CITY OF MERCED | BELLEVUE ROAD COMMUNITY PLAN



BACKGROUND STUDY

Complete Streets

January 24, 2013

CONTENTS

1. PURPOSE OF MEMORANDUM

This memorandum addresses how complete street policies will be developed and implemented in the BCCP. The BCCP will need to result in a comprehensive approach that achieves the goals for the Bellevue area as well as those of the City as a whole.

In order to generate and apply appropriate "complete street" policies for the BCCP area, the following actions are necessary:

- Research, collect, and assess existing "Complete Streets" Merced Vision 2030 General Plan Policies
- Provide recommendations for how to implement the Merced General Plan complete street related policies and implementing actions. This will include specific ideas that can be used to craft prescriptive right-of-way cross sections and design templates for all Plan area streets and adjacent public and semi-public spaces
- Listing of community plan specific "Complete Streets" policies for later consideration
- A transportation-related vision supported by the community that can be articulated in enough detail in the BCCP to guide development

The analysis in this Memorandum addresses the first three steps above. The analysis is in narrative format to expose and discuss issues that need to be clarified in order to move forward confidently. Based on community input through the public process, the consultant team will then work with the community to prepare the fourth item, the transportation-related vision for the BCCP area. The vision will then be turned into part of the transportation chapter of the Bellevue Corridor Community Plan, containing specific goals, policies, and implementing actions.

2. IMPLEMENTATION AND RECOMMENDATIONS

2.1 Research, Collect, and Assess existing "Complete Streets" *Merced Vision 2030 General Plan* Policies

2.1.1 Introduction

For many reasons, the State of California AB 1358, *The California Complete Streets Act*, was passed and gives direction to local governments to address "complete streets" in their general plans. This section discusses the benefits of complete streets, state legislation and policies, and the City of Merced's existing "complete streets" policies.

2.1.2 What are Multimodal Transportation Networks, otherwise known as complete streets?

Multimodal transportation networks allow for all modes of travel including walking, bicycling, and transit to be used to reach key destinations in a community and region safely and directly. Jurisdictions can use complete streets design to construct networks of safe streets that are accessible to all modes and all users no matter their age or ability. Complete streets are defined by various interest groups and Caltrans below:

- **The National Complete Streets Coalition**
  Complete streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities must be able to safely move along and across a complete street. Creating complete streets means transportation agencies must change their orientation toward building primarily for cars. Instituting a complete streets policy ensures that transportation agencies routinely design and operate the entire right of way to enable safe access for all users.

- **The American Planning Association (APA)**
  Complete streets serve everyone – pedestrians, bicyclists, transit riders, and drivers – and they take into account the needs of people with disabilities, older people, and children. The complete streets movement seeks to change the way transportation agencies and communities approach every street project and ensure safety, convenience, and accessibility for all.

- **The California Department of Transportation (Caltrans)**
  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 California Department of Transportation (Caltrans) Complete Streets Policy:

  The *California Department of Transportation Deputy Directive 64-Revision #1: 'Complete Streets: Integrating the Transportation System'* (DD-64-R1) was released on October 2, 2008. DD-64-R1 directs Caltrans staff to support increased mobility and access for all Californians on Caltrans built and maintained roads.

2.1.3 Potential Benefits of Multimodal Transportation Networks

Access to public space is critical to safe, healthy, and prosperous communities. Successful implementation of a comprehensive *complete street* program can accomplish numerous public benefits:

- **Supporting Existing Businesses**

  A network of complete streets can be safer and more appealing to residents and visitors, which can benefit retail and commercial development. Streets designed to maximize social value, also spurs healthy economic exchange. In this way, multimodal streets can improve conditions for existing businesses by helping revitalize an area and attracting new economic activity.

- **Reduced Public and Private Costs**

  Integrating sidewalks, bike facilities, transit amenities, and safe crossings in the early planning phases of roadway construction in both residential and commercial development reduces the complexity and costs of attempting to retrofit years later.

- **Business Attraction**

  Communities that support "complete streets" strive to create amenities that will enhance the quality of life of its residents, improve the physical and social environment in ways that attract businesses and workers, and contribute to economic development. In this way, streets become arteries distributing prosperity. Streets that invite social interaction are more likely to ensure prosperous growth...

- **Development Potential**

  Population growth will put greater demands on existing streets. If streets continue to largely function to move people traveling in motor vehicles, they will not be able to accommodate this growth. Streets will need to enable people to do more while traveling less and to travel more efficiently. Alternatives to single occupant vehicles must also be pursued to provide for the needs of an increasing population.

- **Greenhouse Gas (GHG) Emission Reduction**

  The need to reduce transportation-related GHG emissions was highlighted in the California Air Resources Board's (CARB) *2008 AB 32 Climate Change Scoping Plan*. Transportation accounts for 38 percent of California's GHG emissions. Studies show that even with aggressive state and federal vehicle efficiency standards and the use of alternative fuels, meeting the State's GHG reduction goals will require a shift in the mobility choices of the average Californian.

- **Reduced Traffic-Related Collisions**

  Multimodal transportation networks, using complete streets best practices, can lead to safer travel for all roadway users. Designing streets and travel routes that consider safe travel for all modes can reduce the occurrence and severity of vehicular collisions with pedestrian and bicyclists.

- **Safe Routes to Schools**

  Local multimodal transportation networks address the needs of parents and children by providing safe active transportation options to and from schools. Doing so can reduce vehicle trips, reduce congestion, improve road safety near schools, and increase children's activity rates.

- **Health Benefits**

  Multimodal transportation networks that allow people to walk or bicycle as a viable transportation option can promote an active lifestyle. These active transportation modes increase

physical activity rates. Frequent exercise is known to reduce obesity rates and lower the risk of heart disease and diabetes. A comprehensive transportation network that allows safe walking and bicycling to multiple destinations, including transit, promotes better health.

- **Air Quality**

  Reducing the amount that people drive by increasing the opportunity for walking, bicycling, and transit also reduces vehicle emissions. Emissions from vehicles are a major contributor to poor air quality, which in turn, is a major contributor to health ailments such as asthma. Although poor air quality is not always the cause of asthma, vehicle emissions are a major contributor to asthma related illnesses.

- **Mobility Options**

  Multimodal transportation networks provide options and increase mobility for people who cannot or do not drive to stay connected to their communities. This is especially important for people with disabilities and for all people as they age. Without alternatives to the automobile, these individuals can easily become socially isolated; unable to access essential resources such as grocery stores, houses of worship, and medical care.

2.1.4 The California Complete Streets Act (AB 1358) [1]

On September 30, 2008, Governor Arnold Schwarzenegger signed Assembly Bill 1358, the California Complete Streets Act. The Act states: "In order to fulfill the commitment to reduce greenhouse gas emissions, make the most efficient use of urban land and transportation infrastructure, and improve public health by encouraging physical activity, transportation planners must find innovative ways to reduce vehicle miles traveled (VMT) and to shift from short trips in the automobile to biking, walking, and use of public transit."

The legislation impacts local general plans by adding the following language to Government Code Section 65302(b)(2)(A) and (B):

A. Commencing January 1, 2011, upon any substantial revision of the circulation element, the legislative body shall modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users of the streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan.

B. For the purposes of this paragraph, "users of streets, roads, and highways" means bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.

2.1.5 California Department of Transportation (Caltrans) Complete Streets ` Policy:

The *California Department of Transportation Deputy Directive 64-Revision #1: 'Complete Streets: Integrating the Transportation System'* (DD-64-R1) was released on October 2, 2008. DD-64-R1 directs Caltrans staff to support increased mobility and access for all Californians on Caltrans built and maintained roads. DD-64-R1 states that Caltrans will:

- "Provide for the needs of travelers of all ages and abilities in all planning, programming, design construction, operations, and maintenance activities and products on the State Highway System;

- View transportation improvements (new and retrofit) as opportunities to improve safety, access, and mobility for all travelers and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system;
- Develop integrated multimodal projects in balance with community goals, plans, and values; addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in all projects, regardless of funding;
- Facilitate bicycle, pedestrian, and transit travel by creating "complete streets' beginning early in system planning and continuing through project delivery and maintenance and operations; and,
- Collaborate among all (Caltrans) department functional units and stakeholders to develop a network of complete streets."

DD-64-R1 is limited to Caltrans owned and maintained streets, roads, and highways and focuses on the planning, construction, and maintenance of complete streets and when possible, on the creation of multimodal networks. The goals of DD-64-R1 provide important guidance for the design of streets that make up a local integrated multimodal transportation network.

Caltrans' *Complete Streets Implementation Action Plan* and other information on Caltrans' complete street policies can be found at the following website:

http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets.html

2.1.6 City of Merced Complete Street Policies

The Merced Vision 2030 General Plan is a statement of the community's vision of its long-term or ultimate physical form, and is a guiding framework for land use decisions. The heart of the General Plan is the set of integrated and internally consistent "Goals," "Policies," and "Implementing Actions." *Goals* state finished conditions--the community's vision of what should be done and where. *Policies* state the City's clear commitment on how these *Goals* will be achieved. *Implementing Actions* carry out the *Policies* and are specific.

While there are many "Complete Street" Implementing Actions in the City's General Plan that also apply to the BCCP area, the goal and related policies that guide the development of streets for use by all modes of transportation are presented below.

Goal: A Comprehensive System of "Complete Streets" Addressing all Modes of Transportation

Complete-Street Related

Policy T-1.1: Design streets consistent with circulation function, affected land uses, and all modes of transportation.

Policy L-3.1: Create land use patterns that will encourage people to walk, bicycle, or use public transit for an increased number of their daily trips.

Policy UD-1.2: Distribute and design urban villages to promote convenient vehicular, pedestrian, and transit access.

Policy UD-1.1: Apply transit-ready development or urban village design principles to new development in the City's new growth areas.

Policy L-3.3: Promote site designs that encourage walking, cycling, and transit use.

Transit-Related

Policy T-2.1: Provide for and maintain a major transitway along "M" Street and possibly along the Bellevue Road/Merced-Atwater Expressway and Campus Parkway corridors.

Policy T-2.2: Support and enhance the use of public transit.

Policy T-2.3: Support a safe and effective public transit system.

Bike-Related

Policy T-2.4: Encourage the use of bicycles.

Policy T-2.5: Provide convenient bicycle support facilities to encourage bicycle use.

Policy T-2.6: Maintain and expand the community's existing bicycle circulation system.

Policy OS-3.2: Maintain and expand the City's bikeway and trail system.

Pedestrian-Related

Policy T-2.7: Maintain a pedestrian-friendly environment.

Policy T-2.8: Improve planning for pedestrians.

In summary, the City's General Plan envisions that all streets should be designed as "Complete Streets" which address all modes of motorized and non-motorized transportation, including vehicles, transit, pedestrians, and bicycles. These goals and policies form a foundation upon which to design, build, and construct complete streets within the Bellevue Corridor Community Plan.

2.2 Recommendations for How to Implement the Merced General Plan Complete Street Related Policies and Implementing Actions

This section will suggest complete-street approaches and designs for use in crafting prescriptive right-of-way cross sections and design templates for all Plan area streets and adjacent public and semi-public spaces in the Planning Area. Suggested elements of the BCCP Complete Street Program include:

- Street Networks and Classification
- Traveled Way Design
- Intersection Design
- Pedestrian Design
- Bikeway Design
- Transit Accommodations
- Placemaking

Los Angeles County Model Design Manual for Living Streets

Much of Section 2.2 is from the *Los Angeles County Model Design Manual for Living Streets*. Acknowledgement of the individuals who worked to prepare the design manual are listed at the end of the background memorandum on complete streets.

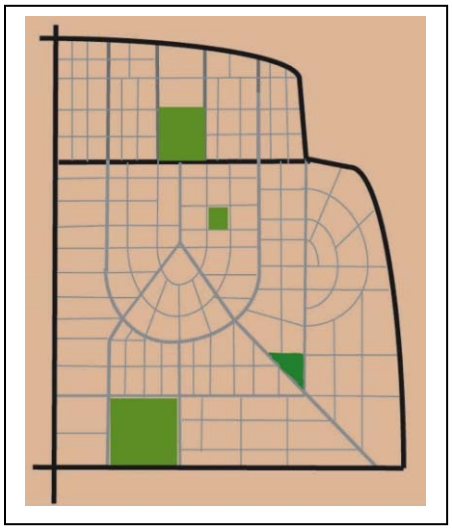
2.2.1 Street Networks and Classification

The chosen street network design of a city is a significant factor in determining whether the environmental, social, and economic needs of its residents can be met. A street network can foster or constrain economic and social activity, enhance or limit social equity in ability to travel and provide or negate a setting for high quality design at all scales: building, neighborhood, and region. Generally, two street networks exist in an urban area, the "Hierarchical" and "Grid" street patterns.

Grid Street Network

Traits

- Highly Connected Streets
- Traffic Dispersed throughout network
- Slower vehicle travel
- Additional road spaces allows for higher density
- The grid street network is built to walking dimensions
- Offers many route choices that connect origins with their destinations



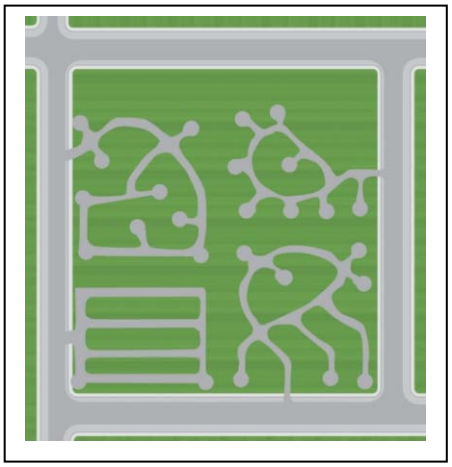
Outcomes

- More conducive to walking and bicycling
- Reduces vehicle miles traveled and associated air pollution impacts
- Low rate of severe car-related injuries
- Quicker response times and reduced service costs
- Compact Urban Form and associated reduced public service costs
- Conservation of farmland and open spaces

Hierarchical Street Network

Traits

- Low Street Connectivity
- Traffic Focused at points and segments
- Higher vehicle speeds
- Street pattern creates amorphous development sites



Outcomes

- Reduced the number of people walking and bicycling
- Increased vehicle miles traveled and associated air pollution impacts
- Higher rate of severe injury
- Challenged fire response time and related costs
- Limits development options

ESSENTIAL PRINCIPLES OF SUSTAINABLE STREET NETWORKS

Complete street networks come in many shapes and forms, but have the following overarching principles in common:

- The complete street network both shapes and responds to the natural and built environment.
- The complete street network privileges trips by foot, bike, and transit.
- The complete street network is built to walking dimensions.
- The complete street network works in harmony with other transportation networks, such as pedestrian, bicycle, transit, and private vehicle networks. Large parts of all of these networks are coincidental with the street network, but if any parts are separate from the street network, they must connect and interact with the network.
- The complete street network protects, respects, and enhances a city's natural features and ecological systems.
- The complete street network maximizes social and economic activity.

Street Types

Federal Highway Function and Classification system contains the conventional classification system that is commonly accepted to define the function and operational requirements for streets. These classifications are also used as the primary basis for geometric design criteria. Traffic volume, trip characteristics, speed and level of service, and other factors in the functional classification system relate to the mobility of motor vehicles, not bicyclists or pedestrians, and do not consider the context or land use of the surrounding environment. This approach, while appropriate for high speed rural and some suburban roadways, does not provide designers with guidance on how to design for living streets or in a context-sensitive manner.

The street types described here provide mobility for all modes of transportation with a greater focus on the pedestrian. The functional classification system can be generally applied to the street types in this document. Designers should recognize the need for greater flexibility in applying design criteria, based more heavily on context and the need to create a safe environment for pedestrians, rather than strictly following the conventional application of functional classification in determining geometric criteria.

Boulevard (conventionally arterials)
A boulevard is a street designed for high vehicular capacity and moderate speed, traversing an urbanized area. Boulevards serve as primary transit routes. Boulevards should have bike lanes. They may be equipped with bus lanes or side access lanes buffering sidewalks and buildings. Many boulevards also have landscaped medians. Boulevards traverse and connect districts and cities, primary a longer distance route for all vehicles, including transit.

Avenue (conventionally collectors)
An avenue is a street of moderate to high vehicular capacity and low to moderate speed acting as a short distance connector between urban centers and may or may not be equipped with a landscaped median. Avenues traverse and connect districts, and links street with boulevards for all vehicles including transit.

Street (conventionally local streets)
A street is a local, multi-movement facility suitable for all urbanized transect zones and all frontages and uses. A street is urban in character, with raised curbs (except where curbless treatments are designed), drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an alley. Character may vary in response to the commercial or residential uses lining the street. Streets serves neighborhoods; connects to adjoining neighborhoods and serve local function for vehicles and transit.

Alley/Lane
An alley or lane is a narrow street, often without sidewalks. Alleys and lanes connect streets and can provide access to the backs of buildings and garages.

Main Street
Main streets feature slower vehicle speeds, favor pedestrians most, contain the highest level of streetscape features, and are typically dominated by retail and other commercial uses Main Streets function differently than other streets in that it is a destination.

Bike Boulevard
A Bike Boulevard is a through street for bicycles, but short distance travel for motor vehicles. Bike Boulevards are usually local streets with low traffic volumes

Festival Street
Festival Streets contain traffic calming, flush curbs, and streetscape features that allow for easy conversion to public uses such as farmers' markets and music events.

2.2.2 Traveled Way Design

Streets and their geometric design have traditionally focused on the movement of motor vehicles, resulting in street environments that neglect other users. This emphasis can be seen in wide travel lanes, large corner radii, and turn lanes that severely impede the safety of pedestrians and the overall connectivity for non-automobile users. The geometric design of the traveled way and intersections has usually reflected the need to move traffic as quickly as possible. A paradigm shift needs to occur to reclaim the public right-of-way for pedestrians and bicyclists and create living streets.

Traveled way design in this chapter is defined as the part of the street right-of-way between the two faces of curbs and can include parking lanes, bicycle lanes, transit lanes, general use travel lanes, and medians. The design of the traveled way is critical to the design of the entire street right-of-way because it affects not just the users in the traveled way, but those using the entire right-of-way, including the areas adjacent to the street.

As a note on terminology, "traveled way" in this document is more or less the equivalent of "roadway" in most conventional design manuals: the curb-to-curb portion of a curbed street.

ESSENTIAL PRINCIPLES OF TRAVELED WAY DESIGN

The following key principles should be kept in mind for a well-designed traveled way:

- **Design to accommodate all users.** Street design should accommodate *all* users of the street, including pedestrians, bicyclists, transit users, automobiles, and commercial vehicles. A well-designed traveled way provides appropriate space for all street users to coexist.
- **Design using the appropriate speed for the surrounding context.** The right design speed should respect the desired role and responsibility of the street, including the type and intensity of land use, urban form, the desired activities on the sidewalk, such as outdoor dining, and the overall safety and comfort of pedestrians and bicyclists. The speed of vehicles impacts all users of the street and the livability of the surrounding area. Lower speeds reduce crashes and injuries.

Senior citizens need more time to cross the street (Credit: Ryan Snyder)

- **Design for safety.** The safety of all street users, especially the most vulnerable users (children, the elderly, and disabled) and modes (pedestrians and bicyclists) should be paramount in any design of the traveled way. The safety of streets can be dramatically improved through appropriate geometric design and operations.

CROSS SECTIONAL ELEMENTS

Living street design treats streets as part of the public realm. The street portion of the public realm is shaped by the features and cross section elements used in creating the street. Attention to what features are included, where they are placed, and how the cross section elements are assembled is necessary.

On-Street Parking

On street parking can be important in the urban environment for the success of the retail businesses that line the street and to provide a buffer for pedestrians and help calm traffic speeds. On-street parking occupies about half the surface area per car compared to off-street, which requires driveways and aisles for access and maneuvering. However, cities should manage demand for on-street parking by charging market-rate prices. Free or underpriced parking encourages people to drive instead of taking transit, biking, or walking. Parking expert Donald Shoup recommends setting variable parking prices to target a 15 percent vacancy rate for curb parking. In addition to encouraging people to curtail driving, it also creates turnover that benefits retailers by making convenient parking available for short shopping trips.

Reverse-in angled parking: Boise, ID (Credit: Dan Burden)

Where angle parking is proposed for on-street parking, designers should consider the use of reverse-in angle (or front out) parking in lieu of front-in angled parking. Motorists pulling out of reverse-in angled parking can better see the active street they are entering. This is especially important to bicyclists. Moreover, people exiting cars do so on the curb side and aren't likely to step into an active travel lane.

Another tool for on-street parking is the park assist lane. Often when on-street parking is provided on busy roads, drivers find it difficult to enter and leave their parked vehicle. Where space is available, consideration should be given to adding a park assist lane between the parking lane and travel way to provide 3 feet of space so car doors can be opened and vehicles can enter or depart with a higher degree of safety and less delay. Bike lanes can serve this function as well. Parking assist lanes also narrow the feel of the travel lane and slow traffic.

Bicycle Facilities

Bicycle facilities within the traveled way may include bicycle lanes, bicycle boulevards, other types of shared roadways (with or without shared lane markings), and cycle tracks.

Transit Facilities

Transit accommodations within the traveled way may include dedicated transit lanes, bus bulbs, bus pullouts, and other features.

Travel Lanes

Travel lane widths should be provided based on the context and desired speed for the area that the street is located in. Table 4.3 shows lane widths and the associated speeds that are appropriate. In low speed urban environments, lane widths are typically measured to the curb face instead of the edge of the gutter pan. Consequently, when curb sections with gutter pans are used, the vehicle, bike, and parking lane all include the width of the gutter pan.

In order for drivers to understand how fast they should drive, lane widths have to create some level of driver discomfort when driving too fast. The presence of on-street parking is important in achieving the speeds shown in Table 4.3. When designated bike lanes or multi-lane configurations are used, there is more room for large vehicles, such as buses, to operate in, but car drivers will feel more comfortable driving faster than is desired.

Alleys can be designed as one-way or two-way. Right-of-way width should be a minimum of 20 feet with no permanent structures located within the right-of-way that would interfere with vehicle access to garages or parking spaces, access for trash collection, and other operational needs. Pavement width should be a minimum of 12 feet. Coordination with local municipalities on operational requirements is essential to ensure that trash collection and fire protection services can be completed.

Turn Lanes

The need for turn lanes for vehicle mobility should be balanced with the need to manage vehicle speeds and the potential impact on the border width such as sidewalk width. Turn lanes tend to allow higher speeds to occur through intersections, since turning vehicles can move over to the turn lane, allowing the through vehicles to maintain their speed.

Left-turn lanes are considered to be acceptable in an urban environment since there are negative impacts to roadway capacity when left turns block the through movement of vehicles. Sometimes just a left-turn pocket is sufficient, just long enough for one or two cars to wait out of traffic. The installation of a left-turn lane can be beneficial when used to perform a road diet such as reducing a four lane section to three lanes with the center lane providing for turning movements.

In urban places, normally no more than one left-turn lane should be provided. While right turns from through lanes may delay through movements, they also create a reduction in speed due to the slowing of turning vehicles. The installation of right-turn lanes increases the crossing distance for pedestrians and the speed of vehicles; therefore, exclusive right turn lanes should rarely be used except at "T" intersections. When used, they should be mitigated with raised channelization islands. See Chapter 5, "Intersection Design," for more details.

Medians

Medians used on urban streets provide access management by limiting left turn movements into and out of abutting development to select locations where a separate left turn lane or pocket can be provided. The reduced number of conflicts and conflict points decreases vehicle crashes, provides pedestrians with a refuge as they cross the road, and provides space for landscaping, lighting, and utilities. These medians are usually raised and curbed. Landscaped medians enhance the street or help to create a gateway entrance into a community.

Well-designed street medians bring multiple benefits (Credit: Dan Burden)

Medians can be used to create tree canopies over travel lanes, contributing to a sense of enclosure. As shown in Table 4.4, medians vary in width. Recommended widths depend on available right-of-way and function. Because medians require a wider right-of-way, the designer must weigh the benefits of a median with the issues of pedestrian crossing: distance, speed, context, and available roadside width.

2.2.3 Intersection Design

Most conflicts between roadway users occur at intersections, where travelers cross each other's path. Good intersection design indicates to those approaching the intersection what they must do and who has to yield. Exceptions to this include places where speeds are low (typically less than 18 mph) or where a shared space design ("naked streets") causes users to approach intersections with caution. Conflicts for pedestrians and bicyclists are exacerbated due to their greater vulnerability, lesser size, and reduced visibility to other users.

Lively intersection (Credit: Dan Burden)

This chapter describes design considerations in intersection geometry and intersection signalization, as well as roundabouts and other features to improve safety, accessibility, and mobility for all users. The benefits and constraints of each feature are examined and the appropriate use and design of each feature are described.

ESSENTIAL PRINCIPLES OF INTERSECTION DESIGN

The following principles apply to all users of intersections:

- Good intersection designs are compact.
- Unusual conflicts should be avoided.
- Simple right-angle intersections are best for all users since many intersection problems are worsened at skewed and multi-legged intersections.
- Free-flowing movements should be avoided.
- Access management practices should be used to remove additional vehicular conflict points near the intersection.
- Signal timing should consider the safety and convenience of all users and should not hinder bicycle or foot traffic with overly long waits or insufficient crossing times.

INTERSECTION GEOMETRY

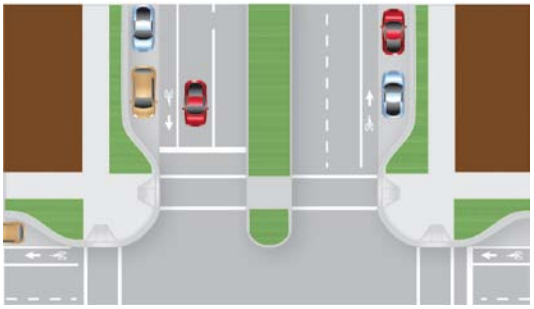
Intersection geometry is a critical element of intersection design, regardless of the type of traffic control used. Geometry sets the basis for how all users traverse intersections and interact with each other.

Corner Radii

This intersection geometry feature has a significant impact on the comfort and safety of non-motorized users. Small corner radii provide several benefits.

Curb Extensions

Where on-street parking is allowed, curb extensions should be considered to replace the parking lane at crosswalks. Integrating curb extensions and on-street



Curb extensions (Credit: Michele Weisbart)

parking into the sidewalk corridor enhances pedestrian safety and the walking experience.

Crosswalk and Ramp Placement
Crosswalks and ramps at intersections should be placed so they provide convenience and safety for pedestrians.

On-Street Parking Near Intersections
On-street parking should be positioned far enough away from intersections to allow for good visibility of pedestrians preparing to cross the street. Curb extensions allow parking to be placed closer to the intersection.

Right-Turn Channelization Islands
Right-turn lanes should generally be avoided as they increase the size of the intersection, the pedestrian crossing distance, and the likelihood of right-turns-on-red by inattentive motorists who do not notice pedestrians on their right. However, where there are heavy volumes of right turns (approximately 200 vehicles per hour or more), a right-turn lane may be the best solution to provide additional vehicle capacity without adding additional lanes elsewhere in the intersection.

2.2.4 Pedestrian Design

Nowhere is the concept of **universal** access more important than in the design of the pedestrian environment. While perhaps not intuitively obvious at first glance, this is the realm of streets with the greatest variation in user capabilities, and thus the realm where attention to design detail is essential to effectively balance user needs. This is also the realm where signs and street furniture are located, and where transitions are made between modes (e.g., driver or passenger to pedestrian via parking, bus stop/train station, or bike rack). The pedestrian environment includes sidewalks, curb ramps, crosswalks, bus stops, signs, and street furniture.

Sidewalks constructed without adequate design guidelines (Credit: Chanda Singh)

Without design guidelines, sidewalks are often too narrow, utility poles obstruct travel, steep driveway ramps are impassable to wheelchair users, and bus stops become blocked by the disorderly placement of shelters, poles, trash receptacles, and bike racks.

With well-defined guidelines, sidewalks are built to accommodate pedestrians of all ages and physical abilities, and become inviting pedestrian environments as the adjacent picture shows.

Designing the pedestrian realm for universal access enables persons with disabilities to live independently and lead full, enriched lives; they are able to go to work and to school, to shop, and otherwise engage in normal activities. Moreover, walking environments that accommodate people with disabilities improve walking conditions for everyone. People with strollers and rolling suitcases can make their way about with ease. Children can mature by learning to navigate through their neighborhoods with independence. Inaccessible pedestrian networks, on the other hand, can lead to people becoming housebound and socially isolated, which in turn can lead to a decline in well-being and a host of associated negative health outcomes such as depression.

LAND USE AND SIDEWALK DESIGN GUIDELINES

The sidewalk design guidelines in this chapter integrate design and land use to provide safe and convenient passage for pedestrians. Sidewalks should have adequate walking areas and provide comfortable buffers between pedestrians and traffic. These guidelines will ensure sidewalks in all development and redevelopment provide access for people of all ages and physical abilities.

Walking requires two important features in the built environment: people must walk along streets and they must get across streets. Crossing a street should be easy, safe, convenient, and comfortable. While pedestrian behavior and intersection or crossing design affect the street crossing experience, motorist behavior (whether and how motorists stop for pedestrians) is the most significant factor in pedestrian safety.


Crossings are a necessary part of the pedestrian experience (Credit: Sky Y...)

A number of tools exist to improve pedestrian safety and to make crossing streets easier. Effective traffic management can address concerns about traffic speed and volume. A motorist driving more slowly has more time to see, react, and stop for a pedestrian. The number of pedestrians also influences motorists; in general, motorists are more aware of pedestrians when more people walk. Most tools to address crossing challenges are engineering treatments, but tools from the enforcement, education, and planning toolboxes are also important.

Providing marked crosswalks is only one of the many possible engineering measures. When considering how to provide safer crossings for pedestrians, the question should *not* be: "Should I provide a marked crosswalk?" Instead, the question should be: "What are the most effective measures that can be used to help pedestrians safely cross the street?" Deciding whether to mark or not mark crosswalks is only one consideration in creating safe and convenient pedestrian crossings.

ESSENTIAL PRINCIPLES OF PEDESTRIAN CROSSINGS

The following principles should be incorporated into every pedestrian crossing improvement:

- Pedestrians must be able to cross roads safely. Cities have an obligation to provide safe and convenient crossing opportunities.
- The safety of all street users, particularly more vulnerable groups, such as children, the elderly, and those with disabilities, and more vulnerable modes, such as walking and bicycling, must be considered when designing streets.
- Real and perceived safety must be considered when designing crosswalks—crossing must be “comfortable.” A “safe” crossing that no one uses serves no purpose.


Curb extensions and median make crossing four-lane streets safer and more manageable.
(Credit: Dan Burden)

- Crossing treatments that have the highest crash reduction factors (CRFs) should be used when designing crossings.
- Safety should not be compromised to accommodate traffic flow.
- Good crossings begin with appropriate speed. In general, urban arterials should be designed to a maximum of 30 mph or 35 mph (note: 30 mph is the optimal speed for moving motor vehicle traffic efficiently).

- Every crossing is different and should be selected and designed to fit its unique environment.

The following issues should also be considered when planning and designing crossings:

- Ideally, uncontrolled crossing distances should be no more than 21 feet, which allows for one 11-foot lane and one 10-foot lane. Ideally, streets wider than 40 feet should be divided (effectively creating two streets) by installing a median or two crossing islands.
- The number of lanes should be limited to a maximum of three lanes per direction on all roads (plus a median or center turn lane).
- There must be a safe, convenient crossing at every transit stop.
- Double (or triple) left or right turns concurrent (permissive) with pedestrian crossings at signalized intersections must never be allowed.
- Avoid concurrent movements of motor vehicles and people at signalized intersections.
- People should never have to wait more than 90 seconds to cross at signalized intersections.
- Pedestrian signals should be provided at all signalized crossings where pedestrians are allowed.

2.2.5 Bikeway Design

Bicyclists operate a vehicle and are legitimate road users, but they are slower and less visible than motor vehicles. Bicyclists are also more vulnerable in a crash than motorists. They need accommodation on busy, high-speed roads and at complex intersections. Cyclist skill level also provides a wide variety of speeds and expected behaviors. Bicycle infrastructure should use planning and designing options, from shared roadways to separate facilities, to accommodate as many user types as possible and to provide a comfortable experience for the greatest number of cyclists.

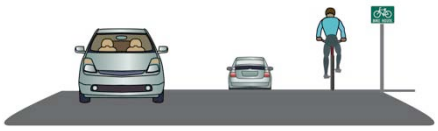
ESSENTIAL PRINCIPLES OF BIKEWAY DESIGN

The following principles inform the recommendations made in this chapter:

- Bicyclists should have safe, convenient, and comfortable access to all destinations.
- Every street is a bicycle street, regardless of bikeway designation.
- Street design should accommodate all types, levels, and ages of bicyclists.
- Bicyclists should be separated from pedestrians.
- Bikeway facilities should take into account vehicle speeds and volumes, with
  - Shared use on low volume, low-speed roads.
  - Separation on higher volume, higher-speeds roads.
- Bikeway treatments should provide clear guidance to enhance safety for all users.
- Since most bicycle trips are short, a complete network of designated bikeways has a grid of roughly ½ mile.

BIKEWAY TYPES

Shared Roadways - A shared roadway is a street in which bicyclists ride in the same travel lanes as other traffic. There are no specific dimensions for shared roadways. On narrow travel lanes, motorists have to cross over into the adjacent travel lane to pass a cyclist. Shared roadways work well and are common on low-volume, low-speed neighborhood residential streets, rural roads, and even many low-volume highways In California shared roadways are known as Class III bikeways.



Shared-use path
(Credit: Marty Bruinsma)

Bicycle Boulevards - A bicycle boulevard is a street that has been modified to prioritize through bicycle traffic but discourage through motor vehicle traffic. Traffic calming devices control traffic speeds and discourage through trips by automobiles. Traffic controls limit conflicts between automobiles and bicyclists and give priority to through bicycle movement at intersections.

Shoulder Bikeways - This facility accommodates bicycle travel on rural highways and country roads by providing a suitable area for bicycling and reducing conflicts with faster moving motor vehicles.

Bike Lanes - Portions of the traveled way designated with striping, stencils, and signs for preferential use by bicyclists, bike lanes are appropriate on avenues and boulevards. They may

be used on other streets where bicycle travel and demand is substantial. Where on-street parking is provided, bike lanes are striped on the left side of the parking lane. In California bike lanes are designated as Class II bikeways.

Cycle Tracks - Cycle tracks are specially designed bikeways separated from the parallel motor vehicle travelway by a line of parked cars, landscaping, or a physical buffer that motor vehicles cannot cross. Cycle tracks are effective in attracting users who are concerned about conflicts with motorized traffic.

Shared Use Paths - Shared use paths are facilities separated from motor vehicle traffic by an open space or barrier, either within the highway right-of-way or within an independent right-of-way. Bicyclists, pedestrians, joggers, and skaters often use these paths. Shared-use paths are appropriate in areas not well served by the street system, such as in long, relatively uninterrupted corridors like waterways, utility corridors, and rail lines. They are often elements of a community trail plan. Shared use paths may also be integrated into the street network with new subdivisions as described in Chapter 3, "Street Networks and Classifications." In California shared-use paths are designated as Class I bikeways.

Shared-use path
(Credit: Marty Bruinsma)

2.2.6 Transit Accommodations

Public transit serves a vital transportation function for many people; it is their access to jobs, school, shopping, recreation, visitation, worship, and other daily functions. Except for subways and rail lines on exclusive rights-of-way, most transit uses streets. For transit to provide optimal service, streets must accommodate transit vehicles as well as access to stops. Transit connects passengers to destinations and is an integral component of shaping future growth into a more sustainable form. Transit design should also support placemaking.

ESSENTIAL PRINCIPLES OF DESIGNING STREETS FOR TRANSIT

Public transit should be planned and designed as part of the street system. It should interface seamlessly with other modes, recognizing that successful transit depends on customers getting to the service via walking, bicycling, car, taxi, or paratransit. Transit should be planned following these principles:

Bus stops are centers of activity (Credit: Ryan Snyder)

- Transit has a high priority on city streets.
- The busiest transit lines should have designated bus lanes.
- Where ridership justifies, some streets, called transit malls, may permit only buses or trains in the travelled way. These often also allow bicycles.
- Technology should be applied to increase average speeds of transit vehicles where appropriate.
- The essential streetscape elements for transit include signs, shelters, and benches. Shelters should be located in a sidewalk's furniture zone so they don't conflict with the pedestrian zone.
- Transit stops should be easily accessible, with safe and convenient crossing opportunities.
- Transit stops should be active and attractive public spaces that attract people on a regular basis, at various times of day, and all days of the week.
- Transit stops should also provide other amenities to make waiting for the next bus comfortable.
- Transit stops function as community destinations. The largest stops and stations should be designed to facilitate programming for a range of community activities and events.
- Transit stops should provide space for a variety of amenities in commercial areas, to serve residents, shoppers, and commuters alike.

Bus stop shelter (Credit: Sky Yim)

- Transit stops should be attractive and visible from a distance.
- Transit stop placement and design influences accessibility to transit and network operations, and influences travel behavior/mode choice.
- Zoning codes, local land use ordinances, and design guidelines around transit stations should encourage walking and a mix of land uses (see Chapter 13, "Designing Land Use along Living Streets").
- Streets that connect neighborhoods to transit facilities should be especially attractive, comfortable, and safe and inviting for pedestrians and bicyclists.

Bicycle facilities at transit stations encourage intermodal travel: Los Angeles, CA

2.2.7 Placemaking

Placemaking for Streets

Streets comprise a large portion of publicly owned land in cities and towns. Streets are a huge part of any community's public space network, and historically served as meeting places, playgrounds for children, marketplaces, and more. As populations spread out from city centers, most American cities have come to view streets primarily as conduits for moving vehicles from one place to another. While moving vehicles is one of their purposes, streets are spaces, even destinations in and of themselves. Conceiving of a street as a public space and establishing design guidelines that serve multiple social functions involves several fundamental steps. Behind them all is a redefinition of whom streets ought to serve. By approaching streets as public spaces, cities redirect their attention from creating merely traffic conduits to designing a place that offers greater value to pedestrians, bicyclists, and transit riders.

PLACEMAKING FOR STREETS

In order to be places, streets must

- Augment and complement surrounding destinations, including other public spaces such as parks and plazas
- Reflect a community's identity
- Invite physical activity through allowing and encouraging active transportation and recreation
- Support social connectivity
- Promote social and economic equity
- Be as pleasant and accessible for staying as for going
- Prioritize the slowest users over the fastest
- Balance mobility and public space functions

So that people can

- Walk and stroll in comfort
- Sit down in nice, comfortable places, sheltered from the elements
- Meet and talk—by chance and by design
- Look at attractive things along the way
- See places that are interesting
- Feel safe in a public environment
- Enjoy other people around them
- And get where they need to go

2.3 Listing of Community Plan Specific "Complete Streets" Policies for Later Consideration.

The *Merced Vision 2030 General Plan* and public comments gathered during the community outreach efforts of the BCCP are the cornerstones that define the vision of the BCCP. The overall vision for circulation is to provide multi-modal transportation system throughout the planning area for use by vehicles, pedestrians, bicycles, and public transit, consistent with the principles of the General Plan's Urban Design Chapter. These principles emphasize planning, design, and construction for all modes in a manner that results in high usage levels. As such, roadways are treated as the essential element in the urban fabric that *connects* rather than *separates* neighborhoods located on opposite sides of a road. Separation of neighborhoods typically occur when road planning, design, and construction focuses primarily on vehicular travel, to the detriment of other travel modes. Consistent with *Merced Vision 2030 General Plan* Transportation Policy T-2.1 (Implementing Action 2.1d), the BCCP emphasizes travel by all transportation modes.

To achieve this vision within the BCCP, plan goals, policies, and implementation actions need to be prepared and adopted for later use by the community. Section 2.3 provides a suggested set of tools to help with this process, and include:

- State Context of Mandatory Circulation Element Issues
- Suggested Goals
- Policy Development Considerations
- Suggested BCCP Complete-Street Policies
- Suggested BCCP Benchmarks and Performance Measures

2.3.1 Mandatory Circulation Element Issues

The circulation element shall contain objectives, policies, principles, plan proposals, and/or standards for planning the infrastructure to support the circulation of people, goods, energy, water, sewage, storm drainage, and communications. Mandatory circulation element issues as defined in statute include: major thoroughfares, transportation routes, terminals, any military airports and ports, and other local public utilities and facilities. Additionally, the statute requires the circulation element be modified to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways. The statute defines "all users of streets, roads, and highways" as "bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors." Transportation networks should additionally consider pedestrian, bicycle, and transit routes, which may not always be located on or along streets, roads, and highways. Circulation elements shall also take into consideration the provision of safe and convenient travel that is suitable to the rural, suburban, or urban context of a local jurisdictions general plan. This could include policies and implementation measures for both retrofitting and developing streets to serve multiple modes and the development of multimodal transportation network design standards based on street types.

2.3.2 Suggested Goals

Guiding Principle

Development of the Bellevue Corridor Community Plan will occur in a manner that enhances the safety, access, convenience and comfort of all users of all ages and abilities, including pedestrians (including

people requiring mobility aids), bicyclists, transit users, motorists, and freight drivers, through the design, operation, and maintenance of the transportation network so as to create a connected network of facilities accommodating each mode of travel that is consistent with and supportive of the local community, recognizing that all streets are different and that the needs of various users will need to be balanced in a flexible manner.

Goals state the broad, overriding outcomes a city wants to achieve. The goals of designing complete streets are to: [2]

- Serve the land uses that are adjacent to the street; mobility is a means, not an end
- Encourage people to travel by walking, bicycling, and transit, and to drive less
- Provide transportation options for people of all ages, physical abilities, and income levels
- Enhance the safety and security of streets, from both a traffic and personal perspective
- Improve peoples' health
- Create livable neighborhoods
- Reduce greenhouse gas emissions and other air pollution
- Reduce energy consumption
- Promote the economic well-being of both businesses and residents
- Increase civic space and encourage human interaction

2.3.3 Policy Development Considerations

The following suggestions are examples of possible complete street policy areas that could be used to prepare the circulation element for the *Bellevue Corridor Community Plan*. [1]

Streets, Roads, and Highways

- The availability of a mix of transportation modes and the infrastructure to support those modes to meet community needs
- The consideration of street patterns; curvilinear, grid, modified grid, etc
- The design of streets (including, but not limited to, width, block size, etc.)
- The consideration of sidewalks and curbs as a standard street design principle
- The consideration of bicycle lanes and/or shared lanes as a standard street design principle
- The consideration of transit accessibility and transit priority measures as a standard street design principle
- The consideration of shade trees and planting strips as a standards street design principle
- The consideration of traffic calming measures (narrower travel lanes, roundabouts, raised medians, speed tables, planting strips, etc.)
- The safety of the traveling public, including pedestrians and bicyclists
- The accessibility and accommodation of bicycle and pedestrian traffic, where appropriate, on and across major thoroughfares
- The design of intersections and public right-of-ways to include adequate and safe access for all users including pedestrians, bicyclists, and motorists of all ages and abilities
- The development of a connected system of streets, roads, and highways that provides continuous, safe, and convenient travel for all users

- The consideration of separate performance and level-of-service standards for bicycle and pedestrian traffic or integrated performance and level-of-service standards that include multiple modes
- The development and improvement of transit, including transit services within a roadway right-of-way
- The consideration of bus HOV lanes or other exclusive right-of-way for transit vehicles

Truck Routes

- The development of proposed truck routes and policies supporting truck route regulations
- The accessibility and accommodation of pedestrian and bicycle traffic, where appropriate, on truck routes

Pedestrian and Bicycle Routes

- The development of a comprehensive pedestrian and/or bicycle plan. See California Streets and Highways Codes Sec. 891.2 requirements for bicycle transportation plans
- The development and improvement of pedestrian and bicycle routes, on and off, streets, roads, and highways. Consider special accommodations such as car-free zones, bicycle boulevards, and paths
- The connectivity of pedestrian and bicycle routes between homes, job centers, schools and facilities, and other frequently visited destinations
- The development of Safe Routes to School programs that address pedestrian and bicycle safety for a two mile radius around all elementary, middle, and high school facilities
- The development of pedestrian and bicycle facilities along routes that support the use of these routes such as benches, shelters, trees, bicycle parking, etc.
- The dedication and preservation of independent alignments (utility, abandoned waterways, or live rail right-of-ways) for the development of bicycle paths
- The development of performance and level-of-service standards for pedestrian and bicycle routes and intersection.
- The development and use of marketing and incentive programs to promote the increase of walking and bicycling

Transit Routes

- The development and improvement of public and private transit routes
- The development and improvement of access to and from transit routes by walking and bicycling and by people with disabilities
- The development of performance and level-of-service standards for transit routes and intersections that consider all transportation modes

Public and Private Transit Terminals

- The location and characteristics of transit terminals to maximize accessibility by all modes of transportation
- The development and improvement of both public and private transit terminals and stops
- The development of inter-modal transfer facilities, such as bicycle parking and bus transfer stations
- The provision of adequate and safe transit facilities including covered shelters, lighting, safe crossings, and locations that support eyes on the street
- The provision of safe and efficient multimodal access to and within transit terminals, complying with ADA standards

Transit and Railroads

- The development and improvement of transit and paratransit services, including mass rapid transit services, commuter light rail and heavy rail metro/subway systems, in consultation with the appropriate transportation agencies
- The accessibility and accommodation of all transit users
- The review and/or development of paratransit plan proposals for jitneys, car pooling, van pooling, taxi service, dial-a-ride, etc.
- The adoption of technology that creates a more effective usage of existing transit such as real time monitors and personalized automatic notification arrivals

Land Uses and Transportation Integration

- The development of transit-oriented development standards, including the appropriate mix of density and intensity of land uses near transit stations, parking requirements, and service and delivery requirements
- The creation of land use patterns, such as mixed-use overlay districts, that allow frequently visited destinations to be accessible by multiple transportation modes
- The availability of transportation infrastructure needed to accommodate increased density and transit-oriented development

Transportation Operations Management

- The development of transportation operations management policies, such as the consideration of reducing speeds, separating pedestrians and bicyclists from vehicle traffic, and adding or upgrading traffic control devices, etc.
- The provision of adequate crossing times and detection for all users at signalized intersections, consistent with AB 1581 (Fuller, Statutes of 2007)
- The appropriate balancing of needs of various users when establishing speed limits for motor vehicles, consistent with AB 2767 (Jackson, Statutes of 2000)

Parking Facilities

- The provision of bicycle parking
- The development of strategies for the control of parking demand such as improved transit services, amenities for bicyclists, subsidized rideshare vehicles, and the consideration of eliminating minimum parking requirements
- The development of strategies for the management of vehicle parking supply such as increased parking fees, graduated parking fees, shared parking, metered on-street parking, staggered work schedules, etc.

2.3.4 Suggested Set of Complete Street Policies

To ensure success of Complete Streets in the BCCP, it is important that the planning and project development process includes consideration of these policies.

All Users and All Modes

Cities will incorporate the full range of appropriate streets elements when planning and designing their transportation networks.

Cities will enhance the safety, access, convenience, and comfort of users of all ages and abilities. Cities understand that children, elderly adults, and persons with disabilities will require special accommodations.

Cities will plan, design, and build high quality access and mobility for pedestrians, bicyclists, and transit passengers.

Connectivity

Cities will design, operate, and maintain a transportation system that provides a highly connected network of streets that accommodate all modes of travel.

Cities will seek opportunities to repurpose rights-of-way, and to add new rights-of-way to enhance connectivity for pedestrians, bicyclists, and transit.

Cities will prioritize non-motorized connectivity improvements to services, schools, parks, civic uses, regional connections, and commercial uses.

Cities will require large, new developments to provide interconnected street networks with small blocks that connect to existing or planned streets on the perimeter of the development.

Jurisdiction

A city's complete streets policy document is intended to cover all roads, streets, and alleys in the city.

Every city agency, including public works, planning, redevelopment, street services, and others will follow the policies in this document.

Cities will require all developers to obtain and comply with their standards.

Phases

Cities will apply their complete streets policy document to all roadway projects including those involving operations, maintenance, new construction, reconstruction, retrofits, repaving, rehabilitation, or changes in the allocation of pavement space on an existing roadway. This also includes privately built roads intended for public use.

Transportation facilities are long-term investments that should be designed and constructed to anticipate all current and future demand and connectivity needs. Those planning and designing street projects will give due consideration to bicycle, pedestrian, and transit facilities from the very start of planning and design work. This will apply to all street construction, re-construction, re-paving, and re-habilitation projects, or changes in the allocation of pavement space on an existing roadway (such as the reduction in the number of travel lanes or removal of on-street parking).

Complete streets may be achieved through single projects or incrementally through a series of smaller improvements or maintenance activities over time.

Cities will draw on all sources of transportation funding to implement complete streets.

Exceptions

Complete streets will be included in all street construction, reconstruction, repaving, and rehabilitation projects, except under one or more of the following conditions:

A. A project involves only ordinary maintenance activities designed to keep assets in serviceable condition, such as mowing, cleaning, sweeping, spot repair, concrete joint repair, or pothole filling, or when interim measures are implemented on temporary detour or haul routes.

B. The City Council exempts a project due to an excessively disproportionate cost of establishing a bikeway, walkway, or transit enhancement as part of a project.

C. The City Engineer and the Planning Manager jointly determine that the construction is not practically feasible or cost effective because of significant or adverse environmental impacts to waterways, flood plains, remnants of native vegetation, wetlands, mountainsides, or other critical areas, or due to impacts on neighboring land uses, including from right of way acquisitions.

D. The City Engineer issues a documented exception that application of complete streets principles is unnecessary or inappropriate.

E. The Director of Development Services issues a documented exception where changes to the street may detract from the historical or cultural nature of the street or neighborhood.

Design

Cities will adopt new complete streets design guidelines to guide the planning, funding, design, construction, operation, and maintenance of new and modified streets while remaining flexible to the unique circumstances of different streets where sound engineering and planning judgment will produce context-sensitive designs.

Cities will incorporate the street design guidelines' principles into all city plans, manuals, rules, regulations, and programs as appropriate. As new and better practices evolve, cities will incorporate those as well.

Cities will keep street pavement widths to the minimum necessary.

Cities will provide well-designed pedestrian accommodation in the form of sidewalks or shared-use pathways on all arterial and collector streets and on local streets.

Cities will provide frequent, convenient, and safe street crossings. These may be at intersections designed to be pedestrian friendly, or at mid-block locations where needed and appropriate.

Cities will provide bicycle accommodation along all avenues, boulevards, and connector streets.

Where physical conditions warrant, cities will plant trees and manage streetwater whenever a street is newly constructed, reconstructed, or relocated.

Context Sensitivity

Cities will plan their streets in harmony with the adjacent land uses and neighborhoods.

Cities will design their streets with full input from local stakeholders.

Cities will design their streets in harmony with natural features such as waterways, slopes, and ravines.

Cities will design their streets to connect or provide continuity between existing trail or path networks, where appropriate.

Cities will design their streets with a strong sense of place. They will use architecture, landscaping, streetscaping, public art, signage, etc. to reflect the community, neighborhood, history, and natural setting.

Cities will coordinate with merchants along Main Street corridors to develop vibrant retail districts.

Performance Measures

Use performance measures below

Implementation Plan

Cities will adopt and apply a complete-street design manual.

Cities will incorporate complete streets concepts into the next circulation element of their general plans.

Cities will either implement complete streets designs on every street, or initiate the process by preparing and adopting bicycle plans, pedestrian plans, green streets plans, Safe Routes to School plans, and an Americans with Disabilities Act transition plan.

2.3.5 Suggested Benchmark and Performance Measures

Conventional street design applies auto-centric performance measures. The most common is the Level of Service (LOS), which seeks to maintain flow of vehicles and leads to widening streets and intersections, removing on-street parking, and other strategies to accommodate the flow of traffic. These techniques undermine the goals and tenets of complete streets.

To meet the goals and tenets of complete streets, communities should adopt the following benchmarks and performance measures. [2]

BENCHMARKS

- Every street and neighborhood is comfortable to walk and bicycle in.
- Every child can walk or bike to school safely.
- Seniors, children, and disabled people can cross all streets safely and comfortably.
- An active way of life is available to all.
- There are zero traffic fatalities.
- Retail streets become one of the most popular destinations for tourists in the country.

PERFORMANCE MEASURES

- Street fatalities and injuries decrease for all age groups.
- The number of trips by walking, cycling, and transit increases.
- Vehicle travel is reduced.
- Prevailing speeds of vehicles on local streets decrease.
- Retail sales and tourism increase.
- Resident satisfaction increases.

3. BIBLIOGRAPHY AND ACKNOWLEDGEMENTS

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2. *Los Angeles County Model Design Manual for Living Streets*

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Julia Campbell, LEED AP, EIT. Master of Urban and Regional Planning student at the UCLA Luskin School of Public Affairs; graduate student researcher for the UCLA Luskin Center for Innovation and formerly a hydraulic engineer focusing on stormwater management. Contributed to and edited Chapter 11.

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Said Gharbieh, BSc, MSc, FCIHT, FCIT, MBIM. Principal at Arup. Leads Arup's transportation planning business in Southern California. Contributed to Chapter 3.

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Julia Lave Johnston, Director of the Land Use and Natural Resources Program at the University of California, Davis, Extension. Formerly Deputy Director for Planning Policy in the California Governor's Office of Planning and Research. Contributed to Chapter 2.

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Brad Lancaster, Author of *Rainwater Harvesting for Drylands and Beyond*. Conducts permaculture consulting, design, and education. Contributed to Chapter 11.

Stephanie Landregan, FASLA, LEED-AP. Director for the Landscape Architecture Program at UCLA Extension. City of Glendale Planning Commissioner. Contributed to Chapter 11.

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Jen Petersen, Ph.D. Urban sociologist. Chief Officer of Ideas and Operations at Creative Commercial Real Estate in New York City. Contributed to Chapter 12.

Grace Phillips, Principal of Gracescapes. Sustainable landscape professional. Master's of Urban Planning student. Contributed to Chapter 11.

Francis Reilly, Urban Planner. Prepared the InDesign layout for the manual.

James Rojas, Urban Planner. Founder of the Latino Urban Forum. Contributed to Chapter 9.

David Sargent, Principal at Sargent Town Planning. Contributed to Chapter 13.

Will Schroeer, Director of Policy and Research for Smart Growth America. Wrote Chapter 14.

Jessica Scully, Writer and Editor. Former technical communication instructor at the University of California, Irvine. Edited the entire manual.

Chanda Singh, Transportation Planner with Ryan Snyder Associates. Contributed to Chapters 3 and 6.

Heather Smith, Planning Director of the Congress for New Urbanism. Played a significant role in producing the *Context Sensitive Design Solutions for Major Urban Thoroughfares for Walkable Communities.* Contributed to Chapter 3.

Pat Smith, ASLA, AICP, Certified Arborist. Principal of Patricia Smith Landscape Architecture. Contributed to Chapter 11.

Gary Toth, Senior Director, Transportation Initiatives for the Project for Public Spaces. Primary author of the Pennsylvania and New Jersey State Departments of Transportation *Smart Transportation Guide.* Contributed to Chapter 9.

Michael Wallwork, PE. President of Alternate Street Design. Traffic engineer and nationally renowned roundabout and traffic calming designer. Contributed to Chapters 4, 5, and 10.

Michele Weisbart, Graphic and Web Designer. Created most of the graphics in the manual as well as the layout.

Scott Windley, Accessibility Specialist, U.S. Access Board. Contributed to Chapter 6.

Will Wright, Director of Government and Public Affairs for the American Institute of Architects in Los Angeles. Contributed to Chapter 2.

Sky Yim, Sky Yim Photography. Contributed many of the photos.

Paul Zykofsky, AICP, Associate AIA. Associate Director, Local Government Commission. Federal Highway Administration Pedestrian Safety Design Instructor, Complete Streets Instructor, National Safe Routes to School Instructor. Contributed content editing.

Useful Definitions [1]

Air Installation Compatible Use Zone (AICUZ): A land use compatibility plan prepared by the U.S. Department of Defense for military airfields. AICUZ plans serve as recommendations to local government bodies having jurisdiction over land uses surrounding these facilities.

Airport: An area of land or water that is used or intended to be used for the landing and taking off of aircraft, and includes its building and facilities, if any.

Airport Land Use Compatibility Plan: A plan adopted by an Airport Land Use Commission, which sets forth policies for promoting compatibility between airports and the land uses which surround them.

All Users: Users of streets roads and highways including bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation and seniors.

Arterial: A major street carrying the traffic of local and collector streets to and from freeways and other major streets, with controlled intersections and generally providing direct access to properties.

Bicycle Boulevard: The Bicycle Boulevard Design Guidebook defines a Bicycle Boulevard as "low-volume and low-speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reductions, signage and pavement markings, and intersection crossing treatments.

Bicycle Lane: According to Caltrans' Highway Design Manual, Chapter 1000, a bicycle lane is a Class II Bikeway and provides a striped lane for one-way bicycle travel on a street or highway,

Bicycle Path: According to Caltrans' Highway Design Manual, Chapter 1000, a bicycle path is a Class I Bikeway and provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.

Bus Rapid Transit (BRT): The Federal Transit Administration defines BRT as a "combination of facility, systems, and vehicle investments that convert conventional bus services into a fixed-facility transit service, greatly increasing their efficiency and effectiveness to the end user."

Collector: A street for traffic moving between arterial and local streets, generally providing direct access to properties.

Complete Street: The National Complete Streets Coalition defines complete streets as follows:

> Complete streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities must be able to safely move along and across a complete street.
>
> Creating complete streets means transportation agencies must change their orientation toward building primarily for cars. Instituting a complete streets policy ensures that transportation agencies routinely design and operate the entire right of way to enable safe access for all users.

The American Planning Association (APA) describes complete streets as follows:

> Complete streets serve everyone – pedestrians, bicyclists, transit riders, and drivers – and they take into account the needs of people with disabilities, older people, and children. The complete streets movement seeks to change the way transportation agencies and communities approach every street project and ensure safety, convenience, and accessibility for all.

The California Department of Transportation (Caltrans) defines complete streets as follows:

> 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.

Connectivity: A well connected circulation system with minimal physical barriers that provides continuous, safe, and convenient travel for all users of streets, roads, and highways.

Conventional Highway: According to the California Highway Manual, a conventional highway is, "a highway without control of access which may or may not be divided. Grade separations at intersections or access control may be used when justified at spot locations."

Expressway: A highway with full or partial control of access with some intersections at grade.

Farm-to-Market: Transportation facilities which provide connections between areas of agricultural production, processing, and storage facilities to agricultural distribution and sales activities.

Production:	The growing of crops or livestock for the purpose of producing food, fiber, and nursery products
Processing:	All activities which handle, refine, or prepare commercial food, fiber, and nursery products for sale and consumption including, but not limited to, packing plants, agricultural storage facilities, wineries, and dairies.
Distribution:	All facilities which have the primary function of receiving agricultural products and transmitting them to sales facilities.
Sales:	Retail and wholesale sale of agricultural products.

Freeway: A highway serving high-speed traffic with no crossings interrupting the flow of traffic (i.e., no crossings at grade). Streets and Highways Code §23.5, in part, states that "Freeway means a highway in respect to which the owners of abutting lands have no right or easement of access to or from their abutting lands or in respect to which such owners have only limited or restricted right or easement of access."

Heliport: A facility used for operating, basing, housing, and maintaining helicopters.

Local Scenic Highway: A segment of a state or local highway or street that a city or county has designated as "scenic."

Local Street: A street providing direct access to properties and designed to discourage through traffic.

Level-of-Service: According to the Transportation Research Board's 2000 Highway Capacity Manual Special Report, Level-of-Service is a qualitative measure describing the efficiency of a traffic stream. It also describes the way such conditions are perceived by persons traveling in a traffic stream. Level-of-

Service measurements describe variables such as speed and travel time, freedom to maneuver, traffic interruptions, traveler comfort and convenience, and safety. Measurements are graduated, ranging from level-of-Service A (representing free flow and excellent comfort for the motorist, passenger, or pedestrian) to Level-of-Service F (reflecting highly congested traffic conditions where traffic volumes exceed the capacities of streets, sidewalks, etc.). Level-of-Service can be determined for freeways, multi-lane highways, two-lane highways, signalized intersections, intersections that are not signalized arterials, and transit, bicycle, and pedestrian facilities.

Light Rail or Light Rail Transit (LRT): A form of urban rail public transportation which typically travels at a lower speed and capacity than heavy and metro rail systems, but typically travels at higher speeds and capacity than traditional tram systems. LRT operates mostly in private right-of-ways, but can also at times be incorporated into public right-of-ways.

Major Thoroughfare: A major passageway such as a street, highway, railroad line, or navigable waterway that serves high traffic volumes.

Multimodal Transportation Network: A well balanced circulation system that includes multiple modes of transportation that meets the needs of all users of streets, roads, and highways. §65302(b)(2)(A).

National Scenic Byway: A segment of a state or interstate highway route that the United States Forest Service has designated as a scenic byway or which another federal agency has designated as a national scenic and recreational highway.

Official County Scenic Highway: A segment of a county highway the Director of Caltrans has designated as "scenic."

Official State Scenic Highway: A segment of a state highway identified in the Master Plan of State Highways Eligible for Official Scenic Highway Designations and designated by the Director of Caltrans.

Paratransit: Transportation systems such as jitneys, car pooling, van pooling, taxi service, and dial-a-ride arrangements.

Railroad Depot: A railroad terminal where passengers and goods are loaded and unloaded.

Recreational Trails: Public areas that include pedestrian trails, bikeways, equestrian trails, boating routes, trails, and areas suitable for use by persons with disabilities, trails and areas for off-highway recreational vehicles, and cross-country skiing trails.

Route: A sequence of roadways, paths, and/or trails that allow people to travel from place to place.

Scenic Highway Corridor: The visible area outside the highway's right-of-way, generally described as "the view from the road."

Terminal: A station, stop, or other transportation infrastructure along or at the conclusion of a transportation route. Terminals typically serve transportation operators and passengers by air, rail, road, or sea (i.e., airports, railroad depots, transit stops and stations, and ports and harbors).

Transit-Oriented Development (TOD): A moderate- to high-density development located within an easy walk or bicycle of a major transit stop, generally with a mix of residential, employment, and shopping opportunities. TOD encourages walking, bicycling, and transit use without excluding the automobile.

Utilities: A set of services provided by local public utilities such as electricity, natural gas, water, and sewage.

Walkability: The measurement of how walkable a community is. Walkable communities typically include footpaths, sidewalks, street crossing, or other pedestrian oriented infrastructure.