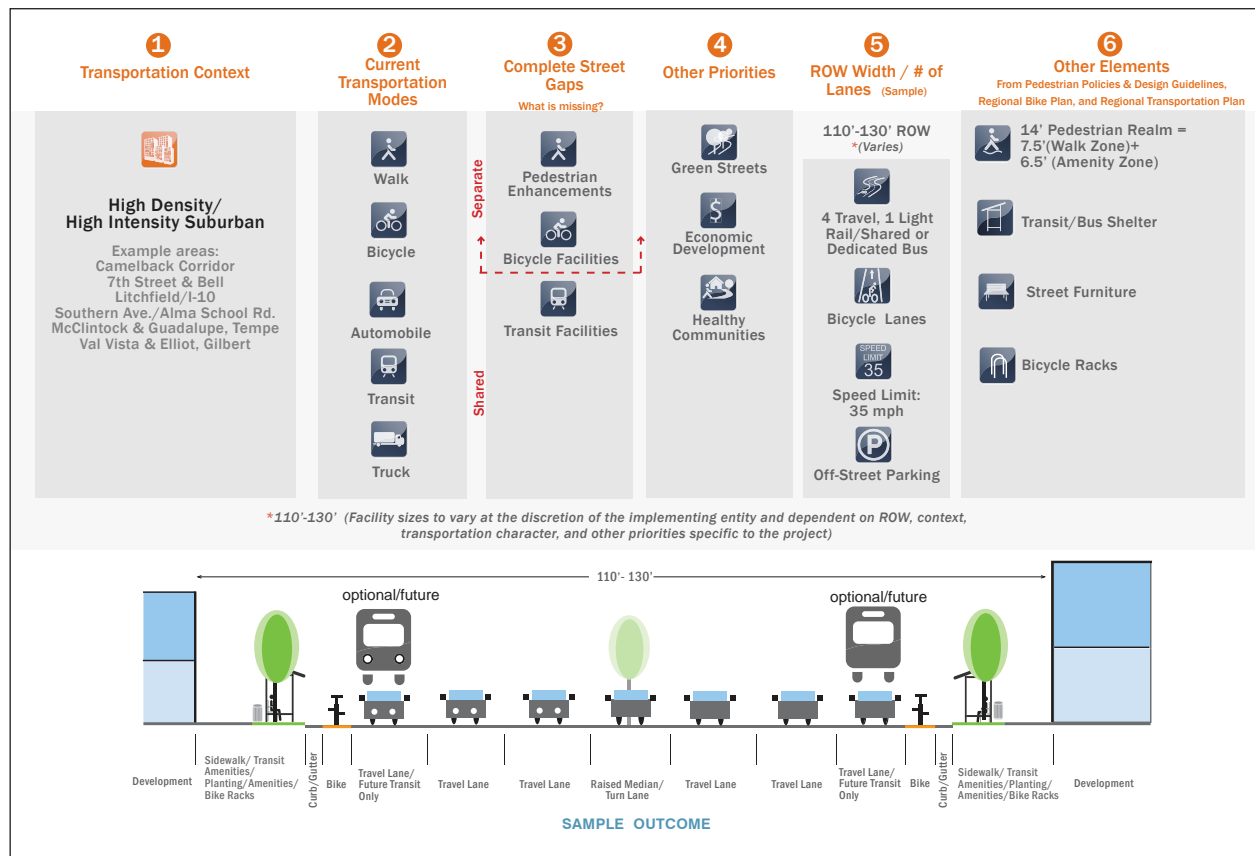
process was applied and why each element of the design solution was selected. Best practices from locations throughout the MAG region relevant to each design solution are also provided.

**PERFORMANCE MEASURES** can evaluate the extent to which Complete Streets are successfully implemented and help the region track its success. This Guide recommends that specific Inventory and Outcome Measures be determined by the MAG Bicycle and Pedestrian Committee for future iterations of the *MAG Performance Measures Framework Study*.

**APPLICATION OF THE GUIDE** is not required, but recommended. The Guide is a model document that provides an approach on how to make streets more complete and details the benefits and potential outcomes when a Complete Streets approach is followed. A variety of strategies for applying the Guide are presented for consideration.

### BEST COMPLETE STREETS PRACTICES AND A SURVEY OF MAG REGION FACILITIES AND COMPLETE STREETS POLICIES

are included in this Guide. The purpose of the best practices survey was to learn about challenges, applicability, and implementation of Complete Streets programs from other jurisdictions throughout the nation. The survey of MAG region jurisdictions provided information that guided the selection of the narrowest right-of-way widths for the Complete Streets Example Outcomes as well as a list of potential local resources for information about Complete Streets policies and practices.



Sample Outcome for a High Density/High Intensity—Suburban context.



# 1. INTRODUCTION



*Main Street in Mesa includes enhanced bicycle and pedestrian facilities by using narrow traffic lanes and narrow medians. Photo credit: Coffman Studio.*

# 1. INTRODUCTION

## WHAT IS THE COMPLETE STREETS GUIDE?

The *Complete Streets Guide* is a step to ensuring that facilities for bicycles, pedestrians, and transit are recognized as integral to a properly designed and functioning street. They are as important to mobility, health, and safety as a vehicular travel lane. With the implementation of Complete Streets, nonmotorized and public transportation facilities will be considered on the same basis as institutionalized components of streets. The concept of Complete Streets is not new. According to *Nation's Cities Weekly*, ten states and 100 communities have endorsed Complete Streets.

This guide moves towards implementing the March 11, 2010 U.S. Secretary of Transportation's Policy Statement on Bicycle and Pedestrian Accommodation. This policy states that walking and bicycling shall be considered equal to other transportation modes and encourages states, local governments, professional associations, community organizations, public transportation agencies, and other government agencies to adopt similar policy statements on bicycle and pedestrian accommodation. Adoption indicates their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system.

As the Metropolitan Planning Organization (MPO) of the largest region in Arizona, the Maricopa Association of Governments (MAG) is an established leader in identifying and promoting transportation choice. Over the years, MAG has been successful in promoting nonmotorized and transit options as an alternative or supplement to vehicular transportation—and identifying why inclusion of these options is beneficial to our health, environment and congestion reduction efforts. Most jurisdictions have recognized the need for, and in most cases installed, bicycle and pedestrian facilities in their communities and most have adopted bicycle and pedestrian plans and standards. Jurisdictions within the MAG region routinely work to accommodate facilities for bicycles and pedestrians and, where appropriate, accommodate transit into the retrofit and design of streets.

However, planning and design for new and retrofitted streets does not always consider nonmotorized and transit elements as integral to a highly functioning street. Sometimes, elements that encourage nonmotorized travel are viewed as an amenity that can be reduced or eliminated to preserve vehicular roadway capacity due to right-of-way constraints or funding shortfalls. This guide ensures that the street planning and design process results in streets that accommodate all modes.

This *Complete Streets Guide* provides sample outcomes, examples of best practices, and policy guidance to ensure that all new and retrofitted streets in the MAG region serve as many transportation modes as practical and possible. This will result in reduced capital costs due to retrofit and liability claims, a greater share of bicycle, transit, and pedestrian trips on our roadways, and more livable communities throughout our region.

This guide will also contribute to creating better neighborhoods. A new analysis from *CEOs for Cities* reveals that homes in more walkable neighborhoods are worth more than similar homes in less walkable neighborhoods. The report, [\*Walking the Walk: How Walkability Raises Housing Values in U.S. Cities\*](#) by Joseph Cortright, analyzed data from 94,000 real estate transactions in 15 major markets provided by ZipRealty. The study found that in 13 of the 15 markets, higher levels of walkability, as measured by Walk Score, were directly linked to higher home values. "Even in a turbulent economy, we know that walk-ability adds value to residential property just as additional square footage, bedrooms, bathrooms and other amenities do," said Cortright. "It's clear that consumers assign a tangible value to the convenience factor of living in more walkable places with access to a variety of destinations."

## HOW TO USE THIS GUIDE

This guide includes information on the benefits of Complete Streets, what the MAG region is trying to accomplish with this Guide, how to plan a Complete Street in the MAG region, Complete Street plans and policies in other locations, and how to implement this Guide. This summary of each chapter will help you to locate where you can find this and other information contained within this Guide.

### Chapter 1—Introduction

- Defines Complete Streets.
- Provides background on previous MAG bicycle and pedestrian planning efforts.
- Identifies benefits of Complete Streets to the MAG region.
- Summarizes implementation recommendations.

### Chapter 2—Reconnaissance

- Summarizes the inventory of MAG Member entity facilities and policies. The full inventory is included in the Appendix of this Guide.

### Chapter 3—National Best Practice Review

- Summarizes the findings from a national best practices review. The individual interview findings are included in the Appendix of this Guide.

### Chapter 4—Goals and Strategies

- Identifies the goals and strategies for implementation.



*This Complete Streets best practice, from the City of Peoria, demonstrates how a bicycle lane was included by eliminating a vehicle lane. Photo credit: Brandon Forrey.*

### Chapter 5—Complete Streets Planning Process

- Describes the Complete Streets Planning Process.

### Chapter 6—Design Strategies and Sample Outcomes

- Provides sample outcomes of the Complete Streets Planning Process for six different typical street types in the MAG region.

### Chapter 7—Intersections

- Contains suggestions for intersection design based on Complete Streets principles.

### Chapter 8—Assessment Measures

- Describes a methodology to assess the implementation of this Guide.

### Chapter 9—Applying The Guide

- Offers options for implementation of this Guide.

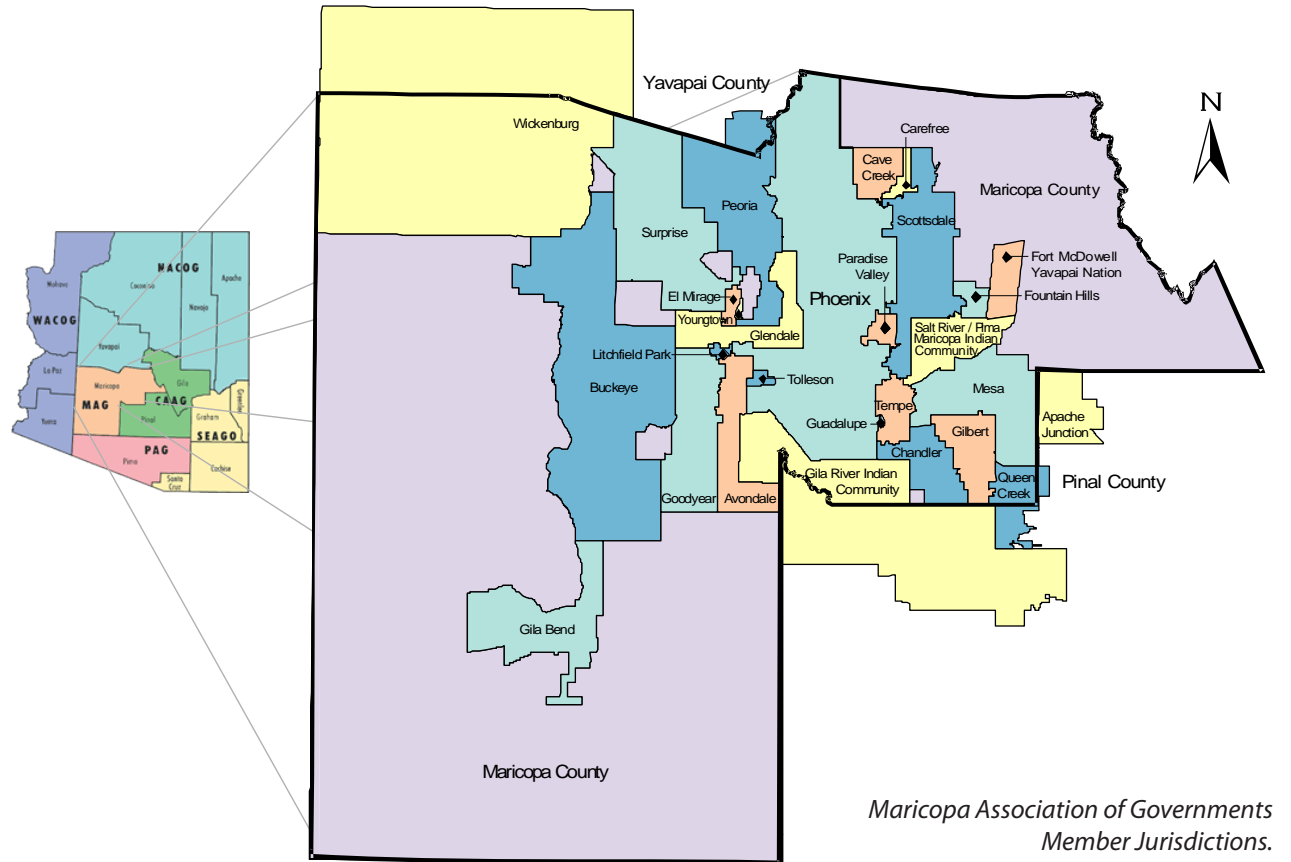
### Chapter 10—Appendices

- Contains the regional inventory of facilities and policies and the individual best practice reviews.

## MAG PROJECT BACKGROUND

The Maricopa Association of Governments is the designated metropolitan planning organization (MPO) for the Maricopa Region. In this capacity, MAG is charged with transportation planning and approval of federal transportation funding for the Maricopa Region. MAG is also designated by the Governor of Arizona as the principal air quality planning agency for the Maricopa Region. Recognizing that over 50% of the region's air pollution is due to automobile emissions, MAG has promoted transit, pedestrian, and bicycle travel for over two decades. MAG's support of nonmotorized transportation includes the *MAG Pedestrian Plan 2000*, the *MAG Pedestrian Policies and Design Guidelines*, the *2007 MAG Regional Bikeway Master Plan*, the *Regional Bike Map*, pedestrian safety road shows, and the support of regional trails programs that provide off-street bicycle and pedestrian facilities. This *Complete Streets Guide* is the synthesis of all of these planning, policy and development efforts.

Prior to the opening of Metro Light Rail in January 2009, the MAG Bicycle and Pedestrian Committee (which represents the merged MAG Regional Bicycle Task Force and the MAG Pedestrian Working Group) recognized that the demand for nonmotorized access to light rail and destinations near it will increase interest in bicycle routes and pedestrian facilities. Many travelers will use all three modes (bicycles, walking, and transit) to reach their destinations. They recognized that as more people walked and bicycled to transit, the destinations they sought would also become more pedestrian friendly.



During the development of this Guide, on March 11, 2010, U.S. Secretary of Transportation Ray LaHood made a major policy announcement that moves the 'Complete Streets' agenda to the center of the nation's transportation policy.

While this policy guidance was not the impetus for this *MAG Complete Streets Guide*, it does make this guide an important resource that could be used by MAG members as they plan and design streets in keeping with U.S. Department of Transportation policy. The purpose of the U.S. Department of Transportation Policy is "to reflect

the Department's support for the development of fully integrated active transportation networks. The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development.



### **U.S. Department of Transportation Policy Guidance:**

The DOT encourages States, local governments, professional associations, community organizations, public transportation agencies, and other government agencies, to adopt similar policy statements on bicycle and pedestrian accommodation as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. In support of this commitment, transportation agencies and local communities should go beyond minimum design standards and requirements to create safe, attractive, sustainable, accessible, and convenient bicycling and walking networks. Such actions should include:

- **Considering walking and bicycling as equals with other transportation modes:** The primary goal of a transportation system is to safely and efficiently move people and goods. Walking and bicycling are efficient transportation modes for most short trips and, where convenient intermodal systems exist, these nonmotorized trips can easily be linked with transit to significantly increase trip distance. Because of the benefits they provide, transportation agencies should give the same priority to walking and bicycling as is given to other transportation modes. Walking and bicycling should not be an afterthought in roadway design.
- **Ensuring that there are transportation choices for people of all ages and abilities, especially children:** Pedestrian and bicycle facilities should meet accessibility requirements and provide safe, convenient, and interconnected transportation networks. For example, children should have safe and convenient options for walking or bicycling to school and parks. People who cannot or prefer not to drive should have safe and efficient transportation choices.
- **Going beyond minimum design standards:** Transportation agencies are encouraged, when possible, to avoid designing walking and bicycling facilities to the minimum standards. For example, shared-use paths that have been designed to minimum width requirements will need retrofits as more people use them. It is more effective to plan for increased usage than to retrofit an older facility. Planning projects for the long-term should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements.
- **Integrating bicycle and pedestrian accommodation on new, rehabilitated, and limited-access bridges:** DOT encourages bicycle and pedestrian accommodation on bridge projects including facilities on limited-access bridges with connections to streets or paths.
- **Collecting data on walking and biking trips:** The best way to improve transportation networks for any mode is to collect and analyze trip data to optimize investments. Walking and bicycling trip data for many communities are lacking. This data gap can be overcome by establishing routine collection of nonmotorized trip information. Communities that routinely collect walking and bicycling data are able to track trends and prioritize investments to ensure the success of new facilities. These data are also valuable in linking walking and bicycling with transit.
- **Setting mode share targets for walking and bicycling and tracking them over time:** A by-product of improved data collection is that communities can establish targets for increasing the percentage of trips made by walking and bicycling.
- **Removing snow from sidewalks and shared-use paths:** Current maintenance provisions require pedestrian facilities built with Federal funds to be maintained in the same manner as other roadway assets. State Agencies have generally established levels of service on various routes especially as related to snow and ice events.
- **Improving nonmotorized facilities during maintenance projects:** Many transportation agencies spend most of their transportation funding on maintenance rather than on constructing new facilities. Transportation agencies should find ways to make facility improvements for pedestrians and bicyclists during resurfacing and other maintenance projects."



Separate bicycle and bus facilities in Tempe.  
Photo credit: Coffman Studio.

Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. In addition, the Federal Department of Transportation encourages transportation agencies to go beyond the minimum requirements, pro-actively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate. Transportation programs and facilities should accommodate people of all ages and abilities, including people too young to drive, people who cannot drive, and people who choose not to drive.

## **BENEFITS OF COMPLETE STREETS**

This guide benefits the entire MAG region. Building Complete Streets will result in facilities that:

### **Make Economic Sense**

Complete Streets provide more transportation choices, more accessible and safe connections between residences, shopping destinations, public transportation, parks, offices, restaurants, entertainment, and educational institutions than streets designed primarily for motorized vehicles.

### **Improve Safety**

Designing streets that accommodate pedestrians and bicycles results in facilities that make streets safer for those who walk and bicycle. Some of these facilities include special signals, mid-block crossings, refuge medians, and bicycle lanes.

### **Contribute to a Healthy Community**

By providing facilities that encourage more walking and biking, Complete Streets promote healthier communities. Strategies 17 and 18 of the *Center for Disease Control Recommended Community Strategies and Measurements to Prevent Obesity in the United States* (July 2009) cite enhancing facilities for bicycling and walking as key to reducing obesity in children and adults.

### **Ease Congestion**

Since Complete Streets provide more transportation choices, they can help travelers avoid traffic jams and increase overall capacity of the transportation network.

### **Aid Children**

Complete Streets provide children with

opportunities to safely walk and bicycle to school, giving them a more positive view of their neighborhood and sense of independence. Safe Routes to School Programs will benefit from Complete Streets since they have the same goal of making streets safe places for children to walk or ride their bike.

### **Improve Air Quality**

Providing bike lanes and more options for travel, can decrease the use of the automobile, thereby cutting the carbon dioxide (CO<sub>2</sub>) emissions. Air quality conformity is an important part of the Regional Transportation Plan and reducing the use of the automobile will help in keeping within the emissions standards.

### **Make Fiscal Sense**

Considering the need of all nonmotorized travelers up front and designing the streets to meet these needs can potentially save costs associated with retrofitting the streets later.

### **Aid Travelers with Disabilities**

Making streets accessible to everyone and all modes of travel helps people with disabilities access the transportation system.

### **Aid Older Adults**

Some methods that have proven to be effective to create Complete Streets for seniors include retiming signals for slower walking speed, constructing median refuges to shorten crossing distances, and installing curb ramps, sidewalk seating, and bus shelters with seating. Improved lighting, signage, and pavement markings are among the measures that benefit drivers of any age, particularly older drivers.

## RELATIONSHIP OF THIS GUIDE TO OTHER PLANS AND ACTIVITIES

Transportation and the quality of life in Arizona communities are inextricably linked. Urban streets, sidewalks, highways, public transportation, and bike lanes all play a large role in this connection. This *Complete Streets Guide* helps to create consistency with transportation plans, policies, and environmental regulations that guide community, the region, and the State.

This *Complete Streets Guide* supports the *Regional Transportation Plan (RTP)* because the Guide describes how the design and planning of the region's streets will enhance safety, help achieve economic development objectives, create more travel choices, sustain the environment, and make places more livable. The Guide encourages the inclusion of bicycle, pedestrian, and transit facilities in all street designs, to the greatest extent possible, creating Complete Streets for a wide variety of travelers.

This Guide helps to ensure that appropriate street types and street design elements are used to support specific land development and transportation objectives.

### MAG Pedestrian Policies and Design Guidelines and MAG Pedestrian Plan 2000

The *MAG Pedestrian Plan 2000* and *Pedestrian Policies and Design Guidelines* help MAG member jurisdictions and private development make safer, more comfortable, and more desirable destinations. The guidelines support pedestrians as an integral part of any transportation system.

The *Pedestrian Plan* evaluated locations throughout the region for potential as high use pedestrian areas. These pedestrian focused documents, together with the MAG

*Regional Bikeway Master Plan* and the *Regional Transportation Plan* (discussed right), provide a point of origin and references for the Complete Streets planning process.

### MAG Regional Bikeway Master Plan 2007 and the Regional Bikeway Map

The *MAG Regional Bikeway Master Plan 2007* serves as a guide for improving, expanding, and connecting the MAG region's bicycle facility network. The plan includes goals, policies, and design guidance for providing bicycle lanes, paths, and routes throughout the MAG region.

Together, the *Bikeway Master Plan* and the *Bikeway Map* (which is updated on an ongoing basis) provide information on existing and planned bicycle facilities throughout the region. And, like the pedestrian documents and the *Regional Transportation Plan* (discussed right) provide another point of origin and references for the Complete Streets planning process.



## Regional Transportation Plan

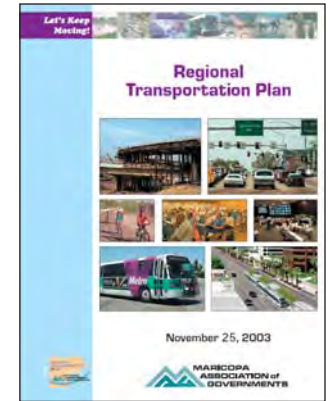
The *Regional Transportation Plan (RTP)* outlines transportation facilities and performance goals for the region.

The *Regional Transportation Plan* was adopted in 2003

and updated in 2006, 2007, and 2010. The RTP identifies freeways, streets, nonmotorized, and transit improvements for the region, as well as a funding source for them through 2026. The RTP does not identify or discuss Complete Streets. With the adoption of this Guide, it is intended that updates of the RTP will include Complete Streets language and provide funding for them.

The RTP Goals include:

- System and Preservation of Safety,
- Access and Mobility,
- Sustaining the Environment, and
- Accountability and Planning.



### Helpful Hint:

**Purple Text** indicates a link to an internet resource or document. To access the document, open a PDF version of this Guide and click on the link from within the Adobe Acrobat Reader program.

## MAG Regional Transit Framework Study

The *MAG Regional Transit Framework* identifies regional transit needs beyond what is currently funded through the *Regional Transportation Plan* (RTP). This framework helps establish a regional transit vision for 2050, with more detailed project descriptions for year 2030. Through a detailed analysis of land

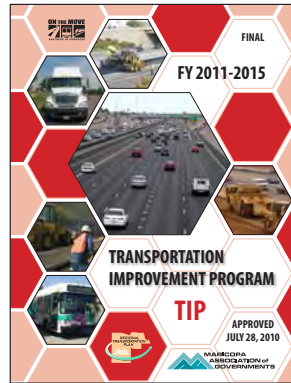
use, socioeconomic conditions, existing and planned transit service and infrastructure, along with input from transit riders and non-riders, the framework identifies transit needs, deficiencies, opportunities, and constraints.



The *Regional Transit Framework* identifies high leverage transit investments that are more competitive with other travel options. The approach is more “market based” than past MAG region transit planning efforts, and is dependent on determining what factors affect the choices that transportation system users make in selecting a mode of travel. A market based approach also needs to be informed by system compatibility factors such as land use, local plans and policies, and other regional and statewide efforts such as Building a Quality Arizona (BQAZ). In particular, this study has revealed that in order to attract new transit riders, the future regional transit system will need to provide clear benefits in terms of convenience and time.

## MAG Transportation Improvement Program (TIP)

The MAG TIP identifies federal funding for transportation projects throughout the region. Generally, transit projects consist of just over one-third of the TIP funded projects. MAG selects projects for inclusion in the TIP through a competitive process. This process evaluates projects on a variety of factors, including provision of facilities for pedestrians, bicycles, and transit. It is intended that street projects that incorporate Complete Streets elements in this Guide may receive increased funding priority through the TIP evaluation process.



## MAG Standards and Specifications

The *MAG Uniform Standard Specifications and Details for Public Works Construction* are used by member jurisdictions, designers, and planners throughout the Valley. While they do not address design issues for specific elements, they do provide minimum standards for such things as sidewalks, ramps, curbs, and street construction. They do provide an opportunity for updated specifications and details to address new construction materials and techniques. These could be applied to such things as green streets with surfaces that are quieter, use less petroleum, and use recycled materials. Potentially, some



of the materials and construction methods used in the creation of Complete Streets could be provided as uniform standards in the *MAG Standards Specifications and Details* manual.

## Transportation Overlay District (TOD)

To support development compatible with light rail, and as part of the overall light rail planning effort, the Valley Metro Regional Transit Authority developed a model Transit Oriented Development Overlay. Subsequently, the cities of Tempe and Phoenix adopted Transit Overlay Districts (TODs) into their ordinances. The TOD is different from a Complete Street. A TOD is a land use regulation that promotes pedestrian environments through higher density in vertically and horizontally mixed land uses. TODs were adopted in Phoenix and Tempe to support their significant investment in transit and implementation of the Mixed Land Use designations in their General Plans. With the expansion of light rail, other jurisdictions, such as Mesa, are investigating the potential of TOD through Form Based Coding and traditional zoning.

## Mean Streets 2004

This study developed by STPP (**Surface Transportation Policy Project**) reported that Phoenix - Mesa had the 10th highest Pedestrian Danger Index (PDI) in the nation (2002-2003). Overall, the PDI shows that the most dangerous places to walk are metropolitan areas marked by newer, lower-density developments, where wide, high-speed arterial streets offer few sidewalks or crosswalks (*Mean Streets 2004, How Far Have We Come*). Since the publication of this report, the Maricopa Region has made substantial strides to improve the pedestrian environment.



## PLAN IMPLEMENTATION

The Maricopa Association of Governments is directed by a Regional Council consisting of a representative of each of its member entities. MAG provides sample policies and guidance in a range of areas. This *Complete Streets Guide* is not a regulatory document. It provides guidance on how Complete Streets can be designed and implemented. This guide does not supersede Complete Streets Plans or policies that may be adopted by MAG member jurisdictions or entities.



*Bicyclists and pedestrians in downtown Tempe.*



*Sidewalk with shade. Photo credit: MAG.*

At the writing of this guide, the Federal Complete Streets Act (S. 584, H.R. 1443) is in subcommittee. Introduced in March 2009 by Senator Tom Harkin [IA] and Congresswoman Doris Matsui [CA-5], this bill would define effective Complete Streets policies that are flexible enough to use in daily transportation planning practice.

The bill directs state Departments of Transportation and Metropolitan Planning Organizations to adopt Complete Street Policies (that are defined in the legislation) within two years of enactment of the bill and apply

the policies to upcoming federally funded transportation projects.

The bill also directs the U.S. Department of Transportation to develop a mechanism to ensure compliance with the bill and to report to Congress on what State Departments of Transportation and Metropolitan Planning Organizations are doing to adopt and implement complete streets policies in accordance with the bill. States that do not comply would have a small percentage of their State's surface transportation funds directed towards safety projects.

The bill also updates current federal code on bicycle and pedestrian accommodation and authorizes needed research and data collection, technical assistance, and dissemination of Complete Streets best practices.

(See <http://www.completestreets.org/federal-policy/>. March 10, 2010)

### Fast Facts\*:

- 10.9% of all trips in the U.S. are made by pedestrians.
- 1% of all trips in the U.S. are made by bike.
- About 25% of morning traffic congestion is related to parents driving their kids to school.
- About 60% of trips shorter than one mile are made in a vehicle - an easy walk for most people.
- About 72% of trips shorter than three miles are made in a vehicle - an easy bike ride for most people.

\*U.S. Department of Transportation



*Sidewalks, landscaping, and transit via on-street trolley service are provided in downtown Scottsdale.*

## 2. RECONNAISSANCE



*McClintock Road in Tempe is a complete street and includes facilities for bicycles, pedestrians, and transit. Photo credit: PLAN\*et.*

# 2. RECONNAISSANCE

## INTRODUCTION

Some jurisdictions in the MAG region have adopted Complete Street policies and/or design guidelines as part of their General Plan or part of their Transportation Plan. This *Complete Streets Guide* intends to strengthen the policies that are already in place, provide tools for the adoption of new policies, and guide the development of new roadways or retrofit projects that can be made more 'complete.'

As part of the process used to develop this Guide, a questionnaire was distributed to all of the MAG member agencies during March and April of 2008. The findings of the questionnaire provided a basis for developing sample outcomes of a Complete Streets process should it be used in this region. The questionnaire consisted of two parts; **Part I** included questions about jurisdictions' adopted policies and plans that incorporated Complete Street elements, and **Part II** addressed the widths and requirements for all types of roadways. The questionnaire also shed light on which jurisdictions have Complete Street policies, to what streets the policies are applied, what facilities are required by the policy, and other information (The survey and responses are included in a separate document titled *Complete Streets Guide Appendices*.)

## SUMMARY OF FINDINGS: POLICY SURVEY

In general, the questionnaire responses demonstrate the jurisdictions' efforts to plan a logical and efficient street network that includes facilities for nonmotorized travel. However, almost half of the 14 jurisdictions that responded to the questionnaire do not have an adopted Complete Streets policy as a stand alone document or as part of a plan. Many jurisdictions stated that their streets include bicycle and pedestrian facilities, some with either dedicated or shared transit facilities. Most jurisdictions, however, are not planning for bicycle facilities or pedestrian facilities (with the exception of a minimum width sidewalk) on all streets. Few jurisdictions have completed a street designed through a Complete Streets process. Complete Streets policies should ensure that all streets and roads are functional for drivers, pedestrians, bicyclists, all age groups, people with disabilities, and transit users. A summary of the responses to the policy portion of the questionnaire follows.

### Which jurisdictions have an adopted Complete Streets policy?

Four jurisdictions have an adopted Complete Streets policy including the City of Scottsdale, Town of Queen Creek, Town of Gilbert, and Town of Buckeye. With the exception of the City of

Scottsdale, where the Streets Element and the Policy Element of the Transportation Master Plan have overlap and consistent policy guidance with regards to a 'Complete Streets' policy, the majority of MAG member agencies do not have adopted policies and/or have not addressed Complete Streets elements to a full extent.

### To what streets types do these policies apply?

Most of the jurisdictions apply the policies to major arterials, minor arterials, major collectors, minor collectors, local collectors and residential streets.

### What facilities are required by the Complete Streets Policy for each street type?

Most jurisdictions require bike lanes and sidewalks for all street types excluding freeways and parkway/boulevards. Medians are required by a few jurisdictions, starting with the major arterials. Sidewalk widths varied between five and ten feet or more, while bike lane widths varied between five and seven feet.

### Do jurisdictions have an adopted on-street bicycle lane policy?

Most jurisdictions have on-street bicycle policies as part of adopted General and/or Transportation plans. In some jurisdictions, the bikeway network is not yet fully developed.

### To what street types is the bicycle lane policy applicable?

The majority of MAG member agencies apply their bicycle lane policy to all streets with the exception of freeways, where bicycles are prohibited by the State Traffic Engineer (currently only the Valley Freeway System and Interstate -10 between Phoenix and Tucson), and local streets.

### Do jurisdictions have an edge line striping policy?

Most jurisdictions do not have an edge-line striping policy and do not provide an edge line if there is curb and gutter. However, a few jurisdictions require between a four and six inch edge line wherever a curb is not present to delineate bike lanes.



Children riding bikes to school via bike lane.

### Do jurisdictions have a policy for connection to off street bicycle paths or shared use trails?

The cities of Peoria, Surprise, Scottsdale, and the towns of Queen Creek, and Carefree, all have connectivity policies that are part of other plans such as Parks and Trails Master Plans, Trails Master Plans, and General Plans.

### Do jurisdictions have a policy for providing for connections to off-street pedestrian or shared use trails?

The majority of jurisdictions provide connections to off-street pedestrian or shared use trails. The policies are part of Transportation Master Plans, General Plans, Parks and Trails Master Plans, and development and design standards.

## SUMMARY OF FINDINGS: STANDARDS SURVEY

In addition to the Policy Survey, MAG members were asked to provide information about specific street standards. This information was used to learn the extent to which jurisdictions within the Maricopa region included narrow vehicular lanes, wide sidewalks, bicycle lanes, and other amenities that support a range of transportation options as part of their standard street designs. In addition, this information was used to understand the range of rights-of-way that could be used to develop sample outcomes from the application of the Complete Streets process in the MAG region. Jurisdiction survey responses are on file with MAG.

Overall, the survey found a wide range of street classes, street widths, and facility standards

throughout the region. Typically, standard sidewalk widths were less than 8' (which is recommended by the MAG Pedestrian Policies and Design Guidelines to accommodate those with disabilities). Within the region, on-street bicycle lanes are usually 5' with no separation or buffer area (besides striping) from traffic. Vehicular travel lanes vary from 11-12 feet on most streets.



# 3. NATIONAL BEST PRACTICE REVIEW



*1st Avenue in downtown Phoenix. Photo credit: Coffman Studio.*

# 3. NATIONAL BEST PRACTICE REVIEW

## INTRODUCTION

To understand best practices that could be incorporated into this Guide, eight entities were selected for detailed study of their Complete Streets Policies and/or Plans. The study focused on the approach used by each to incorporate bicycle and pedestrian facilities into their streets, highlighting unique approaches for implementing Complete Streets policies and practices. The candidates for study included small and large jurisdictions, Metropolitan Planning Organizations and/or Councils of Governments. Each has an adopted Complete Streets Policy.

To select the eight entities for detailed study, a range of agencies with adopted Complete Streets policies were identified. From this group, 15 were selected for more detailed investigation about their policies, the extent to which they were implemented, and their potential relevance to the MAG region. This information was presented to the MAG Bicycle and Pedestrian Committee. Based on the information, the Committee selected eight entities for more detailed study via telephone interview. The eight studied are Caltrans (California Department of Transportation); the cities of Sacramento, Charlotte, Columbus, Scottsdale, Seattle, Austin; and the State of Massachusetts.

The telephone interviews solicited information



*This photo of midtown Sacramento shows a Complete Street within the city. Photo credit: neighborhoods.org.*

from each jurisdiction about those actions, policies and procedures that have been most effective in implementing their Complete Streets plan or policy, the obstacles to implementing the Complete Streets plan or policy and how the obstacles/challenges were overcome. Each entity was also asked about the specific approaches that best addressed regional concerns.

In addition to the telephone interview, a two page e-mail questionnaire was sent to the eight entities. The questions were based on concerns of the MAG Bicycle and Pedestrian Committee regarding key opportunities and obstacles to creating Complete Streets within the MAG region. The information gathered is summarized in a separate document, *Complete Streets Guide Appendices*.



## SUMMARY OF FINDINGS

### Sacramento, California, Area Council of Governments (SACOG)

The 2035 *SACOG Metropolitan Transportation Plan* (MTP) includes specific policies that address Complete Streets. Among the Plan's 13 key actions is an action to "increase investment in funding for bicycle and pedestrian facilities, and introduce the concept of Complete Streets designed for many types of users and modes together instead of favoring auto use only." (*SACOG 2035 Metropolitan Transportation Plan*) To implement the strategy, SACOG established a Community Design Funding program that provides transportation dollars for smart growth developments that promote walking, bicycling, and transit use. The plan also includes a Complete Streets Strategy that provides technical guidance to local agencies and invest(s) regional funds to build Complete Streets projects through designated and planned community activity centers that ensure bicycles, pedestrians, and transit can share the road safely and compatibly with autos. The plan also includes equity funding for the maintenance of Complete Streets.

In addition to the 2035 SACOG MTP, SACOG is also a member of the Complete Streets Coalition of Sacramento. The coalition is an alliance of individuals, community organizations, and public agencies working to complete the streets in the Sacramento region. The group meets monthly to coordinate outreach and education activities to bring regional focus to completing the streets. The COG provides guidance for walk-ability audits on its web site and sponsors conferences

about Complete Streets. Finally, the Sacramento Transportation and Air Quality Collaborative published a *Guide to Complete Streets*, which offers design and other guidance for the Complete Streets in the region. (See [http://www.sacta.org/pdf/STAQC/FinalReport\\_Volumel.pdf](http://www.sacta.org/pdf/STAQC/FinalReport_Volumel.pdf))

### California Department of Transportation (CALTRANS)

In February 2010, CALTRANS adopted the *Complete Streets Implementation Action Plan* as DD-64-R1, a California Department of Transportation Department Directive 64-R1. The directive includes:

- Direction to update specific CALTRANS Guidance, Manuals, and Handbooks
- Specific streets, listed in priority order
- Funding and project selection direction strategies
- Steps to increase the understanding of complete streets department-wide and with external partners.
- Research, projects, and topics for action that will develop more information to gain a better understanding of complete streets.

The CALTRANS *Complete Streets Implementation Action Plan* defines a Complete Street as "a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function and context of the facility. Complete Street concepts apply to rural, suburban, and urban areas." A steering committee, consisting of CALTRANS

department directors guides implementation of the state's Complete Streets policy. As each recommendation is undertaken, a work plan outlines the steps that will be taken to implement it and monitor its progress.

### Massachusetts Department of Transportation

The State of Massachusetts has integrated Complete Streets and Context Sensitive design into its *Project Development and Design Guide*. The Guide states at its outset that the guidebook contains "balanced guidance on public right-of-way design objectives to serve both nonmotorized (i.e. bicycles and pedestrians) and motorized travel." The Design Guide is applicable to all streets:

- When MassHighway is the proponent; or
- When MassHighway is responsible for project funding (state or federal-aid projects); or
- When MassHighway controls the infrastructure (projects on state highway).



A Complete Street in Boston, Massachusetts provides wide sidewalks, bicycle lanes, and parking.

### The Metropolitan Transportation Commission (MTC), San Francisco, California

In June 2006, The Metropolitan Transportation Commission (MTC), which includes the San Francisco Area, adopted the *Routine Accommodation of Pedestrians and Bicyclists in the Bay Area*. Among other things, this policy requires by resolution all projects submitted to the MTC for funding (with the exception of projects and planning efforts that do not impact the traveled way such as emergency communications equipment) include a Complete Streets Checklist with all requests for funding. The Checklist examines ways to accommodate all modes and provides information about how MTC member entities have considered bicyclists and pedestrians in the planning and design of transportation projects. The purpose of the Checklist is to provide a vehicle for discussion about specific accommodations. The checklist is reviewed by county-wide Bicycle/Pedestrian Advisory Committees. The answers to questions on the checklist do not affect eligibility for MTC programs.

### Seattle, Washington

The City of Seattle adopted a specific *Complete Streets Ordinance* that directs the city's transportation department to implement Complete Streets in the construction of all new streets and retrofit of existing streets. The ordinance recognizes that retrofit may occur over stages. Exemptions include maintenance and specific streets where it can be documented that a Complete Streets approach is not warranted.

### Scottsdale, Arizona

The City of Scottsdale, Arizona includes a Complete Streets policy in its *Transportation Master Plan*. "The *Policy Element of the Transportation Master Plan* addresses general, citywide policies that are not specific to a particular transportation mode, or confined to a specific area within the city. While some of these policies will be reiterated in the modal elements or area circulation studies, this document is intended to provide a global view of policies that will affect transportation and transportation facilities throughout the community."

The city's policy objectives are:

- "To design, operate, and maintain Scottsdale's streets to promote safe and convenient access and travel for all users: pedestrians, bicyclists, transit riders, and equestrians, as well as cars, trucks, and buses."
- "Improve community quality of life in Scottsdale neighborhoods by implementing strategies that reduce the negative impacts created by automobile traffic on neighborhood streets, as well as increase the pedestrian and bicycle options for the neighborhood."



*Complete street in downtown Seattle.*

Scottsdale defines a Complete Street as noted below:

A Complete Street is one that is designed and operated to enable safe and comfortable access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities are able to safely move along and across a complete street. Various streets in the community are currently without sidewalks or paths or have inadequate sidewalks; are too narrow to safely share with bikes; may be intimidating to cross as a pedestrian; or are uninviting for transit users. Incomplete streets are often less safe for multiple users than complete streets.

While the City's current design guidelines are very consistent with the complete streets concept, instituting a complete streets policy ensures that the entire ROW is designed and operated to enable safe access for all users. Ingredients that may be found on a complete street include: sidewalks and/or paths, bike lanes, frequent crosswalks, wide shoulders, medians, bus pullouts, special bus



The Scottsdale Transportation Master Plan was awarded the 38th City Manager's Award of Excellence at a Ceremony in Scottsdale, Arizona.

lanes, raised crosswalks, audible pedestrian signals, sidewalk bulb-outs, and more.

Complete streets policies recognize that there is a need for flexibility as all streets are different and user needs will be balanced. All road projects should result in a complete street appropriate to local context and needs. As part of its complete Streets implementation, the City also identifies multi-modal approach, systematic implementation, context sensitive design, and roadway re-striping policies that apply to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire ROW.

### Austin, Texas

Like jurisdictions in the MAG region, the Cities of Austin and Seattle integrated Complete Streets into other planning documents. **The City of Austin** is completing the *Central West Austin Plan* that is focused on creating bicycle and pedestrian facilities through Complete Streets.

### Columbus, Ohio

Since this survey was conducted, the City of Columbus, Ohio and the Mid-Ohio Regional Planning Commission adopted a **Complete Streets Policy** that has resulted in narrowing vehicle lanes and adding bicycle facilities and enhanced sidewalks on a range of streets throughout the region. The policy was supported by a wide range of entities including the Columbus Neighborhood Pride Program, 311 System, Columbus Area Pedestrian Safety Committee, Columbus Traffic Standards Code, Interdepartmental Sidewalk Committee, and UIRF and NCR Programs.



BEFORE



AFTER

These before and after photos of a residential street in West Palm Beach, Florida demonstrate implementation of a Complete Street. Photo credit: Dan Burden



# 4. GOALS AND STRATEGIES



*Streetscape improvements in Glendale's Catlin Court included benches and pedestrian amenities. Photo credit: Coffman Studio.*

# 4. GOALS AND STRATEGIES

## INTRODUCTION

To ensure the widest participation in the development of Goals for this Guide, a workshop on creating Complete Streets was held on May 18, 2009.

*You are invited to an Overview Presentation on*

## Complete Streets

MONDAY, MAY 18, 2009

**Complete Streets are planned, designed and operated to enable safe access for all users.** Pedestrians, bicyclists, motorists and transit riders of all ages and abilities should be able to safely travel along and across any street.

This **Overview Presentation** will provide a background on the benefits of Complete Streets, dispel myths, explain how existing streets can easily be retrofitted into Complete Streets, and detail how a Complete Streets policy can even save you money. This presentation is appropriate for elected officials, transportation agency leaders, transportation planners, traffic engineers, roadway designers, planning and engineering consultants, transit providers, pedestrian and bicycle advocates, health service and older adult providers, and any others who are interested.

*Photos courtesy of Maureen DeCindis*

The workshop was conducted by the Complete Streets Organization and funded by the Arizona Governor's Office of Highway Safety, ADOT, and MAG. It was offered at no charge to local transportation planners, designers, and advocates. The ideas and opinions voiced by the workshop participants were incorporated into the context of Complete Streets Goals and Strategies.

## GOALS

Based on the workshop, the MAG Bicycle and Pedestrian Committee developed the following goals for this Guide and for Complete Streets facilities.

### A Regional Complete Street Policy:

#### Provides:

- Clear and consistent standards for Complete Streets among jurisdictions
- Guidance to the development community

#### Includes:

- Performance measures: inventory and outcome (includes TIP program tie-in)
- Implementation actions

#### Is Relevant:

- To all types of streets
- To all jurisdictions

#### Addresses:

- Funding opportunities

### Complete Streets:

#### Are:

- Context sensitive
- Integrated into ongoing street and transportation planning
- "Green" and sustainable

- Fundable
- Implementable

#### Accommodate:

- All appropriate modes of travel
- Emergency service vehicles
- Space for transit
- Opportunities for people to interact
- Travelers of all abilities

#### Create:

- An expectation of inclusion
- A safe travel environment for people of all ages and abilities

#### Contribute:

- To the overall capacity of the street
- To an increase in property values
- To the health of individuals
- To a healthier environment
- To creating and enhancing a sense of place

#### Increases:

- Connectivity between travel modes
- Travel choices
- Travel efficiency
- Safety through reduction in vehicle, bicycle, and pedestrian crashes
- The number of children walking to school
- Transit ridership
- Access to adjacent uses
- Compliance with speed limits

## ACCOMPLISHING THE GOALS

The Strategies to accomplish this Guide are grouped into three general areas:

- Strategies to Support Implementation of the Guide;
- Strategies to Encourage Good Complete Street Design;
- Strategies to Educate the Community and Transportation Professionals about the Benefits of Complete Streets.

### A. Strategies to Support Implementation of the Guide.

**A.1.** Provide incentives to implement this *Complete Streets Guide* including:

- Potential additional points in the MAG Transportation Improvement Program (TIP) ranking priorities process for a commitment to design a street project in accordance with the MAG Complete Streets process;
- Potential additional points to projects considered through the MAG Pedestrian and Bicycle Design Assistance programs for those projects that will be designed and constructed based on a Complete Streets process;
- Potential additional points to Enhancement Projects recommended through the MAG Transportation Enhancement Fund Committee for those projects that will result in a Complete Street or are part of a Complete Street design process.

**A.2.** Work with the Arizona Department of Transportation to encourage, where appropriate, the planning of State Highways within the MAG region in accordance with this *Complete Streets Guide*.

**A.3.** Work with MAG Committees.

**A.4.** Promote Complete Streets as part of a healthy community.

**A.5.** Work with schools and school districts to encourage Complete Streets as part of their *Safe Routes to School* programs.

**A.6.** Work with local bicycling organizations (such as the Coalition of Arizona Bicyclists (<http://www.cazbike.org/>), the Arizona Bicycle Club (<http://azbikeclub.com>), the Arizona Walks Chapter and national organizations such as the League of American Bicyclists (<http://www.bikeleague.org>) and AZ AARP to encourage them to become involved in the planning and design of Complete Streets.

**A.7.** Work towards creating a Complete Street:

- When restriping, repaving or resurfacing, relandscaping, or enhancing the capacity of a street;
- For Capital Improvement Program and retrofit projects;
- For projects constructed as a part of new development or new master planned communities.

### B. Strategies to Encourage Good Complete Streets Design.

**B.1.** All modes and users are important on all streets. Pedestrians, transit users, and travelers with disabilities needs must be included regardless of their presence or lack thereof at stakeholder planning and design meetings.

**B.2.** Plan for community transportation needs in accordance with the transportation context of the street. The transportation context of a street can be determined by documenting land uses and key destinations (such as schools, shopping centers, offices and senior centers), demographics, and connecting modes and trails along each 1/2 mile of street. This documentation could be photographic, written, or recorded.

**B.3.** Implement a public involvement process as part of the Complete Streets design process. Solicit comments about how people currently use the street, what transportation needs are not currently accommodated by the street, and what transportation needs could be better accommodated by the street. At a follow-up meeting, present the proposed Complete Street design to determine if the community's transportation needs are adequately met.

**B.4.** When a Complete Street intersects another street that may not be a Complete Street, the intersection should be treated as a Complete Street intersection.

**B.5.** Encourage development along Complete Streets to provide direct pedestrian access to the

sidewalk and facilities for bicycle storage and transit stops.

**B.6.** Provide connections to intersecting trails and shared-use paths on all Complete Streets in accordance with the MAG Bicycle Plan and MAG Pedestrian Policies and Design Guidelines.

**B.7.** Narrow travel lanes widths to 11' (10' on collectors or curb lanes of arterial streets) to make the street more easily crossed by pedestrians and/or to accommodate pedestrian and bicycle facilities.

**B.8.** When retrofitting or improving sidewalks with a reduced effective width due to utility easements or other obstructions, consider acquiring additional right-of-way behind the sidewalk, narrowing vehicular lanes or other solutions.

### **C. Strategies to educate the community and transportation professionals about the benefits of Complete Streets.**

**C.1.** Work with the Arizona Department of Transportation and/or the Maricopa Association of Governments to conduct annual Complete Streets workshops to share and disseminate the best practices of the region and the nation.

**C.2.** Educate the community and MAG members about Complete Streets by providing a link to the National Complete Streets Coalition (<http://www.completestreets.org/>) on the MAG web site and encourage member organizations to provide this link on their web site.

**C.3.** Educate the community about Complete Streets by providing a link to the National Complete Streets Coalition, and information on Complete Streets on all transportation project information distributed by MAG and its members.

**C.4.** Publish a regular "Complete Streets Best Practices" column in the *MAGazine* newsletter.

**C.5.** Periodically update the MAG Bicycle and Pedestrian Committee with presentations of examples of Complete Streets policy and practice.

**C.6.** Periodically update the MAG Streets Committee, Transit Committee, Management Committee, and Regional Council with examples of Complete Streets and best practices from around the region.

**C.7.** Create a Complete Streets listserv to help MAG members and others find answers to design and implementation questions from the experience of others. Also use this listserv to disseminate information about Complete Streets.

**C.8.** Encourage transportation choice through land use policies such as providing direct access to transit stops from subdivisions.



*Public art in Mesa. Photo credit: PLAN\*et.*



# 5. COMPLETE STREETS PLANNING PROCESS



*Verrado in Buckeye. Photo credit: AECOM.*

# 5. COMPLETE STREETS PLANNING PROCESS

## OVERVIEW

Planning and designing a Complete Street requires a shift in transportation priorities. A Complete Street accommodates all modes of transportation; pedestrian, bicycles, vehicular, and transit at an appropriate level to the street type and transportation context. A Complete Street accommodates able-bodied travelers and travelers with disabilities. A Complete Street offers transportation options. For the purposes of this Guide, the process used to achieve a Complete Street is illustrated in *Figure 1* and includes the following steps:

1. Identify the Context/Land Use Character of the street.
2. Identify the current modes of transportation appropriate for the area.
3. Determine the Complete Street gaps — those design elements, facilities, and other transportation components that are necessary for a Complete Street.
4. Determine Other Priorities.
5. Identify the right-of-way width (for illustrative purposes only, this guide uses the narrowest rights-of-way for arterial and collector streets) and determine the appropriate number

of vehicular, transit, and bike lanes. (Some of these lanes could be shared in certain instances.)

6. Select the appropriate pedestrian and design elements and facilities. For bicycle and pedestrian facilities use the MAG Regional Bicycle Plan and MAG Pedestrian Policies and Design Guidelines.

## COMPLETE STREETS PLANNING PROCESS

### STEP 1: IDENTIFY THE TRANSPORTATION CONTEXT

The Maricopa Association of Governments region is a broad and diverse region. It includes rural areas, suburban areas, and urban areas. Within each of these areas are businesses, residential communities, and commercial and retail developments with different development and corresponding travel intensities. While Complete Streets provide facilities for all users, the design process recognizes that the type of facility may vary based on intensity of use, which is in large part a function of the transportation context. For the purposes of this Guide, six types of Transportation Contexts were identified. Each is described below.

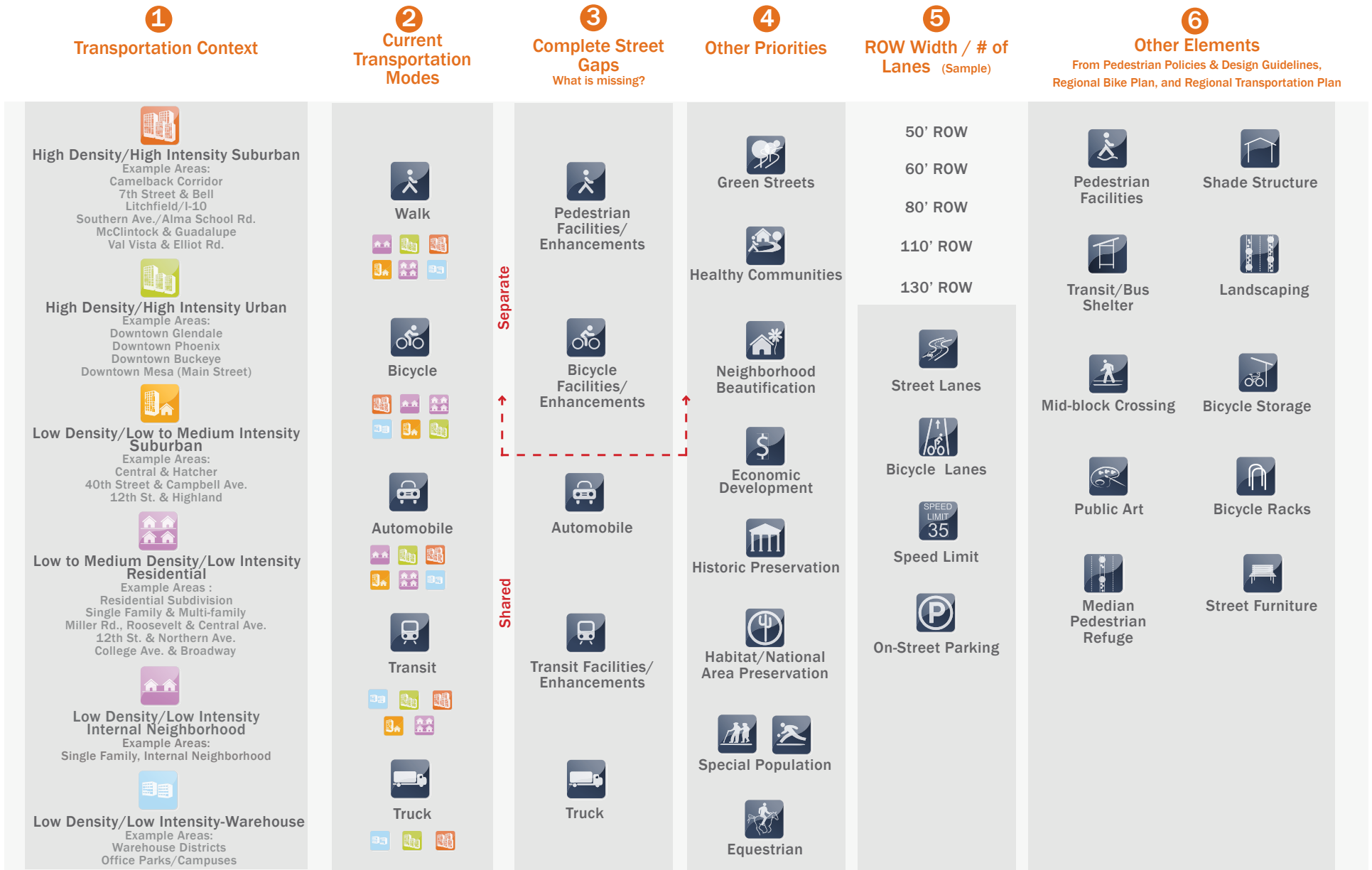
### High Density/High Intensity—Suburban

This includes areas with a variety of land uses and development types that have a relatively high density. These areas are focused around wide, high volume streets. Development in these areas is generally large scale shopping centers and/or campus style commercial/retail, office, and multi-family housing that are set back from the roadway. These areas generate high volumes of vehicular, pedestrian, and bicycle traffic. Transit is vital in these areas, providing access to and from them for residents, customers, and employees. While a significant amount of traffic in these areas is local, through traffic is also significant.

### High Density/High Intensity—Urban

These areas are intense mixed use areas with a fine street grid. While these areas typically include wide streets, they may also include narrow streets that carry high volumes of traffic. Buildings in these area abut the right-of-way. While these areas generate high volumes of traffic, they are designed to reduce the need for single occupancy vehicles by offering mixed land uses in close proximity. They support walking and transit as the primary modes of circulation. As a result, they include on-street parking and common parking areas (as opposed to dedicated parking for each use). In the Maricopa Region, the Phoenix, Tempe, Mesa, and Glendale downtowns are also designed to support light rail and bus transit.

**Figure 1: Complete Streets Planning Process**



### Low Density/Low to Medium Intensity—Suburban

In the MAG region, these are two types of areas: (1) older mixed use commercial and residential areas that generally surround the intersection of collector and arterial streets, or (2) the intersection of collector streets or the four-corner commercial areas that are usually constructed with single family subdivisions. These areas include a variety of uses, usually single story strip commercial surrounded by higher density single family or multi-family uses. While these areas were originally designed for vehicles with front in parking, they have developed into four- and two-corner mixed use areas that offer a range of “park once” destinations and are also frequented by nearby residents arriving by foot and on bicycle.

### Low to Medium Density/ Low Intensity—Residential Subdivisions

The MAG Region overwhelmingly consists of single family subdivisions. This predominant development type typically includes the areas of subdivisions with homes, schools, and parks on wide, local, and collector streets. While vehicles are significant users of the arterial and collector streets internal to these areas, the volumes and speeds are generally low. Other significant transportation users located in these areas include elementary, middle, and high school children who walk and bike ride to neighborhood destinations such as parks, schools, and local commercial uses (see *Low Density/Low Intensity Internal Neighborhood*).

### Low Density/Low Intensity—Internal Neighborhood

Many subdivisions include areas with narrower

streets and single family homes. Because the travel volumes in these areas are low, the transportation facilities dedicated to bicycles often share the road with vehicles and pedestrian facilities are often limited to a narrow sidewalk. Transit facilities are few, if any. As a result, single occupancy vehicles are typically used within these areas to access neighborhood and community destinations such as schools, parks, and shopping. To meet the needs of travelers that do not drive and to provide options to access local destinations, facilities to access public transportation, school bus stops,

neighborhood, and local services are necessary. Additionally, bicyclists and pedestrians need facilities to access public transit (for linked trips).

### Low Density/Low Intensity—Warehouse Districts

These areas include the business parks and commerce parks that line freeways and surround airports and rail corridors. These areas are designed to enable quick ingress and egress for freight; however, they must meet transportation needs for workers that arrive by transit or bicycle.



Senior housing in downtown Mesa. Photo credit: MAG.

## STEP 2: IDENTIFY CURRENT TRANSPORTATION MODES AND FACILITIES

The second step of the Complete Streets process is identifying the current available motorized and nonmotorized transportation modes and their adequacy given the transportation context. This step includes examining the number of lanes, the width of each lane, and travel speeds.

## STEP 3: IDENTIFY COMPLETE STREET GAPS

This step helps identify what facilities are necessary for a Complete Street. For example, are the sidewalks wide enough to accommodate anticipated pedestrian traffic? Are there adequate bicycle or transit facilities? How are bicycles and pedestrians able to cross at the intersections or mid-block (if appropriate). Are facilities for buses or other transit provided? Is the street too wide to safely and comfortably cross? Determining the Complete Street gaps should also consider the context of the street. For example, in a low density/low intensity residential area, a 5' sidewalk, detached from the curb, could be adequate to support pedestrian traffic. In a high intensity/high density urban environment, an 8' or wider sidewalk could be appropriate.

## STEP 4: DETERMINE OTHER PRIORITIES

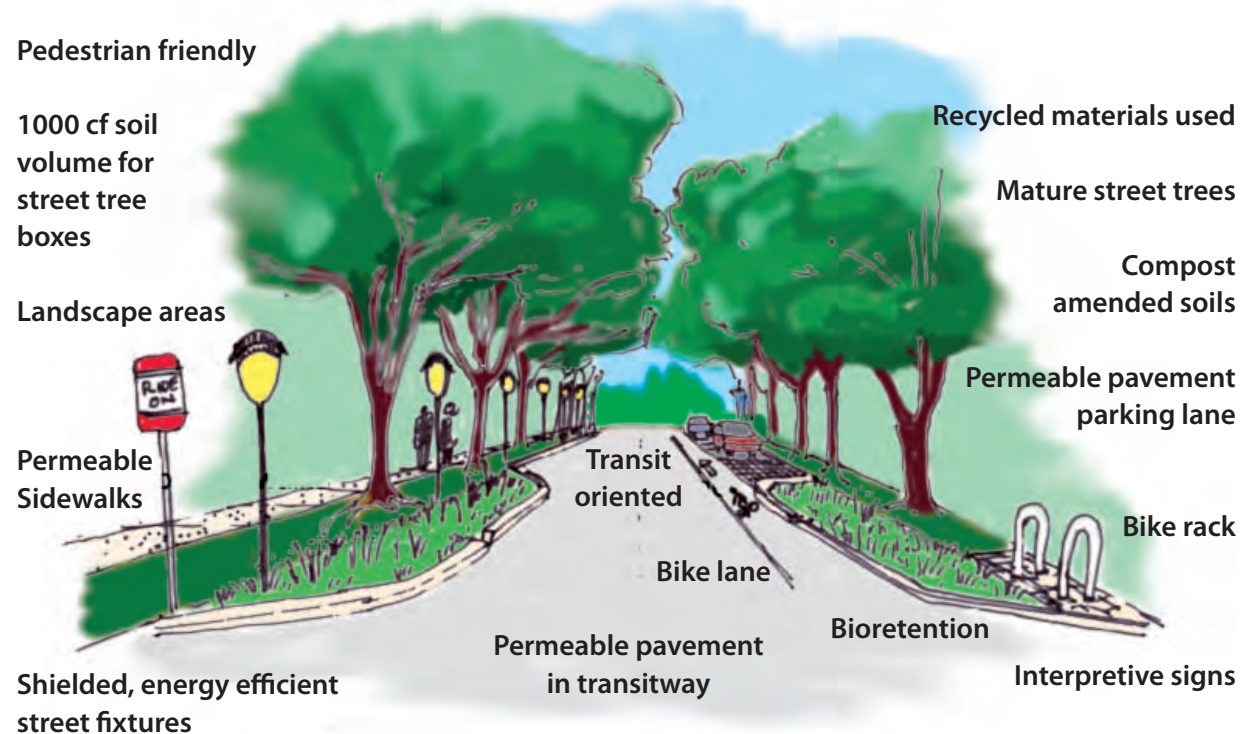
In addition to providing facilities for mobility, streets provide other functions within our

community. Often, street retrofits or new streets are also constructed as gateways, open space parkways, or to revitalize a downtown or neighborhood. Other priorities should be considered when designing and selecting facilities for a Complete Street. Such examples include green infrastructure elements that encourage the use of sustainable materials and design in the construction of streets, economic development, neighborhood beautification, healthy communities, special populations, and safe routes to school.

## Green Street Priorities

Green infrastructure is a concept that rethinks traditional techniques in providing infrastructure so that these investments are provided and operated in a sustainable manner. Because they are so ubiquitous, streets offer a substantial opportunity for green infrastructure. For example, streets offer an opportunity to reduce the use of potable water on irrigation, to reduce storm water runoff, and to treat storm water close to its source. By using recycled materials (such as rubberized surfaces or reconstituted concrete), streets can reduce the waste stream and generate less noise.

### Anatomy of a Green Street



A Green Street Concept from the Low Impact Development Center (LIDC).

The City of Tucson, Arizona has begun to implement Green Streets and published a water harvesting manual. When planning and designing a Complete Street, consideration should be given to landscaping and design techniques that:

- Mimic the pre-development, local hydrology
- Integrate system of storm water management within the right-of-way
- Reduce the volume of storm water runoff
- Provide shade to reduce the urban heat island effect and contribute to the reduction of greenhouse gas.

### Best Practices—Green Streets

**The Low Impact Development Center** lists a range of techniques to incorporate Green Streets elements into Complete Street Planning and Design. (Please note that our soil types and clay content may render these options ineffective in some locations throughout the MAG region.) These include:

- **Alternative Street Designs (Narrower Street Widths):** A green street design begins before any Best Management Practices (BMPs) are considered. If building a new street or streets, the layout and street network must be planned to respect the existing hydrologic functions of the land (preserve wetlands, buffers, high-permeability soils, etc.) and minimize the impervious area. If retrofitting or redeveloping a street, opportunities to eliminate unnecessary impervious area should be explored. Additionally, these techniques should consider the soil types and other factors that will influence their effectiveness.



*A bioswale reduces storm water runoff and creates a natural filtration system. Photo credit: LIDC*

- **Swales:** Swales are vegetated open channels designed to accept sheet flow runoff and convey it in broad shallow flow. The intent of swales is to reduce storm water volume through infiltration, improve water quality through vegetative and soil filtration, and reduce flow velocity by increasing channel roughness. In the simple roadside form, they have been a common historical component of road design. Additional benefit can be attained through more complex forms of swales, such as those with amended soils, bioretention soils, gravel storage areas, underdrains, weirs, and thick diverse vegetation.
- **Bioretention Curb Extensions and Sidewalk Planters:** Bioretention is a versatile green street strategy. Bioretention features can be tree boxes taking runoff from the street, indistinguishable from conventional tree

boxes. Bioretention features can also be attractive attention grabbing planter boxes or curb extensions. Many natural processes occur within bioretention cells: infiltration and storage reduces runoff volumes and attenuates peak flows; biological and chemical reactions occur in the mulch, soil matrix, and root zone; and storm water is filtered through vegetation and soil.

- **Permeable Pavement:** Permeable pavement comes in four forms: permeable concrete, permeable asphalt, permeable interlocking concrete pavers, and grid pavers. Permeable concrete and asphalt are similar to their impervious counterparts but are open graded or have reduced fines and typically have a special binder added. Methods for pouring, setting, and curing these permeable pavements also differ from the impervious versions. The concrete and grid pavers are modular systems. Concrete pavers are installed with gaps between them that allow water to pass through to the base. Grid pavers are typically a durable plastic matrix that can be filled with gravel or vegetation. All of the permeable pavement systems have an aggregate base in common which provides structural support, runoff storage, and pollutant removal through filtering and adsorption.
- **Sidewalk Trees and Tree Boxes:** From reducing the urban heat island effect and reducing storm water runoff to improving the urban aesthetic and improving air quality, much is expected of street trees.

However, most often street trees are given very little space to grow in often inhospitable environments. The soil around street trees often becomes compacted during the construction of paved surfaces and minimized as underground utilities encroach on root space. By placing the right tree in the right place and providing adequate soil volume and a good soil mixture, the benefits obtained from a street tree multiply. To obtain a healthy soil volume, trees can simply be provided larger tree boxes, or structural soils, root paths, or “silva cells” can be used under sidewalks or other paved areas to expand root



Sidewalk trees and tree boxes. Photo credit: MAG.

zones. These allow tree roots the space they need to grow to full size. Finally, ensuring that there are no above ground utility conflicts also helps ensure the growth of full-size trees.

### Economic Development Priorities

Complete Streets provide a balanced transportation system with choices. As such they can enhance economic growth and stability by improving access and connectivity between all modes of travel and destinations from schools to job centers. Additionally, a Complete Street often includes improved landscaping and amenities that give a neighborhood character and a sense of commitment and long term investment. Many communities in the MAG region have devoted considerable resources to downtown reinvestment. Street improvements were critical to those investments in Phoenix, Tempe, Goodyear, and many other cities. Those communities recognized that making their downtown streets more accommodating to all users also enhanced their downtown’s vitality and ability to attract private investment.

Many MAG jurisdictions have used street improvements as a means of neighborhood stabilization. Through these projects, many elements of Complete Streets, such as striped bike lanes, wider sidewalks, street tree plantings, and transit stops were included.

### Best Practices—Economic Development

**The National Complete Streets Coalition** summarized how Complete Streets affect economic development:

- Incomplete streets can restrict economic

development by limiting access only to automobiles on already congested streets. When given the choice of spending money on higher gas prices or staying home, people stay home and tends not to spend money on goods and services. This is compounded for seniors: “half of all non-drivers age 65 and over—3.6 million Americans—stay home on a given day because they lack transportation.”

- Lack of transportation options affects the workforce. In a 2006 report on employment centers outside Pittsburgh, 30% of employers responded that transportation was the number one barrier to hiring and retaining qualified workers.
- Incomplete streets hinder economic growth and can result in lost business, lower productivity, and higher employee turnover.
- Complete Streets help create viable communities. Creating infrastructure for nonmotorized transportation and lowering automobile speeds by changing road conditions can improve economic conditions for both business owners and residents.
- Street design inclusive of all transportation modes, where appropriate, not only improves conditions for existing businesses, but also is a proven method for revitalizing an area and attracting new development.
- Complete Streets boost the economy by increasing property values, including residential properties, as generally homeowners are willing to pay more to live in walkable communities.

## Neighborhood Beautification Priorities

Attractive, safe, and comfortable neighborhoods are more livable. Elements that make a sidewalk more comfortable for walking, such as landscaping, street trees, a separation from moving traffic, likewise make a more attractive street and a more attractive community.

Recent street improvement projects in the MAG region have emphasized improved aesthetic design while making streets more complete. Indian School Road improvements in the older neighborhoods of Scottsdale incorporated



*The City of Phoenix Tree and Shade Master Plan is designed to reduce the heat island effect by increasing the amount of shade in the City.*

bike lanes, wider separated sidewalks, specialty pedestrian level lighting, and generous landscaping and medians. The West 5th Street improvements in Tempe equally addressed transportation issues and aesthetic concerns, helping to integrate the street design into an established neighborhood.

## Historic Preservation Priorities

There is a growing recognition of the relationship between Complete Streets and historic preservation, and their place in revitalizing communities. Historic Preservation highlights the synthesis of multiple community priorities of neighborhood stabilization and beautification, economic development, sustainability, and community health.

The **National Trust for Historic Preservation** established the National **Main Street Center in 1980** which focuses on a **Four-Point Approach®** to transforming the way communities think about the revitalization and management of their commercial districts. The Main Street Four-Point Approach® is a community-driven, comprehensive strategy used to revitalize downtowns and neighborhood business districts throughout the United States. The four points of the Main Street approach work together to build a sustainable and complete community revitalization effort. Of these four points, "Design" most closely aligns with the philosophy of Complete Streets:

- **Organization** involves getting everyone working toward the same goal and assembling the appropriate human and financial resources to implement a Main

Street revitalization program.

- **Promotion** sells a positive image of the commercial district and encourages consumers and investors to live, work, shop, play, and invest in the Main Street district.
- **Design** means getting Main Street into top physical shape. Capitalizing on its best assets—such as historic buildings and pedestrian-oriented streets—is just part of the story. An inviting atmosphere, created through attractive window displays, parking areas, building improvements, street furniture, signs, sidewalks, street lights, and landscaping conveys a positive visual message about the commercial district and what it has to offer.
- **Economic Restructuring** strengthens a community's existing economic assets while expanding and diversifying its economic base.

In Main Street projects throughout the United States, street improvements are a critical component of downtown revitalization. **A New Streetscape: A Firm Foundation for your District** by Donna Dow in the Main Street News, December 2009 summarizes the power of Complete Streets principles with a project in **Durant, Oklahoma**; "A new, improved streetscape can yield powerful results for your commercial district...Pedestrian pathways are easily accessible to everyone, and the stage is set for success." She goes on to say, "the district has new sidewalks and street amenities, underground utility wires, a community public space with a performance stage, an enhanced parking lot,



and improved rear entrances to businesses. As a result, the downtown is seeing more activities and many more people. The increased foot traffic is a result of people feeling comfortable in the heart of the community again.”

Two Main Street Projects in Iowa illustrate the relationship between Main Streets and Green Streets. In 2008, the Iowa Department of Economic Development (IDED) selected two Main Street communities to serve as pilots for its Green Streets Initiative. As pilots, the Main Streets of Woodbine and West Union will experiment with measures to achieve sustainable communities and serve as models for their colleagues in Iowa and others throughout the nation.

The City of Woodbine, Simonson & Associates Architects, and the IDIED banded together to “develop a sustainable master plan, which incorporated energy-efficiency improvements, downtown revitalization, beautification, and streetscapes,” says Main Street Woodbine Co-Director Darin Smith.

In the MAG region, **Apache Junction** and **Buckeye** have Main Street Programs. Other MAG jurisdictions have blended the priorities of historic preservation and Complete Streets philosophies. Revitalization efforts in the historic downtowns of **Glendale**, **Phoenix**, **Mesa**, **Goodyear**, **Tempe**, **Peoria**, and others, stressed enhanced pedestrian environments with widened sidewalks, pedestrian lighting, bike racks, and landscaping. Tying transit to historic preservation, circulator bus systems move through the downtowns of **Tempe**, **Mesa**, and **Scottsdale**.

### Healthy Communities Priorities

Wider, more attractive sidewalks, bike lanes, and improved transit improve accessibility for pedestrians and cyclists allow them to incorporate a more active lifestyle into their transportation choices. A more active lifestyle provides personal and community health benefits. The Complete Streets Coalition provides more information on the **relationship between Complete Streets and public health**.

The National Complete Streets Coalition states:

- **When streets are designed only for cars, they deny people the opportunity to choose more active ways to get around, such as walking and biking.** Even where sidewalks exist, lack of shade, large intersections, and speeding traffic may make walking unpleasant or even unsafe—discouraging any nonmotorized travel. Incomplete streets mean many people lack opportunities to be active as part of daily life.
- **Post World War II growth patterns and street designs tend to favor the automobile over walking and bicycling.** The health impacts are clear—one study found that, on a daily basis, each additional hour spent driving is associated with a 6% increase in the likelihood of obesity, while each additional kilometer walked is associated with a 5% reduction in this likelihood.
- **Complete Streets make active living easy.** Complete Streets provide opportunities for increased physical activity by incorporating features that promote regular walking, cycling, and transit use into just about

every street. A report prepared by the National Conference of State Legislators found that the most effective policy avenue for encouraging bicycling and walking is incorporating sidewalks and bike lanes into community design—essentially, creating complete streets. The continuous network of safe sidewalks and bikeways provided by a complete streets policy is important for encouraging active travel. A recent comprehensive assessment by public health researchers of actions to encourage more physical activity recommended building more sidewalks, improving transit service, and shifting highway funds to create bike lanes.

- **Walkability has a direct and specific relation to the health of residents.** A comprehensive study of walkability has found that people in walkable neighborhoods did about 35-45 more minutes of moderate intensity physical activity per week and were substantially less likely to be overweight or obese than similar people living in low-walkable neighborhoods.



Downtown Tempe illustrates a sense of place. Credit: MAG.

- **Easy access to transit can also contribute to healthy physical activity.** Nearly one third of transit users meet the Surgeon General's recommendations for minimum daily exercise through their daily travels.
- **A community with a Complete Streets policy ensures streets are designed and altered to make it easy for people to get physical activity as part of their daily routine.** This would help people stay trim, avoid heart disease, and receive the many other benefits of physical activity.



*Bicycle racks in Mesa. Photo credit: Dan Burden.*

### Special Populations Priorities

Special populations can include the very young, the very old, and those with mobility challenges. Mobility challenges can occur at anytime; therefore, a Complete Street should strive to accommodate all people at all times. Within the MAG region, concentrations of seniors exist within neighborhoods and communities. Concentrations of children exist around elementary schools.

Public rights-of-way and facilities are required to be accessible to persons with disabilities through federal statute. Safe Routes to Schools are an important element of Complete Streets. In addition to consideration of the pedestrian, the Safe Routes to School element of a Complete Street specifically looks at the potential for the Complete Street to be a travel-way for elementary and secondary school access. In the MAG region, many schools are located on streets that are wider than 80 feet. Safe Routes to School is a program to encourage more children,

including those with disabilities, to safely walk and bicycle to school. Incorporating this element into a Complete Street requires local schools and parents to be engaged in the Complete Street planning and design process. The MAG Pedestrian Policies and Design Guidelines includes information on Safe Routes to School. Additional information is located at The National Center for Safe Routes to School (SRTS) website. <http://www.saferoutesinfo.org/>

### STEP 5: IDENTIFY RIGHT-OF-WAY/ NUMBER OF LANES

Street and right-of-way and the number of travel lanes are key factors in the planning and development of a Complete Street. While each jurisdiction has its own methodology to determine the number of travel lanes, these methodologies favor vehicular travel and frequently result in excessive travel lanes and

widths. An alternative to building unnecessary lanes is to construct a complete street, even if it results in a loss of travel lanes. If, in the future, additional capacity becomes necessary, the street can be retrofitted through narrowing medians or travel lane width. In the case of new streets where the right-of-way is not yet determined or may be constrained by existing development, a wide street can easily accommodate all of the facilities that would be necessary for a Complete Street. However, if the street is too wide, it becomes more difficult for the pedestrian to navigate. Wide vehicular travel lanes, numerous vehicular travel lanes, and wide streets typically result in increased speeds, making the street more dangerous for motorists, pedestrians, and bicycles. Wide streets require more pavement, increase maintenance costs, and are less environmentally friendly.

Planning and designing a Complete Street is challenging in areas where the ultimate width of the right-of-way is limited or constrained by environmental, land use, or other factors. Sometimes, standard improvements must be rethought or redesigned in order to maintain acceptable levels of safety or comfort for nonmotorized users. For example, a pedestrian crossing could be improved with bulb outs, underpasses, or overpasses. Signal timing also may need to be adjusted. In some of these instances, traditional facility sizes such as lane widths may be reduced and with those reductions come reductions in speed or the capacity of a particular mode.

## Right-of-Way

Generally, within the MAG region, arterial street rights-of-way range from 110' to 130' wide. Collector Streets range from 60' to 80' wide. Local streets are 40' to 60' wide. Bicycle lanes are generally located on arterial or collector streets. To demonstrate the potential application of Complete Streets in the MAG region, this Guide examines Complete Streets potential with the most restrictive right-of-way widths currently in place within the region. These widths were determined through this Guide's facilities inventory survey. The purpose of using narrow rights-of-way in this Guide was twofold:

- The use of narrow rights-of-way demonstrates how a Complete Street could be planned and designed in the most challenging environments.
- The use of narrow rights-of-way instead of using the terms arterial, collector, and local street, helps to shift the preconception of what the region's streets should be. For example, an arterial street is envisioned as a high volume, auto dominated environment. A street with a 110' right-of-way has no preconception. In a high intensity/high density urban area, a street needs to accommodate higher volumes of pedestrians and transit than the same 110' wide street in a low intensity/low density suburban residential area.

When determining the number of lanes appropriate to a Complete Street, the regional and local bicycle, transit, and transportation plans should be consulted.

## Number of Lanes

### Selecting Bicycle Lanes and Lane Widths:

Most jurisdictions have standards for bicycle lanes identified in their General or Comprehensive Plan or Transportation Plan. These should be consulted as a part of the Complete Streets planning process.

### Selecting Street Lanes and Lane Widths:

Many jurisdictions throughout the region have their own standards. These should be consulted when planning and designing Complete Streets. Key to a Complete Street is the concept of a "road diet;" the recognition that fewer lanes or/and narrower lane widths and slower speeds do not significantly impede safety and in many cases (e.g., roads carrying fewer than 25,000 vehicles per day), operational efficiency.

## Best Practices—Bicycle Lanes

### (Green) Bike Box

Though not yet adopted in the MUTCD, the bike box is an intersection safety design to prevent bicycle/car collisions, especially those between drivers turning right and bicyclists going straight. At a red light, cyclists are more visible to motorists by being in front of them. The bike box is a green box painted on the road with a white bicycle symbol inside. It also includes painted green bicycle lanes approaching and leading from the box.

### Physically Separated Bike Lanes

In some, unique cases, these lanes can provide a safe place for nonmotorized vehicles. They can be separated from traffic by painted stripes on the



Portland, OR Bike Box. Photo credit: Beach650 on Flickr.



Shared lane marking in Pittsburgh, PA.

street, narrow median, tree lined path, a sidewalk, or a concrete buffer. A separated bike lane should never be placed between parked cars and the curb.

### Shared Lane Marking

Shared lanes may be appropriate in some cases, such as turn lanes, or in situations when bicycles share a parking lane. In these cases, a shared lane marking may be used on roadways that have a speed limit of 35 mph or less to:

- Assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle;
- Assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane;
- Alert road users of the lateral location bicyclists are likely to occupy within the traveled way;
- Encourage safe passing of bicyclists by motorists, and
- Reduce the incidence of wrong way bicycling.

### Additional Resources—Vehicle Lanes

In addition to these standards, other sources provide information about street design that may be useful in Developing Complete Streets. These include:

**Retrofitting Urban Arterials into Complete Streets:** John LaPlante's research at TRB's 3rd Urban Street Symposium (2007).

**Relationship of Lane Width to Safety for Urban and Suburban Arterials:** This research by Ingrid B. Potts, Douglas W. Harwood, and Karen R. Richard investigates the relationship between lane width and safety for roadway segments and intersection approaches on urban and suburban arterials. The research found no general indication that the use of lanes narrower than 3.6 meters (12 feet) on urban and suburban arterials increases crash frequencies.

**Road Diets: Fixing the Big Roads** by Dan Burden and Peter Lagerwey. This is one of the earlier documents explaining road diets and documenting outcomes of these types of approaches.

### Selecting Transit Lanes

Transit is a fundamental element of most complete streets. Sometimes, transit can be provided as a neighborhood circulator (e.g., a small multi-passenger vehicle with a regular route through a neighborhood without fixed stops), other appropriate transit, or as an inter-jurisdictional or regional route. While each community in the MAG region accommodates transit differently (e.g., some communities have bus pull outs, some do not), transit can be accommodated through its own facility such as a dedicated lane for a bus

or rail line, or through facilities shared with other vehicles, such as a bus or streetcar. Regardless of the type of transit, accommodations should be made within the street for transit appropriate to the street and its context.

### Additional Resources—Transit Elements

In planning for and designing transit facilities for a Complete Street, the following resources are available:

**Transit Facilities Design Manual**—Sunline Transit Agency, Thousand Palms, CA. This manual provides basic transit stop and planning guidance to help make roads and communities more transit friendly. The concept behind the manual was to encourage planners and designers to think about transit as an integral



Valley Metro's RAPID provides bus and express bus services throughout the region. Photo credit: STV.

part of a site, neighborhood, or road during the planning and design process.

**Rethinking The Suburban Bus Stop**—This publication, by Airport Corridor Transportation Association (ACTA), a Transportation Management Association in Pittsburgh, PA., provides design guidance for transit stops in urban and suburban areas.

**Accessible Bus Stop Design Guidance: Bus Priority Team Technical Advice Note BP1/06 January 2006**—This document provides information about accessible bus shelter placement in a variety of situations. It includes easy to read diagrams and graphics.

## STEP 6: SELECT COMPLETE STREETS—OTHER ELEMENTS

In addition to roadway or modal elements (such as travel, transit, turn, and bicycle lanes) Complete Streets include elements and facilities for pedestrians (such as sidewalks, shade, lighting, signing, facilities for people with disabilities, and tools to manage the pedestrian environment), bicycles (such as lanes, storage, signing, and tools to manage bicycle traffic), and transit (such as lanes, signals, facilities for people who use transit, and tools to manage the flow of transit). This portion of the process integrates the adopted MAG Pedestrian Policies and Design Guidelines and the MAG Bicycle Plan, as well as other transportation planning documents such as those identified in Chapter 1 of this Guide. These documents are key reference sources for planning and designing Complete Streets and



offer a range of options for safe, comfortable, and attractive pedestrian and bicycle facilities appropriate for the MAG Region. In addition to these documents, there are other resources available for planning and designing Complete Streets, including the Municipal Research and Services Center of Washington: **Designing Transportation Facilities for Pedestrians and Bicycles - Complete Streets - Living Streets resources list.**

### **Pedestrian Elements:**

Many jurisdictions throughout the region have their own pedestrian facility standards. These should be consulted when planning and

designing Complete Streets. Additionally, the MAG Pedestrian Policies and Design Guidelines recommends minimum standards for pedestrian facilities and for facilities that are located within pedestrian destinations. For a basic, 'safe,' pedestrian facility, the **minimum** standards recommend:

- A 6-foot wide walkway, visually and functionally separate from the path of vehicles;
- A walkway surface that is smooth, slip resistant and without cracks, indents, or steep grades, and clear of protruding objects;
- Walkways that go around driveway crossings;
- All intersection corners and changes in elevation have ramps;
- The walkway is physically separated from vehicular traffic by at least one vertical or horizontal element;
- At least 1 foot candle of lighting at intersections and crosswalks;
- Pedestrian crossings with vehicular traffic have a defined crosswalk;
- Traffic signals are timed for a walking speed of 2.8 feet per second;
- Minimum 50% shade coverage.

Minimum standards for a 'comfortable' facility increase sidewalk widths to a 7' - 12' and increase shade coverage to 60%. In high intensity/high density urban areas or 'destinations' as defined in the Guidelines, additional recommendations include, but are not limited to, 75% shade coverage, marked crosswalks, the elimination of driveway crossings, and the addition of transit stations. While these are MAG recommendations, every effort should be made to incorporate them into the planning and design for a Complete Street

in order to enrich the pedestrian environment while considering other transportation elements and right-of-way constraints.

### Additional Resources—Pedestrian Elements

In addition, other resources to enhance the planning and design of the pedestrian elements of a Complete Street are available and should be consulted. These include:

### Planning Complete Streets for an Aging America

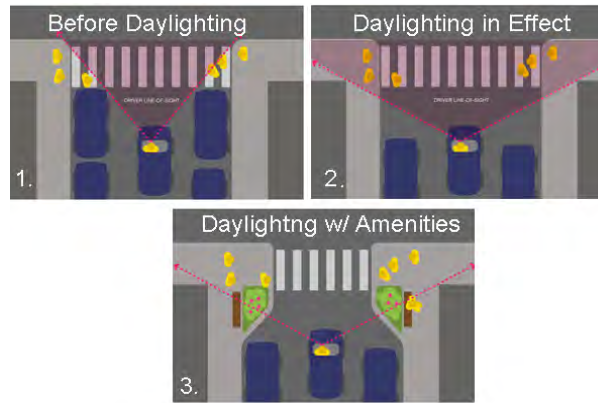
—A major report from The AARP Public Policy Institute, working with the Renaissance Planning Group, the National Complete Streets Coalition, the Institute of Transportation Engineers, and others, on considering the needs of older people in multimodal street planning.

### Beyond 50.05 A Report to the Nation on Livable Communities: Creating Environments for Successful Aging

—AARP’s report includes an evaluation guide and online 10-point community self assessment check-list to evaluate the livability of your community for older Americans.

**Special Report: Accessible Public Rights-of-Way Planning and Design for Alterations**—This report addresses universal access considerations.

**Daylighting** - Daylighting is a simple, inexpensive strategy to increase pedestrian safety, which removes parking spaces surrounding an intersection in order to create better visibility for pedestrians crossing the street. The parking area that is removed can either be delineated by parking signs or painting the curb or physical barriers such as curb extensions can be installed to provide an area for amenities.



Daylighting illustration. Graphic credit: StreetsWiki.

### Additional Resources—Bicycle Elements

Many jurisdictions throughout the region have their own bicycle facility standards. These should be consulted when planning and designing Complete Streets. The MAG Regional Bikeway Master Plan includes a Complete Streets Goal and illustrates the Goal by identifying the following considerations in planning bicycle facilities along Complete Streets:

- Multiple transportation modes: cars, buses, bicycles, and pedestrians;
- Wide and striped bike lanes;
- Bicycle accommodations on buses;
- Shared-use paths;
- Generous trees planted along the street, which create shade and comfort;
- Supportive adjacent land uses: mixed-use developments and a variety of residential densities;
- Separate unpaved trails;
- Bus stops with shade, seating, bike racks, signs, and maps.



Example of a shared use path next to the Crosscut Canal. Photo credit: MAG.

Other resources that provide information on bicycle elements that could be included in a Complete Street include:

**FHWA Design Guidance Accommodating Bicycle and Pedestrian Travel: A Recommended Approach** - This resource includes information on applying engineering judgement to providing bicycle facilities, guidance, and additional references for bicycle and pedestrian facilities.

# 6. DESIGN TECHNIQUES AND SAMPLE OUTCOMES



*Multiuse path near canal. Photo credit: MAG.*

# 6. DESIGN TECHNIQUES AND SAMPLE OUTCOMES

## INTRODUCTION

This Guide provides policy and design guidance for the planning and design of Complete Streets throughout the MAG region. This section of the Guide includes examples that demonstrate how a Complete Street can be built or retrofitted under the most restrictive right-of-way conditions found in the region. **None of the examples on the following pages are intended to provide a set of prescriptive design standards for a Complete Street.** Instead, each example illustrates how, within a particular context, a Complete Street can be designed to provide safe and adequate facilities for walking, bicycling, and transit on par with other transportation modes.

*“Good street designs are those that demonstrate a little serendipity and enthusiasm. Such an attitude quickly infects community participants, smoothing the design process and resulting in more creative expression.”*

*-Moudon,  
Public Streets  
for Public Use*

## STRATEGIES TO ENCOURAGE GOOD COMPLETE STREETS DESIGN

Each jurisdiction is encouraged to consider the Complete Streets strategies in this guide. A variety of techniques can be used to treat bicycles, pedestrians, and transit facilities on an equal footing with vehicles. Each jurisdiction is encouraged to develop their own list of Complete Streets techniques. A selection of techniques to make Complete Streets is listed below. In addition, throughout the region, many jurisdictions have developed innovations to ensure that facilities for bicycles, transit, and pedestrians are provided on their streets. These techniques are described in the following examples.

**Technique 1:** Provide dedicated pedestrian facilities on all Complete Streets, in accordance with the adopted Maricopa Association of Governments Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment Level of Service C or better.

**Technique 2:** When signal timing cannot be adjusted to safe levels for pedestrians in accordance with MUTCD guidelines and this plan, provide pedestrian refuges where the distance to cross a street is greater than 60 feet from face of curb to face of curb.

**Technique 3:** Provide sidewalks that are a minimum of eight feet wide on all Complete Streets that are more than five lanes or wider than 70 feet from face of curb to face of curb.

**Technique 4:** Provide dedicated bicycle-only facilities, in accordance with the adopted MAG Regional Bikeway Master Plan, on all Complete Streets with a lip of gutter to lip of gutter pavement width of 60 feet or greater, or on all Complete Streets with more than three striped vehicular travel lanes, or on a Complete Street with outside vehicular travel lanes that are less than 14 feet wide.

**Technique 5:** On Complete Streets with more than two vehicular travel lanes or greater than 60 feet face of curb to face of curb pavement width, reduce vehicular lane widths to a minimum of 10 feet and reduce travel speeds prior to the reduction or elimination of onstreet bicycle facilities or pedestrian facilities<sup>1</sup>.

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<sup>1</sup> The AASHTO 2006 Policy on Geometric Design of Highways and Streets states that lane widths of 9 to 12 ft. are generally used...In urban areas where pedestrian crossings, right-of-way, or existing development become stringent controls, the use of 11 ft. lanes is acceptable. Lanes 10 ft. wide are acceptable on low speed facilities...In some instances, on multilane facilities in urban areas, narrower inside lanes may be utilized to permit wide outside lanes for bicycle use. In this situation, 10 to 11 ft. lanes are common on inside lanes with 12 to 13 ft. lanes utilized on outside lanes...The upper limit for low-speed design is 45 mph.





*Public art bus stop.*

**Technique 6:** Consider providing a neighborhood circulator and appropriate sidewalk waiting areas.

**Technique 7:** Provide a shared transit/vehicular travel lane or room for transit facilities (current or planned) on all Complete Streets that are more than 60 feet wide or are four or more travel lanes.

**Technique 8:** Provide transit shelters near the sidewalk (or space for planned or potential transit stop facilities) on all Complete Streets that are more than 60 feet wide or are four or more travel lanes.



*Shaded bus stop in Mesa. Photo credit: Dan Burden.*

**Technique 9:** Most jurisdictions have a Level of Service (LOS) standard that is better than E. However, within High Intensity/High Density areas where walking, transit, and bicycling are key modes of transportation, a lower level of service for vehicles may be acceptable. (The Manual on Uniform Traffic Control Devices, or MUTCD, defines LOS E as “limit of acceptable delay, unstable flow, poor signal progression, traffic near roadway capacity, frequent cycle failures.”)

## 6.1 Sample Outcome for a High Density/High Intensity Area in a Suburban Context

### STEP 1. ASSESS CURRENT CONDITIONS CONTEXT/LAND USE CHARACTER

The rights-of-way in these sample contexts are mostly 110 feet or wider. This type of High Density/High Intensity context includes large community retail and “big box” uses in large strip centers set back from the street in developed shopping areas. Some of the centers have retail pads closer to the street. The development within these contexts is automobile oriented and usually requires walking through large parking lots to access it from the street, transit stop, or a parking space. In these example areas, retail uses are located on all four corners of the intersection, and continue along the street for 1/4 mile or more from the intersection. All of these example areas are surrounded by high density and/or single family housing within walking distance (1/4 mile). These areas accommodate large volumes of through vehicular traffic (around 41,000 to 48,000 ADT at the main intersections and about 25% less traffic outside the main intersections). All the example areas are served by bus.

#### Current Transportation Modes and Facilities

In these example areas, the predominant existing transportation character is single occupancy vehicles. While pedestrians may walk between stores within a single development, it is difficult to walk from one development to another or



*Camelback Corridor: East Camelback Road and 24th Street, Phoenix. Photo credit: Sharon at blogspot.com*

from the main shopping area stores along the periphery of the development when separated by large parking areas. Within the developments there are no bicycle facilities or lanes and the sidewalk is too narrow for shared use. Additionally, sidewalks around the perimeter of the development and within the development are generally connected to the curb with little or no separation from the roadway, travel lanes internal to the development, or parking areas. The main intersections within these areas generally include left and right turn bays and are from six to eight traffic lanes wide. Generally, there are no refuges for the pedestrian once they leave the sidewalk to cross the street. Left turn arrows are provided to maximize traffic flow.

### STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

#### Identify Complete Streets Gaps

For these types of streets to be Complete, bicycle facilities and enhancements to pedestrian and transit facilities are needed. This sample street was completed by including bike lanes, shared bus/vehicular lanes, and sidewalks that are separated from traffic by the bike lane, landscaping, and bus stops. Within developments in this context, internal streets could be made complete with the addition of crossing facilities between commercial pads, bicycle racks or lockers, benches, and shade.

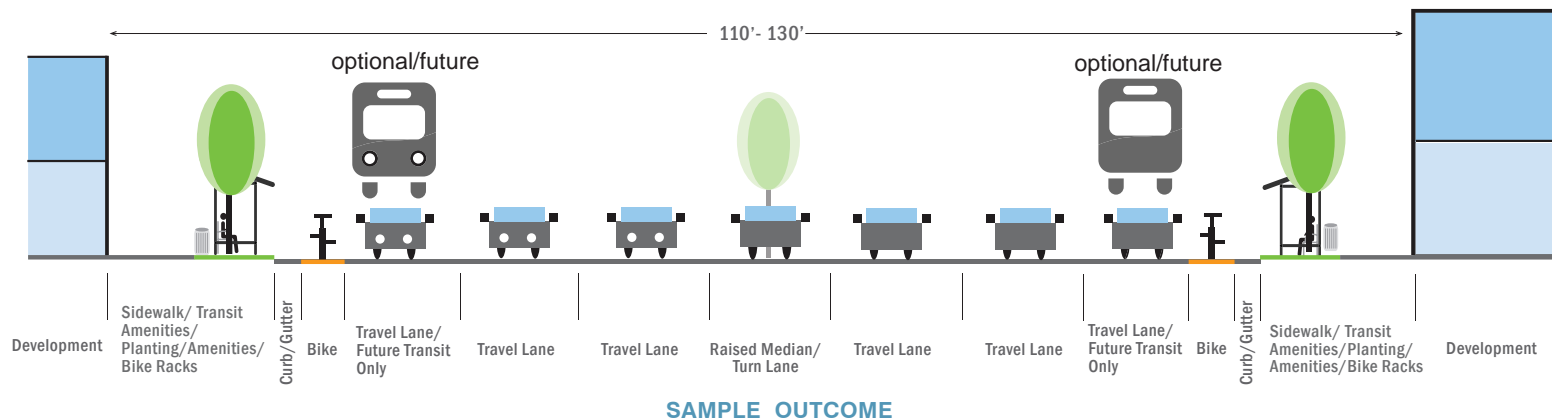
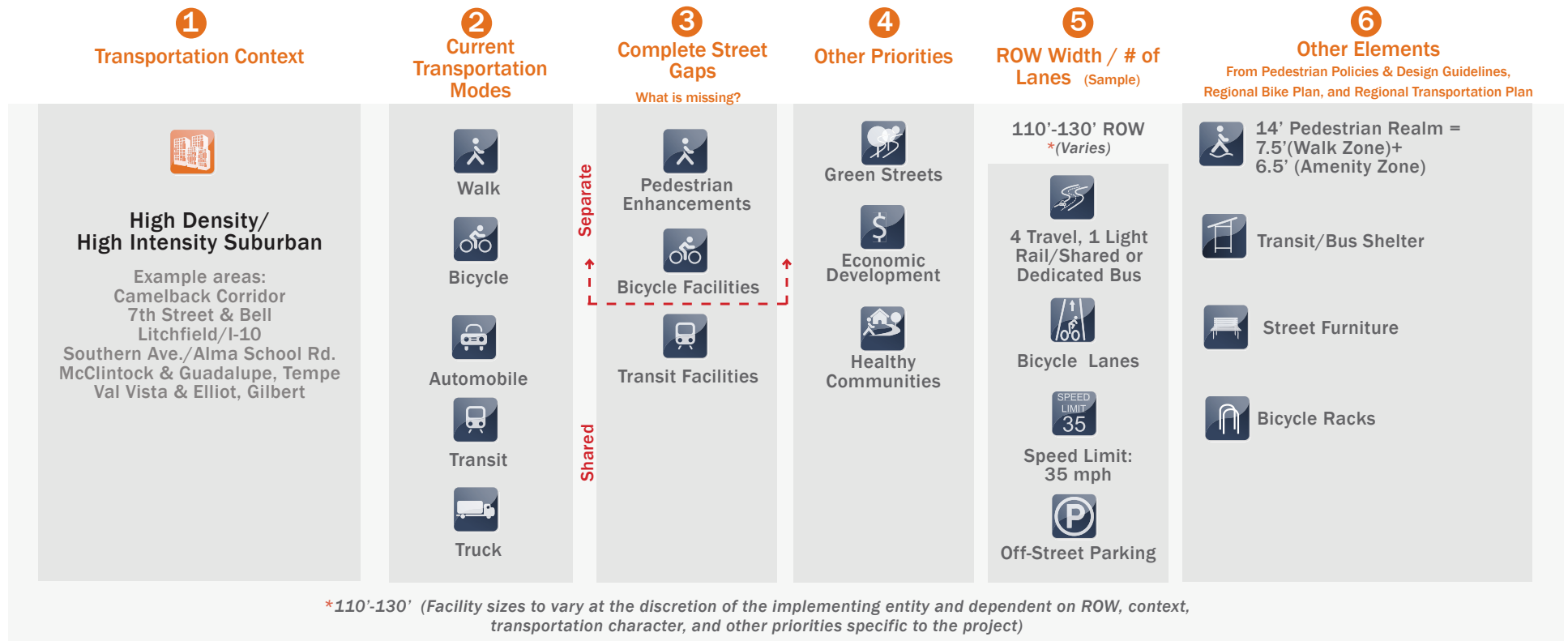
#### Other Priorities

##### Green Streets

To minimize storm water runoff, this design approach includes bioswales within medians where appropriate. Tree grates provide some limited opportunity for filtration and storm water retention. Ample shade trees contribute to reducing the urban heat island effect while shading pedestrian routes and parking areas. Other Green Elements, such as pedestrian and bicycle connections from adjacent neighborhoods, could be considered to enhance the healthy communities elements of this example as well.

Two of the areas identified as typical of this example are adjacent to or within walking distance of a significant wash or river. All of

**Figure 2. Complete Street Planning Process : High Density/High Intensity—Suburban Context**



the areas identified as typical of this example are within walking distance (1/4 - 1/2 mile) of residential areas. A Green Streets approach to a Complete Street in these types of areas could also help to limit runoff into waterways and provide connections to trails and parks associated with these waterways.

### **Economic Development**

These areas are important in terms of employment and the retail sales tax they generate. Any improvements must contribute to the access and attractiveness of these locations so they remain a destination within the community. Improved walking and bicycle facilities provide additional choices for access to these economic assets.

### **Healthy Communities**

Because these streets provide access from nearby homes to a community center, an opportunity to promote Healthy Communities was identified. In other words, by providing better pedestrian and bicycle access to these areas through a Complete Street, these areas would become attractive places to walk and bicycle to and within, creating a convenient every day form of physical activity.

### **Special Populations/Safe Routes To School (SRTS)**

Many MAG region streets similar to these examples include charter and other schools located in commercial areas. These types of schools do not operate on a district basis, and provide services to students that live throughout the region. As a result, Safe Routes to School elements such as enhanced pedestrian crossings and wide sidewalks are appropriate for these situations.

### **Right-of-Way Width/Number Of Lanes/Speeds**

#### **Right-of-Way**

Within the MAG region, the rights-of-way for primary streets within these context areas range from 110 to 150 feet. This sample illustrates a 110 foot right-of-way, the most restrictive. Because these areas are predominantly large commercial and office areas connected to one another, the larger streets generally provide the only ingress and egress for these areas.

#### **Bicycle**

A five-foot striped bicycle lane was selected for this street. To provide some additional separation from traffic, a 12' outside lane was also provided.

#### **Vehicular**

This Sample Outcome recognizes that these are high vehicular volume areas. It also recognizes that to provide a safer pedestrian environment, vehicular speeds, which are between 40 and 45 mph, could be reduced through narrowing the 12' wide vehicle inside lanes to 10'. This example could also be accomplished through providing 11' wide inside vehicle lanes and reducing the pedestrian realm to nine feet wide, or by reducing the bicycle lane width and allowing the bike lane to overlap into the gutter pan. While acceptable, both of these options would result in a below average pedestrian environment with respect to the MAG Pedestrian Policies and Design Guidelines as well as reduce the quality and safety of the bicycle and pedestrian environments. Using a median to better manage left turns and enhance traffic movement could also enhance through traffic volumes.

#### **Transit**

Transit access is via a 12' wide outside lane shared with vehicles. Transit facilities, such as a bus shelter and benches, are provided in the pedestrian realm at all bus stops. While these facilities periodically reduce the effective width of the sidewalk by approximately four feet, they can be provided without significantly impacting the pedestrian travel environment. If these facilities are provided with a nine foot wide pedestrian realm, they could result in an effective sidewalk width that is less than the six foot wide minimum recommended by the MAG Pedestrian Policies and Design Guidelines.

#### **Truck**

These vehicles can be accommodated in 11' travel lanes.

### **Complete Street Elements**

These areas are very intense, yet suburban in nature.

#### **Pedestrian**

To improve the pedestrian environment, 11' wide pedestrian realms were created. These realms provide enough room for sidewalks and pedestrian amenities (such as benches) and landscaping (e.g., shade trees) in grates. While these amenities reduce the effective width of the pedestrian area in some locations, they provide a buffer from traffic and enhance the pedestrian environment. This approach would result in a Roadside Pedestrian Condition of C (average) with regards to the MAG Pedestrian Policies and Design Guidelines.

## Complete Street Design Techniques Demonstrated by the Sample Outcome

- Provide dedicated pedestrian facilities on all Complete Streets.
- Provide pedestrian refuges on all Complete Streets where the distance to cross the street is greater than 60' from face of curb to face of curb.
- Provide sidewalks in accordance with the MAG Pedestrian Policies and Design

Guidelines or local Complete Streets guidance, that are a minimum of eight feet wide on all Complete Streets that are more than five lanes wide or 70' from face of curb to face of curb.

- Provide dedicated bicycle-only facilities, in accordance with the adopted MAG Regional Bikeway Master Plan, on all Complete Streets with a face of curb to face of curb pavement width of 60' or greater, or on all Complete Streets with

more than three, striped, vehicular travel lanes, or on a Complete Street with outside vehicular travel lanes that are less than 14' wide.

- Promote Complete Streets as part of a Healthy Community.
- Provide a shared transit/vehicular travel lane on all Complete Streets that are more than 60' wide or four or more travel lanes.
- Within High Intensity/High Density areas, Complete Streets should accomplish a level of service (LOS) of E or better (assumed).
- Provide transit shelters on the sidewalk (or space for planned or potential transit stop facilities) on all Complete Streets that are more than 60' wide or are four or more travel lanes.



Dedicated pedestrian facility. Photo credit: MAG.

## 6.2 Sample Outcome for a High Density/High Intensity Area in an Urban Context

### STEP 1. ASSESS CURRENT CONDITIONS CONTEXT/LAND USE CHARACTER

The streets in these MAG region examples are located in contexts that include high intensity community retail and/or urban downtown uses. Generally, development in these areas is pedestrian-oriented; parking is on-street or in congregate parking areas. In all these example areas, a mix of retail, commercial, and residential/retail uses are located along the entire street front. All of the areas are highly accessible by transit, pedestrians, and automobiles. While these areas are a destination for high volumes of traffic, they do not support high volumes of through traffic and the widest streets usually carry less than 30,000 vehicles per day.

#### Existing Transportation Modes

The predominant existing transportation mode within all of these example areas is pedestrian. On-street parking provides a buffer between pedestrians and traffic. Generally, sidewalks are shaded. In some cases, benches and other pedestrian amenities are provided. In these areas, there are generally few bicycle lanes, although facilities for bicycle storage (e.g., bicycle racks) are available at some locations. The sidewalk is generally not wide enough for shared use by bicycles and pedestrians. Generally, intersections do not provide turn bays. There are no refuges



*Downtown Scottsdale.*

for the pedestrian once they leave the sidewalk to cross the street. Left turns are signaled to maximize traffic flow.

### STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

#### Identify Complete Streets Gaps

For these examples to be considered as Complete Streets, transit, pedestrian, and bicycle facilities are needed. Pedestrian facilities should include wide sidewalks, shade, and directional signs. Bicycle facilities should include bike lanes, lockers, and racks. Transit facilities should include transit stop with shade, signs, and benches.

#### Other Priorities

The region's downtowns are important in terms of employment, community identity, and the

sales tax they generate. A Complete Street in this context should contribute to enhancing access and mobility within this context. Also within this context, a complete street should enhance the attractiveness of the area so the area continues as a desirable destination. Because these types of areas are challenged by the effects of urban heat islands, a Green Streets approach is a priority. Finally, because these areas are designed to be residential as well as commercial, a healthy communities approach is desired to enhance quality of life within them.

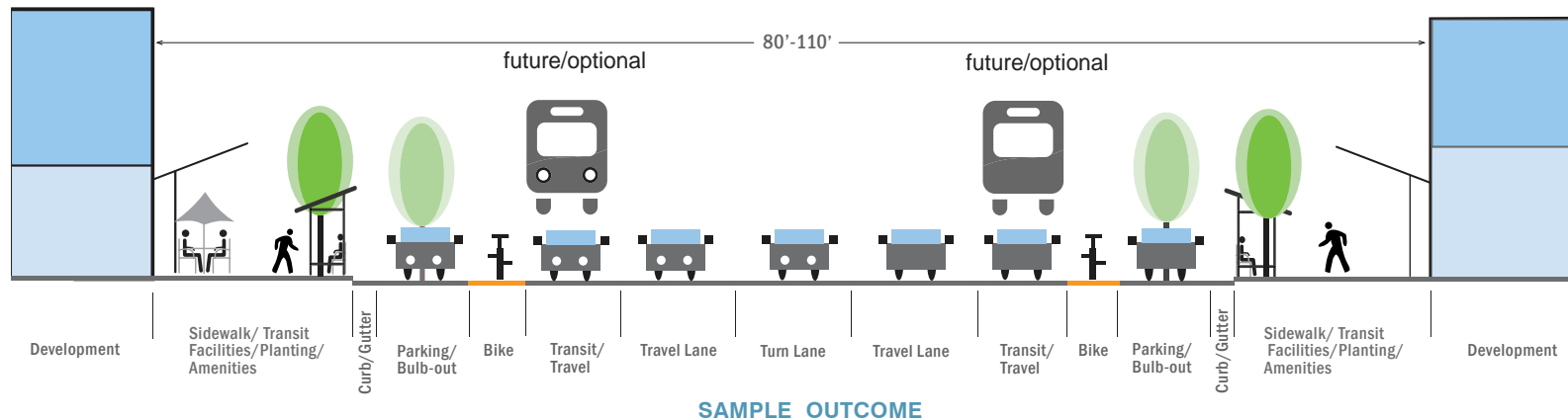
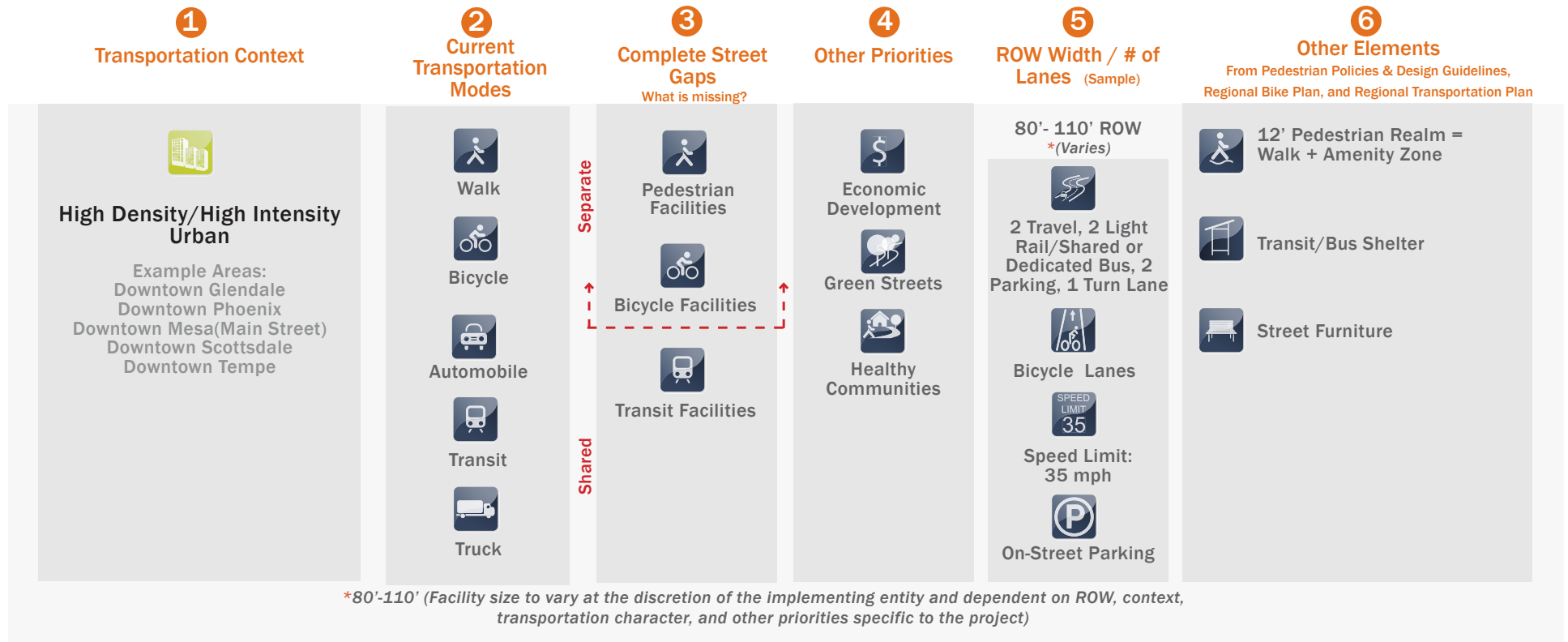
#### Economic Development

Ingress and egress remain important in these areas. As a result, two through lanes and a center turn lane were maintained. Also key to the economic vitality of a successful downtown, urban environment, is a vital and comfortable pedestrian area. Consequently, a priority was placed on maintaining a wide sidewalk that would allow for dining, outdoor displays, performance artists, and other street side activity.

#### Green Streets

To achieve this priority, it was determined that trees would be used to provide opportunities for filtration, storm water retention, and to contribute to reducing the urban heat island effect. In this case, tree grates are used to maintain the widest effective sidewalk width and allow for rainwater infiltration.

**Figure 3. Complete Street Planning Process Diagram: High Density/High Intensity—Urban Context**



## Healthy Communities

Enhanced pedestrian areas will encourage walking and increase physical activity. The bike lane provides some opportunity for enhanced safety and improved bicycle mobility for long distance commuters and bicyclists who arrive at these destination on bicycle-friendly transit. In urban environments such as these, bicycles could also share a wide outside lane with vehicles and buses.

## Right-of-Way Width/Number of Lanes

Within the MAG region, the right-of-way for main streets within these areas ranges from 110' to 140'. Other rights-of-way within these areas are typically 60' to 80' wide.

## Bicycle

A five foot striped bicycle lane was selected for this street. To provide some additional separation from traffic, a 12' outside lane was also provided.

## Vehicular

This urban context sample outcome recognizes that streets in these areas provide access to parking and central destinations. Because large volumes of through traffic are generally not an issue in these types of urban environments, interior vehicle travel lanes were narrowed to 11' to provide facilities for on-street bicycle lanes, transit, and pedestrians. A 12' outside travel lane is used to provide space for a shared transit (bus) and vehicle lane. Parking is used to provide a separation between vehicles and pedestrians. Medians are used to limit mid-block and other left turn movements enhancing traffic movement and level of service. If additional lanes

are needed, this option could be modified to eliminate parking, and provide two 11' lanes and a wide 14' outside shared bus, vehicle and bicycle lane. See [Pedestrian and Bicycle Information Center \(PBIC\)](#) for more information about shared vehicular and bicycle lanes.

## Transit

Transit access is via a 12' outside lane shared with vehicles. Transit facilities, such as a bus shelter and benches, are provided in the pedestrian realm at all bus stops. While these facilities periodically reduce the effective width of the sidewalk by approximately four feet, they can be provided without significantly impacting the pedestrian travel environment.

## Truck

Trucks in these areas can be accommodated in an 11' lane. Curb lanes next to bicycle lanes may be a minimum of 10' wide.

## Complete Street Elements

### Pedestrian

Safety and comfort are key to a successful urban pedestrian environment. While the decision to include a separate bicycle facility in these areas impacted the sidewalk width to some degree, a 12' pedestrian realm was provided. This width enables a wide clear zone while providing room for transit facilities and pedestrian amenities such as shade. This wider sidewalk width also provides opportunities for outdoor dining and other urban experiences. Additional buffering of the sidewalk from the street was accomplished with an 8' parking lane interspersed with street trees. The parking lane was also important to the



*Raised planters provide seating along this downtown Tempe Street. Photo credit: docKaos' photostream.*



*In downtown Glendale, local circulators, on street/ shared bicycle facilities, and a high quality pedestrian environment make the street complete. Photo credit: Coffman Studio.*



economic viability of the area and contributes to the pedestrian environment by reducing the effective distance to cross the street at intersections. Using the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment, this street provides a level of service of C (average).

### **Complete Street Design Techniques Provided by this Example**

- Provide on all Complete Streets, dedicated pedestrian facilities, in accordance with the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment Level of Service C or better.
- Provide sidewalks in accordance with the MAG Pedestrian Policies and Design Guidelines and that are a minimum of eight feet wide on all Complete Streets that are more than five lanes or 70' wide.
- Provide dedicated bicycle-only facilities, in accordance with the adopted MAG Regional Bikeway Master Plan, on all Complete Streets with a width of 60' or greater, or on all Complete Streets with more than three, striped, vehicular travel lanes, or on a Complete Street with outside vehicular travel lanes that are less than 14' wide, and posted speed of 25 mph.
- Promote Complete Streets as part of a Healthy Community.
- Provide a shared transit/vehicular travel lane on all Complete Streets that are more than 60' wide or four or more travel lanes.



*Bus Stops, such as this one at McClintock and Guadalupe Road in Tempe, include bike racks for those who ride to the bus. Photo credit: PLAN\*et.*

- Within High Intensity/High Density areas, Complete Streets should accomplish a level of service (LOS) of E or better (assumed).
- Provide shade and seating and ideally transit shelters on the sidewalk (or space for planned or potential transit stop facilities) on all Complete Streets that are more than 60' wide or are four or more travel lanes.

## 6.3 Sample Outcome for a Low Density/Medium to Low Intensity Area in a Suburban Context

### STEP 1. ASSESS CURRENT CONDITIONS CONTEXT/LAND USE CHARACTER

These example streets are located in medium to low intensity neighborhoods with multi-family and higher density residential and neighborhood retail development. Generally, development in these MAG region areas is post-war or post-war style. Parking areas are generally located between the development and the street, or in the back of the development. These areas may or may not be accessible by transit. They are within walking distance of single and/or multi-family residential development. These areas generally experience traffic volumes of less than 20,000 vehicles per day. In the MAG region, these streets generally offer few pedestrian accommodations and may or may not include on-street bicycle lanes or transit facilities.

#### Current Transportation Modes

In these example areas, the predominant existing transportation character is automobile. Sidewalks are generally attached to the curb with little or no buffering, shade, or amenities and are often not wide enough for shared use by bicycles and pedestrians or for two people to walk side by side. Transit facilities are generally not present even when transit service is offered. In these areas, there are generally few bicycle lanes and no bicycle storage. The roadway does not include right turn bays and left turns are



16th Street and Bethany Home Road, Phoenix.  
Photo credit: PLAN\*et.



Central Avenue and Hatcher Road, Phoenix.  
Photo credit: PLAN\*et.

generally from a center turn lane or inside lane. There are no refuges for pedestrians once they leave the sidewalk to cross the street. Sometimes, turn arrows are provided to maximize traffic flow.

### STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

#### Identify Complete Streets Gaps

For these examples to be considered as Complete Streets, transit, and bicycle facilities and improvements to pedestrian facilities are needed.

#### Other Priorities

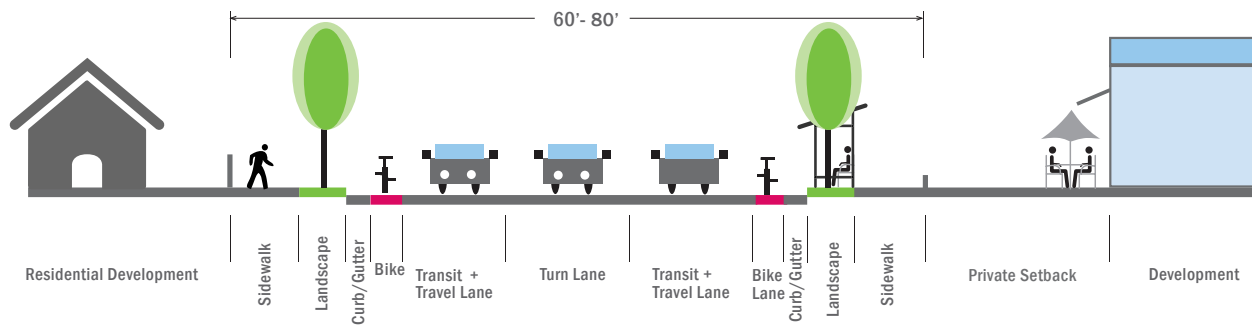
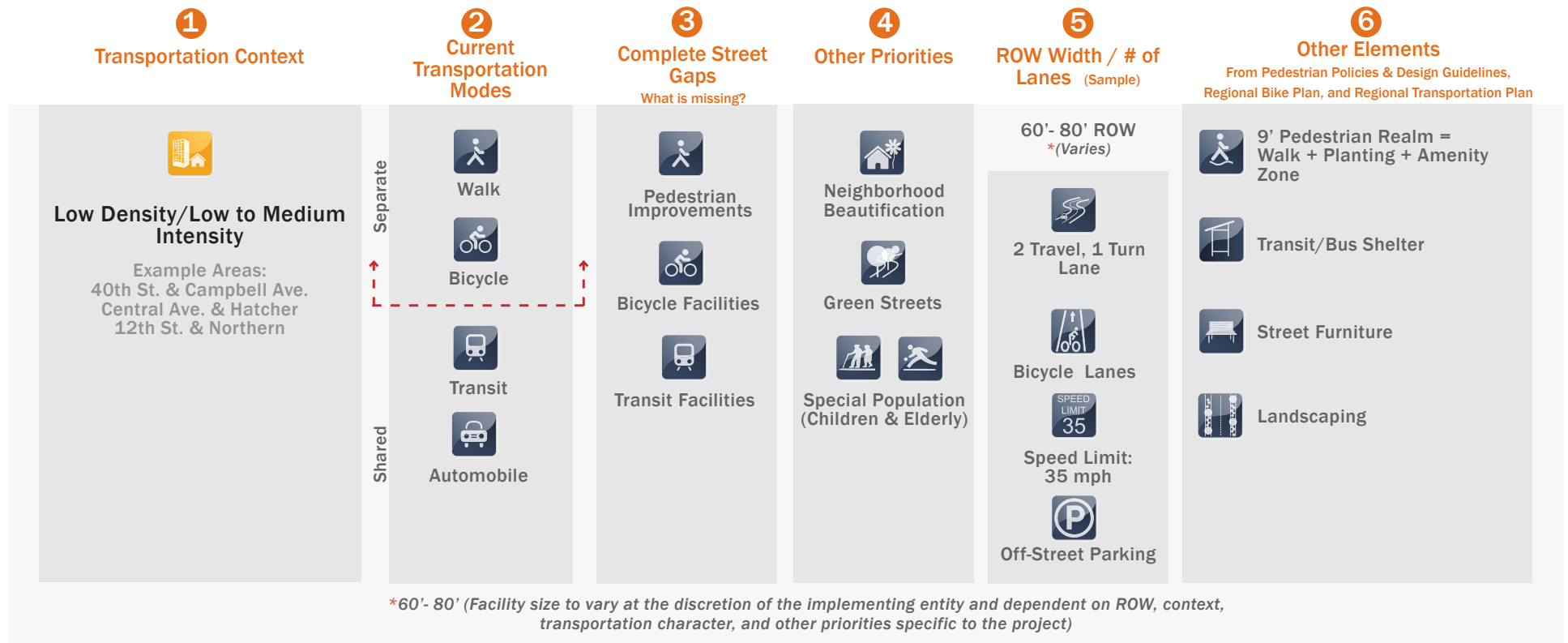
#### Neighborhood Beautification

Sometimes, streets and the development along them provide a window or gateway into a neighborhood. Many times, streets in these areas are the locus of the neighborhood transit stop and provide opportunities for local services and retail to cluster at a convenient location accessible to residents by foot and/or bicycle. Because these areas are representative of the neighborhood, landscaping is an important element of a Complete Street. In this instance, street trees and other plants or public art set within the landscape area or sidewalk could establish or reflect the character of the surrounding neighborhoods.

#### Green Streets

To accomplish this priority, landscaped areas offer a permeable surface to capture storm water and increase groundwater filtration, as well as provide a location for vegetation that shades the sidewalk and reduces the urban heat island effect.

**Figure 4. Complete Street Planning Process Diagram: Low Density/Low to Medium Intensity—Suburban Context**



**SAMPLE OUTCOME**

To increase the width of the sidewalk, tree grates could be used (although these would reduce the green street benefits). While trees in grates would not be as effective as a landscaped area, they could provide some filtration and shade.

### Special Populations

Local commercial areas provide a walkable and bikeable destination within a neighborhood. As a result, these areas provide an opportunity to enhance access to services desired by nearby residents and to provide above average bicycle, transit, and pedestrian facilities for special populations (such as the elderly, youth, and children) that may be more dependent on walking, bicycles, or transit.

### Right-of-Way Width/Number of Lanes

The narrowest width for these types of streets within the MAG region is 60' and the right-of-way for streets within these areas generally ranges from 60' to 80'. In some cases, these areas include streets that range from 80' to 110' wide.

### Bicycle

A four foot striped bicycle lane adjacent to an 18" gutter was selected for this street. This provides a total width of 5.5' for the bike lane.

### Vehicular

This Sample Outcome recognizes that streets in these areas carry lower (less than 20,000 Vehicles Per Day) volumes of traffic and provide access to neighborhood services and residential areas. Because large volumes of through traffic are generally not an issue in these types of contexts,

vehicle travel lanes were narrowed to 10' to provide or improve facilities for on-street bicycle lanes, transit, and pedestrians. Because the street is narrow, no medians are provided.

### Transit

Neighborhood circulator transit access is via a 10' lane shared with vehicles. Transit facilities, such as a bus shelter and benches, are provided curbside by replacing the landscape area with sidewalk and transit facilities at transit stops. While these facilities periodically may reduce the effective width of the sidewalk by approximately one foot and eliminate some planting area, they are necessary to a Complete Street and can be provided without significantly impacting the pedestrian travel environment.

### Complete Street Elements

#### Pedestrian

While the decision to include a separate bicycle facility in these areas impacted the sidewalk width to some degree, a five foot wide sidewalk, separated from the curb by a four foot planting area is provided. The five foot sidewalk is less than the minimum recommended by the MAG Pedestrian Policies and Design Guidelines. This narrower sidewalk width, however, allows for other important pedestrian amenities such as a planting area that can provide shade trees and a buffer from the roadway. Using the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment, this street provides a Roadside Pedestrian Condition of B (comfortable).

### Complete Street Design Techniques Provided by this Example

- Provide dedicated pedestrian facilities on all Complete Streets, in accordance with the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment Level of Service C or better.
- Provide dedicated bicycle-only facilities, in accordance with the adopted MAG Regional Bikeway Master Plan, on all Complete Streets with a width of 60' or greater, or on all Complete Streets with more than three, striped, vehicular travel lanes, or on a Complete Street with outside vehicular travel lanes that are less than 14' wide.
- Provide neighborhood circulator or appropriate transit stops and sidewalk waiting areas (or room for planned or potential facilities) on all Complete Streets with fewer than four travel lanes.



Tempe's West 5th Street is one of the region's first Complete Streets. It includes many innovations such as bulb outs, speed tables, widened sidewalks, bike channels, and bus stops for Tempe's Orbit circulator. Photo credit: Coffman Studio.

## 6.4 Sample Outcome for a Low to Medium Density/Low Intensity Area in a Predominantly Residential Context

### STEP 1. ASSESS CURRENT CONDITIONS

#### Context/Land Use Character

The streets in these examples are located in contexts with a range of primarily medium to high residential density uses. Generally, development in these MAG region areas is adjacent to commercial areas or at the periphery of downtown urban areas. Parking is either on-street or in private parking areas maintained by each housing development. These areas are generally accessible by transit and within walking distance of some neighborhood services. Streets generally experience traffic volumes of less than 20,000 vehicles per day. In the MAG region, these streets generally offer minimal pedestrian accommodations and may or may not include on-street bicycle lanes or transit.

#### Current Transportation Modes

The predominant existing transportation character is automobile. Rights-of-way for streets in these areas are generally a minimum of 64' wide, and right-of-way ranges from 60' to 80' wide. Sidewalks are generally attached to the curb with little or no buffering, shade, or amenities. Transit facilities are generally not present even when transit service is offered. In these areas, there are generally few bicycle lanes and no bicycle storage. The sidewalk is generally not wide enough for shared use by bicycles and pedestrians. The roadway does not include



Peoria Avenue and 10th Street in Phoenix. Photo credit: PLAN\*et.

right turn bays and left turns are typically made from a center turn lane or inside lane. There are no refuges for pedestrians once they leave the sidewalk to cross the street.

### STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

#### Identify Complete Streets Gaps

For these examples to be considered as Complete Streets, transit and bicycle facilities and improvements to pedestrian facilities are needed.

#### Other Priorities

#### Neighborhood Beautification

Sometimes, streets and adjacent development provide a window or gateway into a

neighborhood. In many cases, streets are representative of the neighborhood. In this case, sidewalk landscape was considered an important element of neighborhood character. Consequently, this example outcome includes a landscaped median to provide space for a historic landscape palette and street lights to enhance the historic character of the surrounding neighborhoods.

#### Historic Preservation

Some higher density areas include older, historic (or potentially historic) neighborhoods constructed when street cars operated (such as in Central Phoenix) or prior to the suburban expansion that followed World War II. Within these neighborhoods, landscape areas, street lights, unique curb material, specialty paving, and amenities add to the character of the area. In this example, landscape areas common to the pre-World War II "streetcar suburbs" were maintained to enhance the historic context.

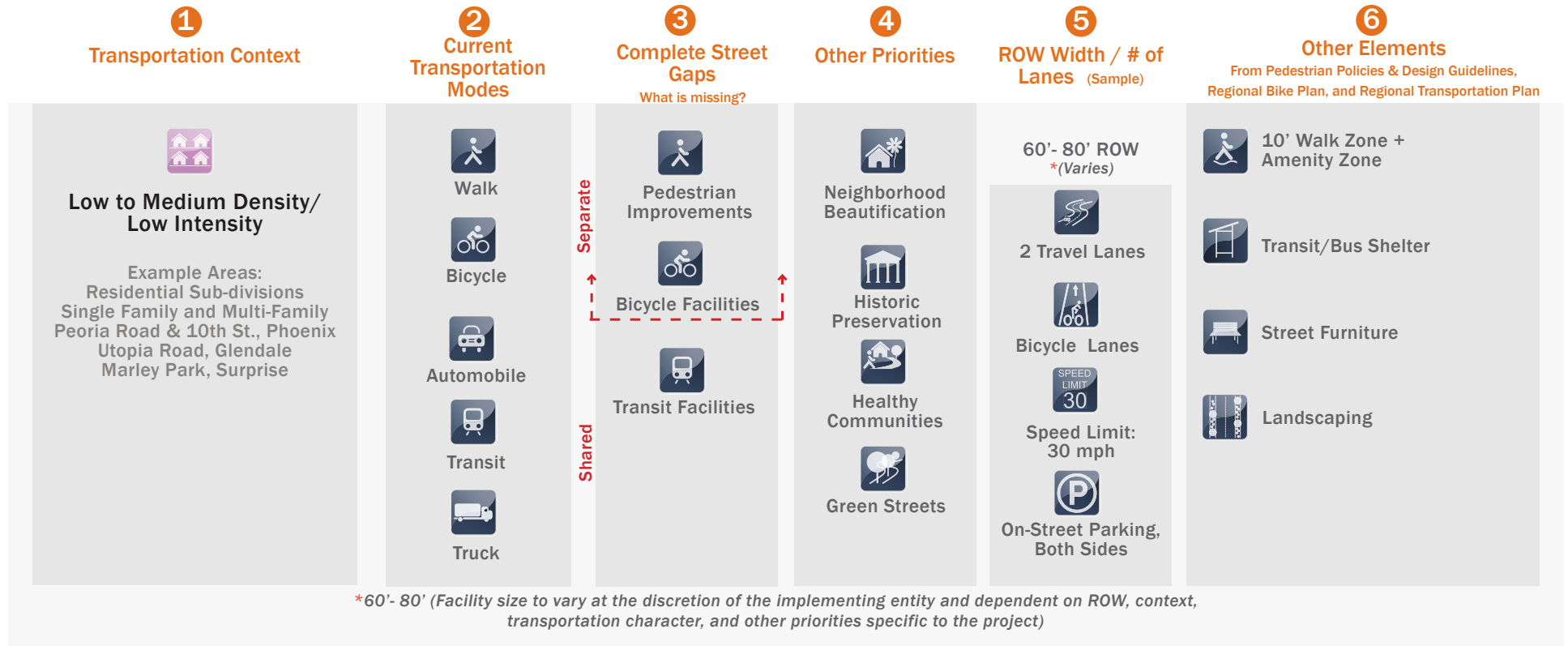
#### Healthy Communities

This item is accomplished through the provision of a five foot wide sidewalk separated from the street by a combination of parallel parking and street trees. The enhanced pedestrian environment encourages walking.

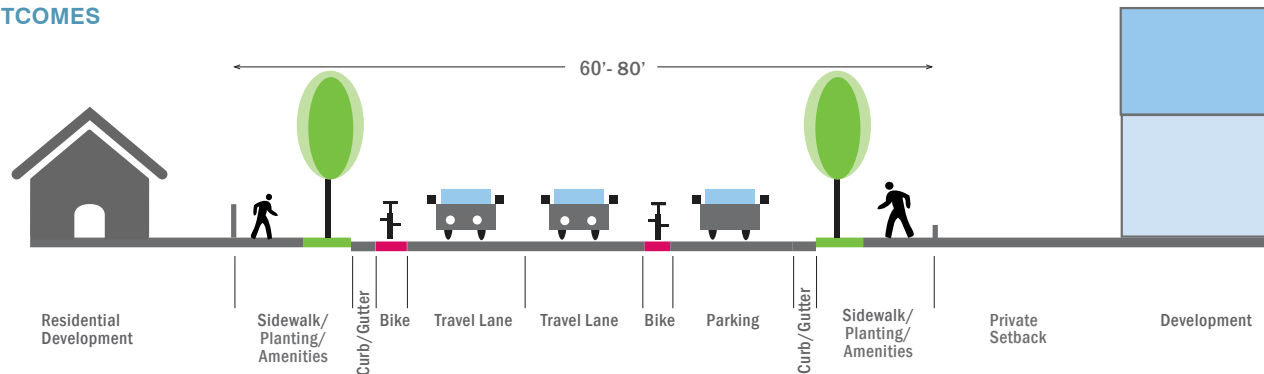
#### Green Streets

To accomplish this priority, landscaped areas are provided that offer a permeable surface to

**Figure 5. Low to Medium Density/Low Intensity—Predominantly Residential Context**



**SAMPLE OUTCOMES**



capture storm water and increase groundwater filtration, as well as a location for vegetation to provide shade and reduce the urban heat island effect. To increase the width of the sidewalk, tree grates could be used. While trees in grates would not be as effective as a landscaped area, they could provide some filtration and shade.

### Right-of-Way Width/Number of Lanes

The narrowest width for these types of streets within the MAG region is 64' and the right-of-way for streets within these areas generally ranges from 60' to 80'. In some cases, these areas include streets that range from 80' to 110' wide.

### Bicycle

Bicycles are accommodated in a 5' bike lane.

### Vehicular

This Sample Outcome recognizes that streets in these areas carry lower (less than 20,000 vehicles per day) volumes of traffic and provide access to neighborhood services and residential areas. In this context, to safely accommodate bicycles and vehicles in a shared lane, travel lanes are 14' wide. To maintain safety, speed limits are capped at 30 MPH, and no center turn lane is provided. Additionally, on-street parking helps to slow speeds. Because the street is narrow, no medians are provided.

### Transit

Current or future neighborhood circulator transit access is via a 14' lane shared with vehicles. Transit facilities, such as a bus shelter and benches can be provided curbside by replacing the landscape area with sidewalk and transit facilities at transit stops. While these

facilities periodically may reduce the effective width of the sidewalk by approximately one foot and eliminate some landscape area, they are necessary to a Complete Street and can be provided without significantly impacting the pedestrian travel environment.

## Complete Street Elements

### Pedestrian

A five foot wide sidewalk, separated from the curb by a five foot landscape area, was selected for this street. The five foot sidewalk is less than the minimum recommended by the MAG Pedestrian Policies and Design Guidelines. This narrower sidewalk width, however, allows for other important pedestrian amenities such as a five foot wide landscape area that can provide a historic context and planting area for trees that provide shade and a buffer from the roadway. Using the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment, this street provides a Roadside Pedestrian Condition of B (comfortable).

## Complete Street Design Techniques Provided by this Example

- Provide dedicated pedestrian facilities on all Complete Streets, in accordance with the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment Level of Service C or better.
- Provide neighborhood circulator or transit stops and sidewalk waiting areas (or room for planned or potential facilities) on Complete Streets when appropriate.



Glendale Utopia Road. Photo credit: Coffman Studio.



Scottsdale uses local circulators and bike lanes in low to medium density neighborhoods to make their collector streets complete. Photo credit: Coffman Studio.



The 12th St. neighborhood in Phoenix includes bike lanes, a bus stop, shared vehicular/bus lanes, and a turn lane in this mixed density residential neighborhood. Photo: PLAN\*et.

## 6.5 Sample Outcome for a Low Density/Low Intensity Area in a Single Family Internal Neighborhood Context

### STEP 1. ASSESS CURRENT CONDITIONS

#### Context/Land Use Character

The streets in these examples are located in single family residential neighborhoods. They provide access to community or regional streets, parks, and schools. Parking in these areas is either on-street or in driveways. These areas are not generally accessible by transit. They are generally within walking distance of neighborhood amenities such as parks. Streets in these areas generally experience very low traffic volumes. In the MAG region, these streets generally offer minimal pedestrian accommodations and do not include on-street bicycle lanes or transit facilities.

#### Current Transportation Modes

In these example areas, the predominant existing transportation character is automobile. Sidewalks are generally attached to the curb with little or no buffering, shade or amenities. Right-of-way in these areas range from 50' to 60' wide. Transit facilities or service are usually not present. The sidewalk is typically not wide enough for shared use by bicycles and pedestrians. The roadway does not include right turn bays or left turn lanes. There are no refuges for pedestrians once they leave the sidewalk to cross the street. Some neighborhood circulators may be routed nearby.



*Longmore Road and Linder Avenue, Mesa. Photo credit: City of Mesa*

### STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

#### Identify Complete Streets Gap

Internal neighborhood streets are used by vehicles and the people who live along them. In many cases, those too young or old to drive use these streets to access neighbors, and to walk to transit, parks, or schools. For these examples to be considered as a Complete Street, adequate space on the sidewalk or the roadway for people to bike or walk is needed.

#### Other Priorities

##### Neighborhood Beautification

Sometimes, streets and the development along them provide a window or gateway into a neighborhood. Because these areas are typical of the neighborhood, landscape was considered an important element of a Complete Street. In this instance, sidewalks are set back from the curb allowing street trees to shade pedestrian, bicyclists, and vehicles, while also enhancing and unifying the street landscape and the overall neighborhood.

##### Healthy Communities

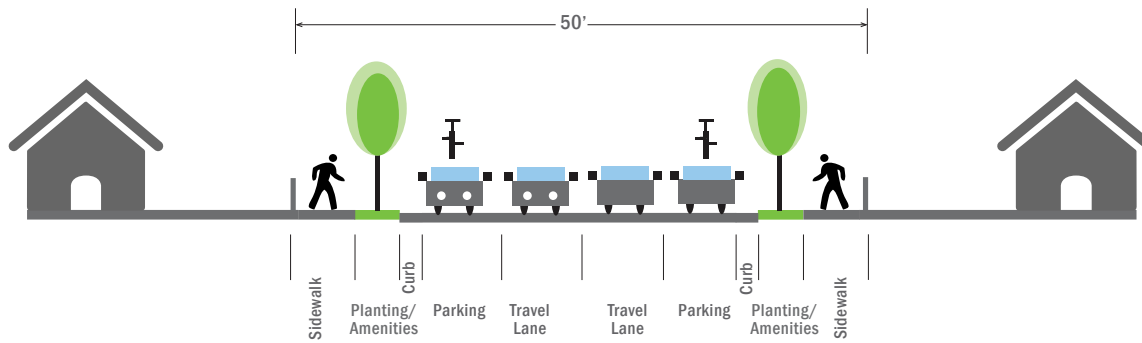
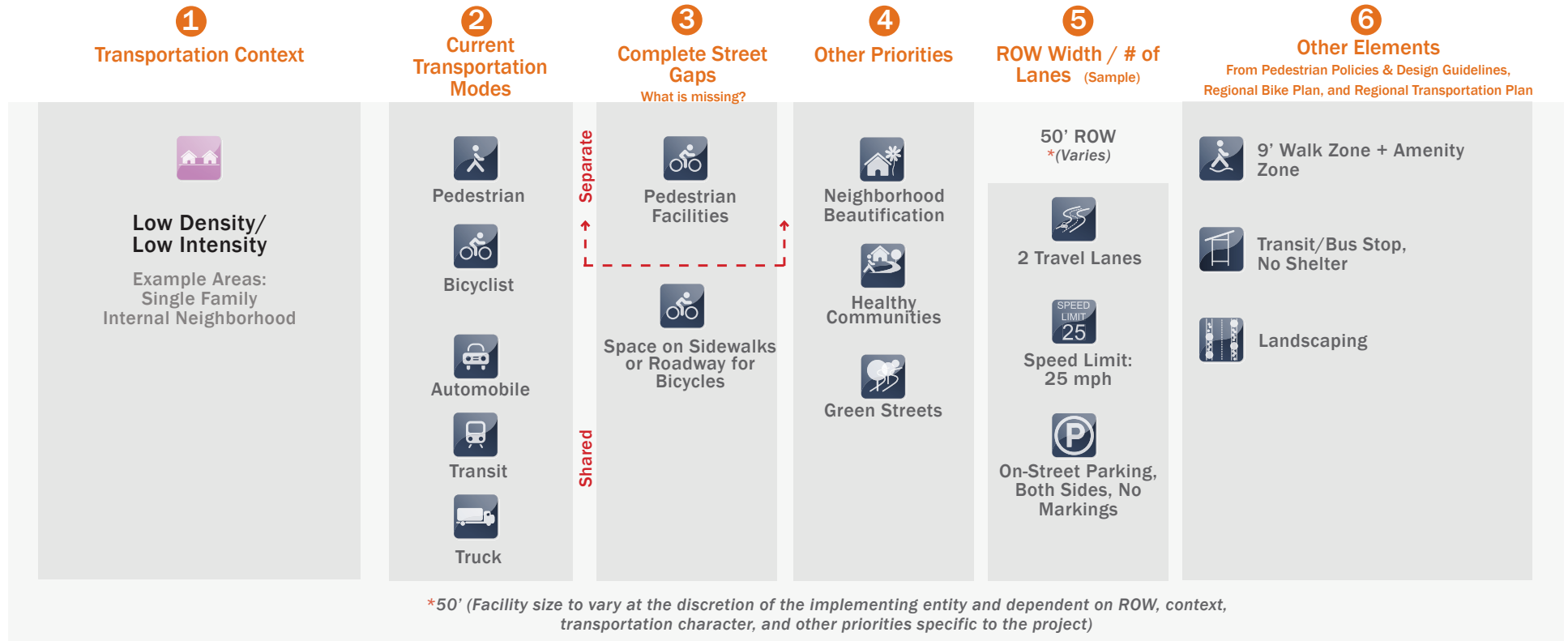
These examples provide opportunities for improved bicycling and walking environments that link neighborhood destinations and thereby help increase overall daily physical activity.

##### Green Streets

To accomplish this priority, landscaped areas are provided that offer a permeable surface to capture storm water and increase groundwater filtration, as well as a location for shade trees to help reduce the urban heat island effect. Permeable sidewalk pavement could reduce runoff even more.



**Figure 6. Low Density/Low Intensity—Single Family Internal Neighborhood Context**



**SAMPLE OUTCOME**

## Right-of-Way Width/Number of Lanes

The narrowest width for these types of streets within the MAG region is 50' and the right-of-way for streets generally ranges from 50' to 60'.

### Bicycle

Bicycles are accommodated in a shared, unstriped 28' wide roadway. It is recommended that this approach be used when average daily traffic is less than 5,000 vehicles per day.

### Vehicular

This sample outcome recognizes that streets in these areas carry lower (less than 5,000 vehicles per day) volumes of traffic and provide access to neighborhood services and individual residences. In this context, an unstriped 28' roadway is provided that accommodates on-street parking, bicycles, and vehicle travel. To maintain safety, speeds are capped at 25 MPH. Additionally, on-street parking and the lack of striping helps to slow speeds. Because the street is narrow, no medians are provided.

### Transit

Transit facilities are not provided on this street. However, the potential for transit is provided via the four foot wide landscape area, which could be replaced with benches or a shelter for a neighborhood circulator stop, if desired.

## Complete Street Elements

### Pedestrian

A five foot wide sidewalk, separated from the curb by a four foot landscape area is provided.

The five foot sidewalk is less than the minimum recommended by the *MAG Pedestrian Policies and Design Guidelines* but is considered acceptable due to the low traffic volumes on this street. Using the adopted *MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment*, this street provides a Roadside Pedestrian Condition of B (comfortable).

## Complete Street Design Techniques Provided by this Example

- Provide dedicated pedestrian facilities on all Complete Streets, in accordance with the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment Level of Service C or better.
- Provide neighborhood circulator or appropriate transit stops and sidewalk waiting areas (or room for planned or potential facilities) where appropriate.



*Bike lanes and a sidewalk on one side of the street help to keep this Scottsdale neighborhood's rural character while providing for multiple travel modes. Photo credit: Coffman Studio.*



*A sidewalk, separated from the roadway makes the pedestrian environment in the Catlin Court neighborhood attractive. Photo credit: Brandon Forrey.*

## 6.6 Sample Outcome for a Low Density/Low Intensity Area in a Warehouse District, Office Park, Campus, or Commercial/Industrial Context

### STEP 1. ASSESS CURRENT CONDITIONS CONTEXT/LAND USE CHARACTER

The streets in these examples are located in single use industrial areas or office parks. They provide access to employment, goods, and services. Parking is either on-street or in parking lots. They are not typically within walking distance of neighborhood amenities such as parks. Streets in these areas usually experience very low vehicular traffic volumes (less than 15,000 vehicles per day) with a higher percentage of commercial truck traffic than other areas. In the MAG region, these streets generally offer minimal pedestrian accommodations and do not include on-street bicycle lanes or transit facilities.

#### Current Transportation Modes

In these example areas, the predominant existing transportation character is automobile. Sidewalks are generally attached to the curb with little or no buffering, shade or amenities. Right-of-way in these areas range from 50' to 80' wide. Transit facilities or service are typically not present. The sidewalk is usually not wide enough for shared use by bicycles and pedestrians. The roadway does not include right turn bays or left turns lanes, but includes a center turn lane. There are no refuges for pedestrians once they leave the sidewalk to cross the street.



Commerce Park, Phoenix Arizona. Photo credit: Carlson Real Estate.



Community College, Glendale Arizona. Photo credit: Carlson Real Estate.

### STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

#### Complete Street Gaps

These streets provide access for employees and the delivery of goods and services. In many cases, employees in these areas use transit or bicycles to commute to and from work. For these examples to be considered as Complete Streets, improved or additional bicycle and pedestrian facilities are needed.

#### Other Priorities

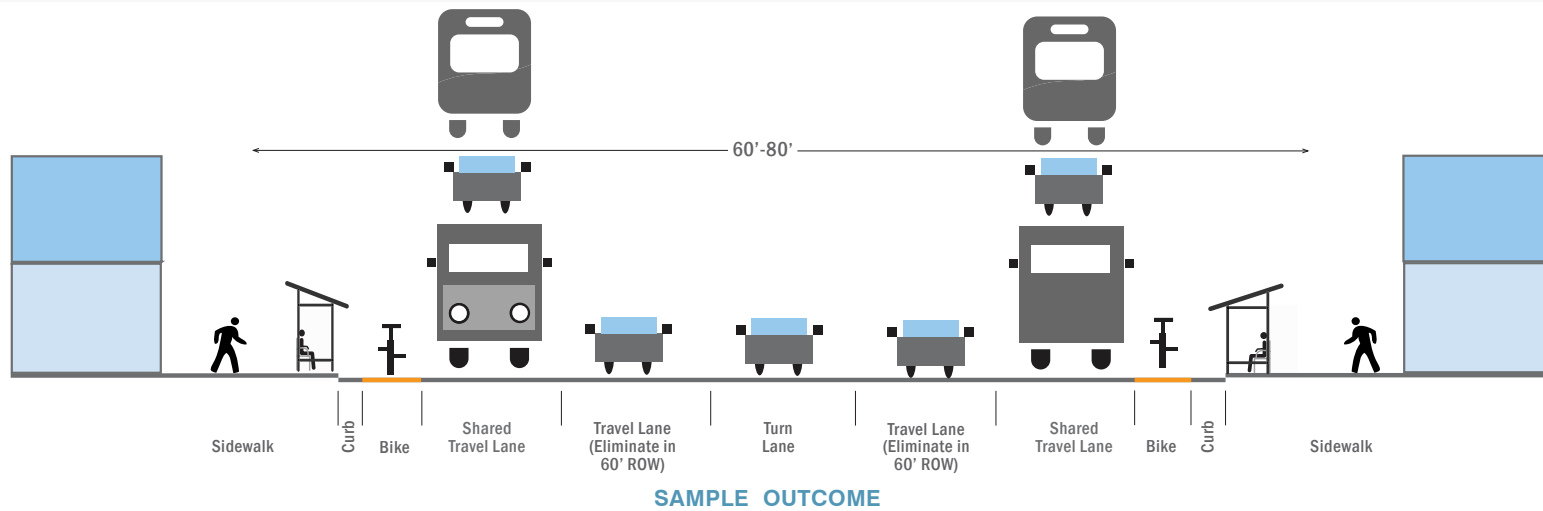
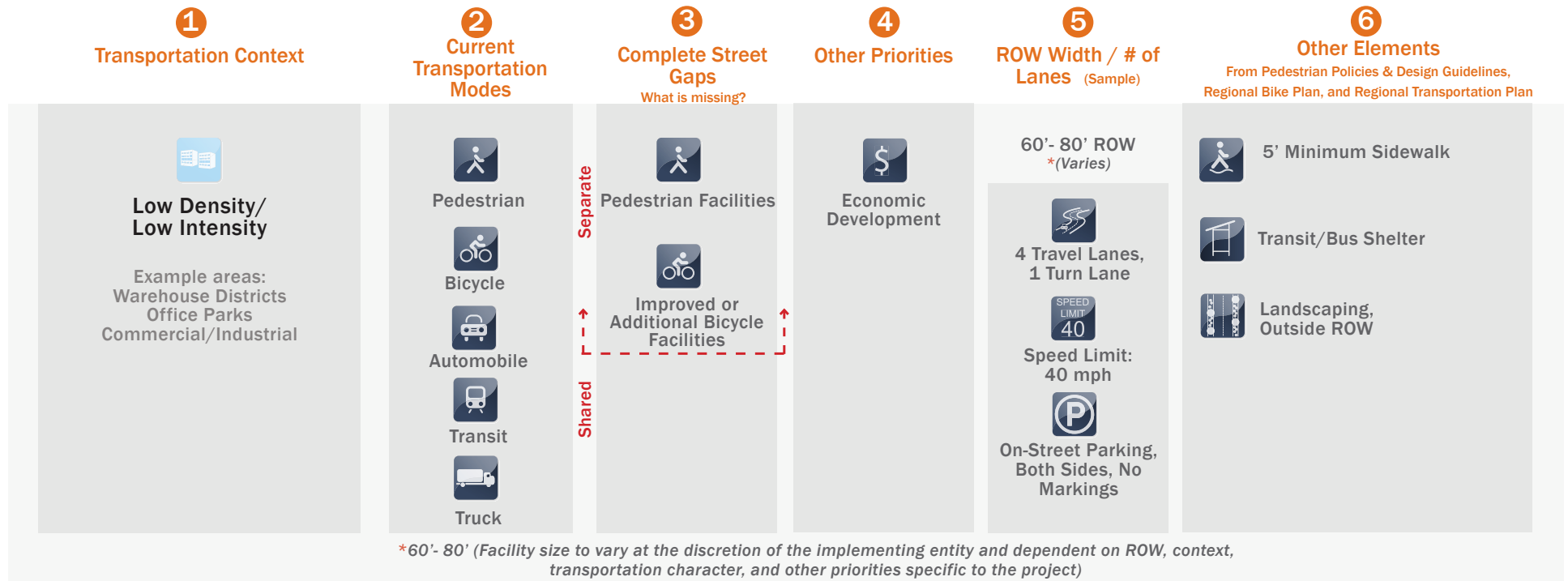
##### Economic Development

These areas must function for the economic activities within them. To address this priority, wide lanes to accommodate trucks and center turn lanes to ensure little or no congestion and maximum speed limits of 40 MPH are included in these streets.

#### ROW Width/Number of Lanes

The narrowest width for these types of streets within the MAG region is 50' and the right-of-way for streets within these areas generally ranges from 50' to 80'.

**Figure 7. Complete Street Planning Process Diagram: Low Density/Low Intensity—Warehouse Districts, Office Parks, Campuses, or Commercial/Industrial Context**



## Bicycle

Bicycles can be accommodated in a separate five foot wide, striped bicycle lane to help buffer bicycle traffic from trucks.

## Vehicular

In this context, one 12' wide turn lane and two, 11' wide exterior travel lanes for trucks, buses and vehicles are selected. A 12' wide center turn lane helps to reduce congestion that may result from left turns. Speeds are capped at 40 MPH.

## Transit

Transit stops should be provided within the sidewalk areas on this street. To enhance the pedestrian environment, the center turn lane could be removed to create space for a four foot landscaped/transit stop facility between the curb and sidewalk, and the interior vehicle travel lanes should be at least 11' wide.

## Truck

Minimum 11' lane width, except curb lanes next to bike lanes may be minimum 10' wide.

## Complete Street Elements

### Pedestrian

A 6' wide sidewalk was selected for this sample outcome. In many of these areas, private landscaping is assumed to provide shade and contribute to the pedestrian environment. The six foot sidewalk is less than the minimum recommended by the MAG Pedestrian Policies and Design Guidelines.

However, it is buffered to some extent from vehicular traffic by the bicycle lane. Using

the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment, this street provides a Roadside Pedestrian Condition of C (safe). If no landscaping is provided on private land, this sample outcome could result in a Roadside Pedestrian Condition of D (below average) and consequently, would not meet the requirements of a Complete Street because pedestrians are not accommodated on a par with other travel modes.

### Complete Street Design Techniques Provided by this Example

- Provide dedicated pedestrian facilities on all Complete Streets, in accordance with the adopted MAG Pedestrian Policies and Design Guidelines Roadside Pedestrian Condition Assessment Level of Service C or better.
- Provide dedicated bicycle-only facilities, in accordance with the adopted MAG Regional Bikeway Master Plan, on all Complete Streets with a width of 60' or greater, or on all Complete Streets with more than three, striped, vehicular travel lanes with outside lanes that are less than 14' wide.
- Provide a shared transit/vehicular travel lane on all complete streets that are more than 60' wide or are four or more vehicular travel lanes.
- Provide transit stop facilities on the sidewalk (or space for planned or potential transit stop facilities) on all Complete Streets that are more than 60' wide or are four or more travel lanes.



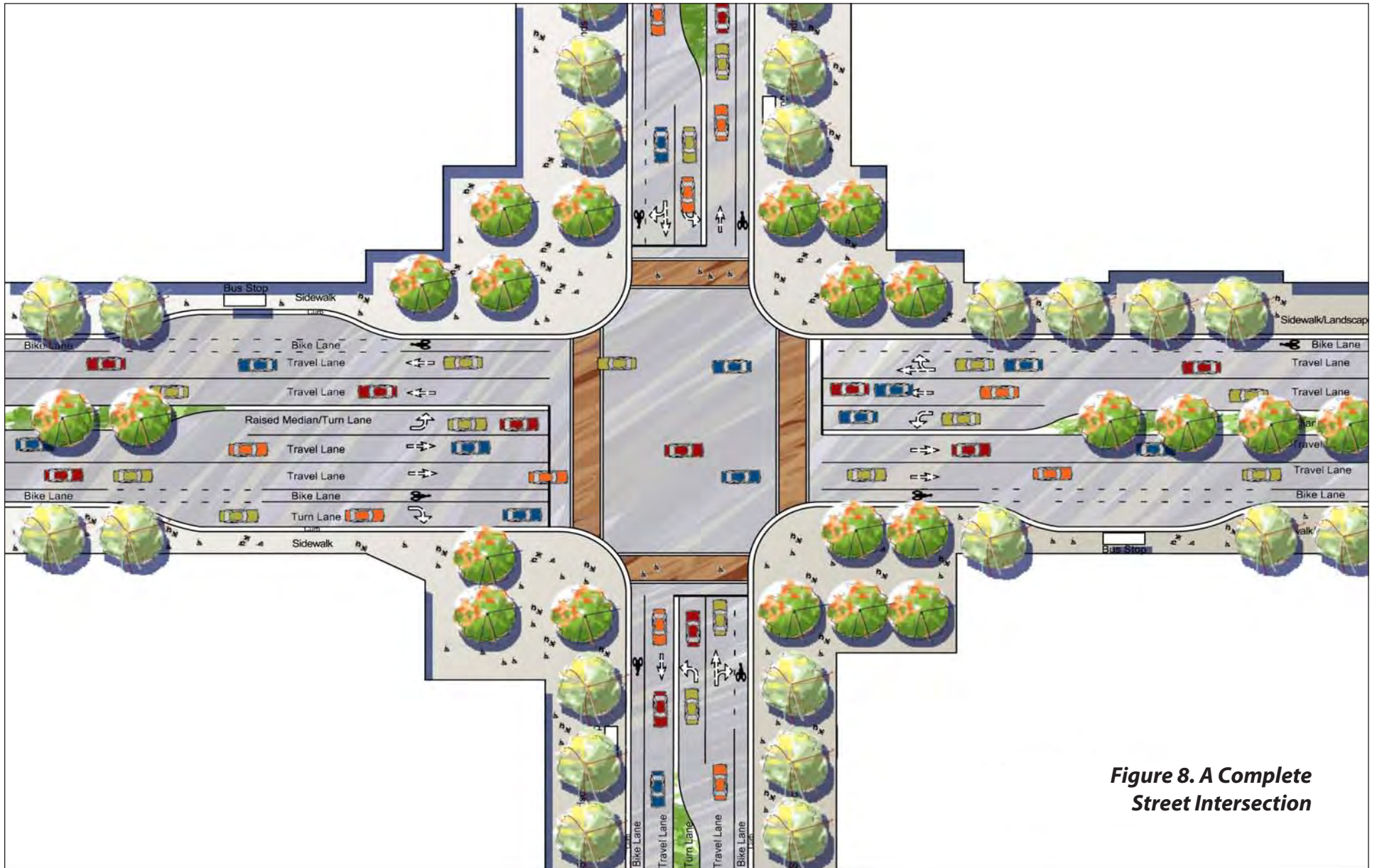
*Litchfield Road in Goodyear incorporates Complete Streets elements with a mid-block pedestrian crossing, pedestrian signals, and a refuge to access this important employment center. Photo credit: Coffman Studio.*



*52nd Street in a Tempe office/warehouse district is complete with bus service, sidewalks, and a bike lane. Photo credit: Coffman Studio.*



# 7. INTERSECTIONS



**Figure 8. A Complete Street Intersection**

# 7. INTERSECTIONS

## INTRODUCTION

Maintaining Complete Streets facilities through intersections is important to maintaining safety and mobility. Intersections often pose unique challenges with regard to the provision of bicycle and pedestrian facilities because they accommodate higher volumes of left and right turns, and through traffic in all directions.

## STEP 1. ASSESS CURRENT CONDITIONS

### Context

Intersections within the MAG region vary widely and include a variety of land uses. In many locations throughout our region, residential developments are walled. Access and egress points are primarily designed for vehicles and include sidewalks or/and bicycle facilities. Often, access to a wide road is placed 1/4 or 1/2 mile from a signal, which substantially increases the distance a bicyclist or pedestrian must travel to safely cross the street at the point they exit a subdivision.

Often, in suburban areas, service retail uses, such as a grocery store, dry cleaners, or restaurants are in shopping areas located at signalized intersections. Because access to many residential areas is 1/4 to 1/2 mile from these retail intersections, the distance a pedestrian or cyclist must travel to reach and return from the retail center is substantially increased.

Key challenge areas within the MAG region exist at the intersections of streets with freeways or parkways. In many of these situations, bicycle facilities are eliminated and pedestrian facilities are reduced. In some cases, bicycle routes are routed to separate freeway or parkway intersection (or crossing) facilities.

### Current Transportation Modes

Intersections between all types of streets exist within the region. Generally, if a bicycle or pedestrian facility is provided on one of the intersecting streets, it is carried through the intersection. Bus stops are generally located on the far side of an intersection to minimize the disruption of the stop on vehicular traffic flow.

## STEP 2. WHAT IS NEEDED TO MAKE THIS STREET COMPLETE?

### Identify Complete Street Gaps

Throughout the MAG region, intersections pose challenges to pedestrians and cyclists. Generally, for an intersection to be a part of a Complete Street, it should provide facilities for all the modes that are accommodated within the street. In other words, a Complete Street should include a complete intersection.

### Complete Streets Elements

#### Bicycle

Bicycles should be accommodated in a separate five to seven foot wide bicycle lane. As shown in the Manual on Uniform Traffic Control Devices, bicycle lanes should be maintained on the left side of a dedicated right turn lane with a minimum width of four feet. If the right turn lane is not dedicated, the bicycle lane should remain adjacent to the curb or could be a shared bicycle vehicle lane.







Scottsdale uses a HAWK on Chaparral Road just east of 78th Street. Photo credit: City of Scottsdale.

### Crosswalks

Pedestrian crossings and vehicular stop lines should be placed at the edge of the curb radius and not more than 30' from the extension of the curb line. This allows the creation of a pedestrian refuge while maintaining a comfortable turn radius for larger vehicles. Facilities such as ramps, pedestrian signals, and detectable warnings should be provided at all crosswalks. Ramps should face into the crosswalk and separate ramps can be provided for each pedestrian crossing. Specific policies regarding crosswalks are located in the *MAG Pedestrian Policies and Design Guidelines*.

### Refuges

Pedestrian refuges are a proven strategy to enhance the safety of intersections and are supported by Federal policy. This guide recommends that if the *Manual on Uniform Traffic Control Devices* (MUTCD) guidelines for crossing times cannot be met by an intersection signal,

then a pedestrian refuge should be considered to enhance pedestrian safety and make the street complete. Additionally, in areas of high pedestrian volumes or special needs (e.g., urban areas, areas adjacent to schools, senior citizen centers, and parks), pedestrian refuges should also be considered to make the street complete.

The intersection crossing distance can be reduced through the use of center lane pedestrian refuges and diverter islands (if a free flow-right turn lane is permitted). Textural changes should also be provided to alert visually impaired pedestrians of the presence of a refuge. Wheelchair ramps should be placed on diverters. Specific policies regarding refuges are located in the *MAG Pedestrian Policies and Design Guidelines*.

### Sidewalks

Sidewalks should be wide and provide adequate areas and shade for pedestrians congregating at crosswalks. Specific policies regarding sidewalks are located in the *MAG Pedestrian Policies and Design Guidelines*.

### Signal Timing

Signal timing is important to intersection operation for vehicles and pedestrians. While faster signal times allow more vehicles to pass through an intersection, a longer signal cycle length provides a better crossing environment for the pedestrian. A variety of signal types that provide information to the pedestrian and increase pedestrian safety are also suggested. These include countdown, pedestrian audible, and push button signals. Specific policies regarding signal timing are located in the *MAG Pedestrian Policies and Design Guidelines*.

### Overpasses or Underpasses (e.g., bridges/tunnels)

Overpasses or underpasses should continue the same quality of facility through the crossing. For example, a six lane road with bicycle and pedestrian facilities that crosses a parkway or freeway should maintain the bicycle and pedestrian facilities through the crossing.

### Vehicular

Intersection functionality must be maintained. However there are a range of strategies that can be employed to reduce the number of dedicated and/or optional left and right turn lanes included in an intersection. These strategies include adopting time of day levels of service (e.g., lower levels of service are acceptable during rush or high volume times, such as special events) or time of day on-street parking (where parking lanes can become dedicated turn lanes during times of high traffic volumes).

### Transit

Transit facilities are provided within the sidewalk areas in a Complete Street. Since transfers are important elements of transit at intersections, pedestrian crossings should be close to transit stops.



# 8. PERFORMANCE MEASURES



*Phoenix 2nd Avenue Enhancement Project. Photo credit: MAG.*

# 8. PERFORMANCE MEASURES

## INTRODUCTION

The ability for MAG and its member agencies to effectively evaluate the successful implementation of Complete Streets is very important. Performance measures will help MAG and its member jurisdictions track the effectiveness of the *Complete Streets Guide* and the implementation of Complete Streets in the region. Performance measures are related to the goals and objectives in this Guide.

### FHWA “TOP NINE” Life - Saving Strategies:

- Road Safety Audits
- Rumble Strips and Rumble Stripes
- Median Barriers
- Safety Edge
- Roundabouts
- Left and Right Turn Lane at Stop-Controlled Intersections
- Walkways
- Medians
- Pedestrian Refuge Areas

*FHWA Safety Program, FHWA Urges Road Agencies to Consider “Top Nine” Life-Saving Strategies.*

*There are two types of performance measures:*

### Inventory Measures

Inventory Measures evaluate specific implementation of recommended improvements. For example, they may include the number of miles of bike lanes, the number of enhanced crossings with a pedestrian refuge, the number of pedestrian activated signalized crossings, the number of staggered crossings, the number of miles of wide (8'+) sidewalks, and the number of transit stops or stations. These Inventory Measures may also include the percentage increase in these improvements across a jurisdiction in a given year.

### Outcome Measures

On the other hand, Outcome Measures evaluate the effectiveness of Complete Streets in changing and shifting travel modes and thus reducing congestion and increasing air quality. As an example, Outcome Measures could assess reductions in crash rates and increases in bicycle, transit, or pedestrian travel on streets that have become Complete Streets.

This Guide recommends that specific Inventory and Outcome Measures will be determined by the modal committees, to enhance future iterations of the MAG Performance Measures Framework Study.



*Recording traffic counts before and after Complete Streets improvements can evaluate outcome measures.*

# 9. APPLYING THE GUIDE



*The City of Tempe provides mid-block crossings along many of its trails. This one, at the Western Canal, includes detectable warnings, a HAWK signal, and public art. Photo credit: PLAN\*et.*

# 9. APPLYING THE GUIDE

## INTRODUCTION

This Guide does not mandate the incorporation of complete streets guidelines, policies, and planning processes. It provides, however, an approach on how to make streets more complete while describing benefits and potential outcomes when a Complete Streets process is followed. There are several opportunities to apply this approach both to new construction and to retrofits.

### Adoption by MAG

Adoption of this Guide by the MAG Regional Council demonstrates that the regional planning agency supports and encourages voluntary implementation of this Guide throughout the region. In addition, adoption of the strategies in this Guide could result in enhancing opportunities for Complete Streets to be funded with transportation dollars allocated by MAG. Complete Streets could be a consideration in the ranking of projects for Federal funding. The MAG Standards and Specifications provide an opportunity for implementation of the Green Streets element of this Guide.

### Adoption by Jurisdiction

Each of MAG's member entities have their own street standards. Some jurisdictions include a Complete Streets policy as part of other

transportation plans. Adoption of this Guide by those entities would result in providing additional guidance to existing policies or in the incorporation of a Complete Streets policy into the existing transportation planning, zoning, and design practices of an individual jurisdiction or tribe.

### Adoption by ADOT

ADOT does not currently have an adopted Complete Streets policy. Adoption of this document by ADOT, for the MAG region, could result in the provision of Complete Streets along and across state roads within this region.

### Model Guidance

This guide could be used to provide guidance for the policy development, planning, design, and construction of a Complete Street for entities that do not wish to adopt this guide.

### The MAG Transportation Plan Prioritization Process

Entities that request monies through the MAG TIP and other Federal funding processes, for retrofit or construction of streets, may receive additional consideration for projects that are committed to planning, designing, and/or constructing in accordance with Complete Streets goals and the Complete Streets process.



*Citizen input and support is important to the design and implementation of Complete Streets. Photo credit: PLAN\*et.*

### The MAG Design Assistance Program

Extra consideration may be given through the MAG Design Process for those retrofit projects that are part of a documented Complete Streets process.

### Through Community Support

As transportation choices throughout the region continue to increase with light rail and additional bicycle and pedestrian facilities. As the context within which streets operate become more urban and walkable, people will continue to demand a full range of transportation options on all their streets. This guide will provide a framework through which people can benefit from streets that accommodate a range of travel choices.





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