

Arterial and Collector Street Design Elements

- Design Guidelines
- Design Standards

Introduction

This chapter provides guidelines and standards for city staff, public agencies, private developers, and others for use in designing and building multi-modal streets that conform to the Goals, Objectives, and Planning Principles for design of arterial and collector streets.

Design Guidelines are general statements about factors that should influence the design of the street. They are presented as general design considerations to be used as a basis for deciding what to emphasize where design options are evident, or when constraints lead to conflicts among the various design elements. Design guidelines are not mandatory and are qualified by “should” or “may” statements.

Design Standards are more specific and are intended to produce desirable outcomes for arterial and collector street improvements. For minor projects where the street design is not being significantly altered (described as Minor Projects in the next section), the design standards in this document are to be regarded as *highly preferred, but not mandatory*. For more major street improvements (described below as Major Projects), these design standards are to be interpreted as *required standards*. Even so, there will be situations on major street projects where it is not feasible to achieve the minimum standard. In these cases a design exception may be considered.

Application of Design Standards

The Arterial and Collector Street Plan is intended to provide a city-wide street classification map and a set of design standards and guidelines for the city’s arterial and collector streets. While several miles of new arterial and collector streets will be built during the next 15 to 20 years, most of the arterials and collectors already exist. Much of this existing major street mileage will not be altered in any significant way during the next 20 years, although some existing streets will be candidates for various major or minor improvement projects, ranging from traffic calming, to intersection redesign, to major reconstruction of the roadway. Unlike new streets, existing streets will present many constraints to being retrofitted with new standards, due to features like mature trees and narrow rights-of-way.

Minor Projects

Because of this wide range of circumstances, these design standards must be applied with a certain amount of flexibility and creativity. Many improvements to existing streets involve only minor changes to the existing conditions. Projects or activities such as the following occur frequently on arterial and collector streets:

- resurfacing or partial reconstruction of the pavement (preservation projects)
- installation of traffic calming features
- intersection improvements such as traffic signal changes, turn lanes, etc.
- reconstruction of existing features that results in only minor, incidental widening or minor increases in capacity.
- retrofitting existing streets with bicycle lanes and/or sidewalks.

For purposes of applying the design standards, these types of improvements to existing streets will be designated Minor Projects, for which these design standards are regarded as desirable or preferred standards rather than absolute requirements. In many instances these standards will not be attainable, and design exception will not normally be required in these cases.

Major Projects

In contrast to Major Projects, there are a number of activities that involve more significant modification of existing arterial and collector streets, and construction of new street mileage. The following kinds of improvements are considered Major Projects:

- construction of new street mileage
- major reconstruction of existing streets, e.g. upgrade to city standards
- major widening of existing streets, resulting in an increase in capacity by addition of one or more through travel lanes

For Major Projects, these design standards are regarded as minimum requirements.

Where a proposed design doesn't meet the minimum standard a design exception shall be considered. (Specific situations requiring an exception, and the process and criteria for granting an exception, are discussed below.)

The following examples illustrate how different kinds of projects will be implemented:

Minor Projects: resurfacing or reconstruction of the roadbed without widening, intersection improvements or traffic calming projects: projects that involve preservation or minor improvements are usually at a scale that does not require the project to be listed separately in TransPlan. Public involvement can be adjusted to fit the level of interest or controversy. For example, resurfacing projects usually include public notice but not major citizen involvement in the design process, while traffic calming projects can entail a significant degree of citizen involvement in the design, timing and/or location of the project. Design standards in the ACSP are regarded as desirable but not mandatory for all of these projects.

Bicycle lane added to existing street: the draft TransPlan proposes adding bicycle lanes to 11th

Public Involvement in Street Improvement Projects

Type of Project	Must project be included in adopted TransPlan?	Degree of public involvement in design of project
Minor Projects: • Preservation and minor safety/operational improvements • Improvement of an intersection • Traffic calming • Adding bicycle lanes to existing improved streets	No	Generally minor
	No	Significant input/review by affected neighborhood and other interested citizens
	Yes	
Major Projects: • New collector or arterial streets • Major reconstruction, upgrading to city standards • Major widening of existing arterial/collector (adding new, through travel lanes)	Yes	Decision-maker is part of overall land use process
	Yes	Significant input/review by affected neighborhood and other interested parties
	Yes	Advisory committee of citizens assists with "corridor study" to explore alternatives, recommend design concept

How Design Standards Apply to Street Improvement Projects

Type of Project	Adopted standards in this plan are:	Process for considering exceptions:
Minor Projects: • Preservation and minor safety/operational improvements • Improvement of an intersection • Traffic calming • Adding bicycle lanes to existing improved streets	Highly preferred/ desirable. Not required as a standard.	Since design standards are not mandatory for Minor Projects, there is no need for exceptions to the standards.
Major Projects: • New collector or arterial streets	Required	Exceptions (and appeals) considered as part of overall land use process
• Major reconstruction, upgrading to city standards • Major widening of existing arterial/collector (adding through travel lanes)	Required	Exceptions considered as part of overall design process. Appeals follow administrative process (City Code).

and 13th avenues, from Lincoln Street to Chambers Street. If the Council decides to include this project in the adopted TransPlan, staff would work with residents, property owners and the neighborhood association to conduct a design charrette or similar process for citizen input. Various options would be evaluated for implementing the bike lanes while retaining and enhancing the maximum amount of on-street parking, and addressing other city and neighborhood goals. Design standards in the ACSP would be used as desirable guidelines—for example, width of bicycle lanes and parking areas, etc. The process would focus on reaching consensus on the optimum design for safety, mobility and livability.

Major Projects: New streets: Generally, new arterial or collector streets are built as part of new residential, industrial or commercial developments. When these developments proceed without significant controversy relating to site factors, type of use, etc. the street construction is not likely to generate widespread public interest. A recent example is Legacy Street, a collector street constructed in 1998 in northwest Eugene in conjunction with a new middle school and city park, and adjacent new residential development. In that example the immediate land owners, developers, school district, and other affected individuals and agencies were all involved in the location, design and timing of the street project. Normal city land development review processes were followed, and there was no apparent need for a separate public process regarding the street design. ACSP standards will be considered design requirements for these types of street projects.

Major Projects: Major reconstruction of existing streets to upgrade them to city standards (with curbs and sidewalks, for example), is another type of project defined as a Major Project in the ACSP. Examples include proposed reconstruction of Ayres Road, Garden Way, and Bethel Drive to provide a safer, better-maintained road surface and safe facilities for bicycles and pedestrians. These kinds of projects typically entail major citizen input, using design charrettes or other techniques to evaluate various options and achieve a consensus. These projects also involve the formation of a Local

Improvement District by the City Council, whereby adjacent property owners participate in the funding of the project. This process requires a certain level of notification and involvement on the part of property owners and residents, and public hearings by the City Council.

Major Projects: Major widening of existing, already improved streets to add capacity, are few in number and are listed separately in TransPlan as proposed “corridor studies” which will include citizen advisory/design committees or other forms of public participation in a planning and design process. The draft TransPlan proposes corridor studies to evaluate 18th Avenue, Chambers Street and several parallel south-Eugene streets (Willamette, Hilyard, Amazon Parkway), to address capacity, safety, non-auto modes, and other issues. These corridor studies are not necessarily expected to result in recommendations to widen the streets—other options will be examined including intersection improvements, bus priority techniques, traffic calming, etc.

Citizen Involvement in Street Design

The adopted classification of a given street segment will be used as a starting point for determining the design standards to use on any major improvement project for that street. Existing and/or planned conditions (such as current or planned development, existence of on-street parking, local factors such as slopes, vegetation, etc.) will be considered in a preliminary staff assessment of the range of possible street widths and other variables that might be feasible for a specific location.

Any project defined earlier as a Major Project, and some Minor Projects, will include a citizen involvement program. There will usually be an initial public meeting or scoping session to identify major issues and determine the best method for incorporating public input into the design of the project. In some cases a preliminary design will be developed by staff and taken back out to the neighborhood for feedback and revisions. For some projects, a *citizen design team* will be formed to develop the design, following the design standards and guidelines in this document and applying them to the particular circumstances of each particular street project to reach agreement on the best design for that street.

This process of using a citizen design team could apply, for example, to a number of the street reconstruction projects proposed in TransPlan, as well as projects like addition of bicycle lanes or other special lanes (such as turn lanes), where the proposal would be likely to result in loss of on-street parking. Design of traffic calming features could also follow this process.

Arterial and Collector Street Design Standards and Guidelines

The typical design elements found within the right-of-way for arterial and collector streets are: vehicle lanes, bicycle lanes (with some exceptions), drainage and curbs, planting strips, street lighting, sidewalks, and utilities. Optional features include median islands and on-street parking. All of these design elements are specified within a designated paving width and right-of-way width for each particular street, based on the specific needs and setting of that street.

Design Standards

Design standards in this chapter are required for the following types of street improvement projects in Eugene (unless otherwise specified in the wording of the particular standard):

- Newly constructed arterial and collector streets.
- Major reconstruction of existing arterial and collector streets, to upgrade the street to urban standards through reconstruction of the roadbed and addition of curbs, gutters and sidewalks.
- Major widening of existing improved arterial and collector streets that results in adding one or more through vehicular travel lanes.

For all other types of street improvement projects, these standards are to be considered as desirable design guidelines but are not mandatory.



The standards are not intended to apply to construction of or improvements to freeways and expressways.

Design Guidelines

In addition to spelling out the minimum design standards for arterial and collector streets, this plan also provides a set of Design Guidelines to help design professionals and the general public reach a consensus on the best possible design for any particular street improvement project. While the Design Standards can be regarded as specifying a set of “minimum tolerable” conditions for certain attributes of arterial and collector streets, the Design Guidelines found in this chapter are to be used as a working manual of best design practices for constructing, reconstructing, and improving Eugene’s major street network.

Criteria for Exceptions

Design standards in this chapter must be met except when an exception can be justified through consideration of the following:

- 1) Topography or slope constraints;
- 2) Significant trees or other vegetation;
- 3) Other natural resource constraints, including wetlands, wildlife habitat, etc.;
- 4) Historic resources;
- 5) Insufficient right-of-way, and inability to obtain additional right-of-way at reasonable cost and within a reasonable time frame for the project;
- 6) Adopted Council policies, including those found in neighborhood plans.

Design exceptions might be considered for streets with topographic, vegetation, or right-of-way constraints like this street in the South Hills

Pavement and Right-of-Way Widths

Design Guidelines

- 1) Determination of total pavement width should balance consideration of the available right-of-way; pedestrian, transit, emergency responder, and bicyclist needs; overall street function, and traffic capacity needs.
- 2) Wide streets can present an impediment to pedestrian crossings. Pedestrian refuge medians and/or landscaped medians with pedestrian refuges should be designed into arterial and collector street intersections with more than three travel lanes, whenever possible, to reduce crossing distances and improve safety and comfort for pedestrians and motorists.
- 3) As an alternative to widening streets in built-up areas with right-of-way constrictions, consider creating paired, one-way street designs where the street layout permits.
- 4) Where needed, right-of-way width may be increased to accommodate high-occupancy-vehicle (HOV) lanes or exclusive transit lanes, as indicated in adopted plans.
- 5) Utility manhole covers and other infrastructure access elements should not be placed within bicycle lanes on new streets.
- 6) An initial determination of required Right-of-Way and pavement widths for new street construction and street reconstruction projects will be made by City of Eugene staff.

Pavement and Right-of-Way Width Design Standards

- 1) Depending on the projected traffic volumes and any circumstances unique to the location, curb-to-curb pavement widths for major arterial streets typically range from 68' to 94' with total right-of-way widths ranging from 100' to 120'. (See Figure 37 on page 94).
- 2) Curb-to-curb pavement widths for minor arterial streets typically range from 46' to 70' with total right-of-way widths ranging from 75' to 100'. (See Figures 38 and 39 on page 96).
- 3) Pavement widths on major collector streets typically range between 32' and 44' with total right-of-way widths ranging between 60' and 75'. (See Figures 41 and 42 on page 98).
- 4) Pavement widths for Neighborhood Collector streets range from 20' to 43' with total right-of-way widths ranging from 40' to 55' depending on a number of factors, including availability of on-street parking, need for shared use of travel lanes with bicycles, and use of the street by transit vehicles. (See Figures 44 through 52 on pages 100 through 105).
- 5) Utility placement and design of curbs and drainage facilities shall be in accordance with adopted Local Street Design Standards.

Wide streets can present an impediment to pedestrian crossings



Vehicle Travel Lane Widths

Design Guidelines

- 1) Travel lane width is a function of the use of the lane, the type of vehicle served, and the speed of the vehicle. All of these factors, as well as whether the lane is an “inside” lane or an “outside” lane should be considered in determining travel lane width.
- 2) Lane widths should be wider on higher-speed streets than on lower-speed streets.
- 3) Outside lanes may require a wider width to accommodate turning trucks and buses, and to reduce the effects of adjacent obstructions like parked cars. If a bicycle lane is present, outside lanes need to be wide enough to provide for safety and comfort of bicyclists adjacent to those lanes.
- 4) Typical travel lane widths:
 - a) Major Arterials. Travel lanes are typically 12' wide on major arterial streets. (See Figure 37 on page 94).
 - b) Minor Arterials. Travel lanes are typically 11' wide on minor arterial streets. (See Figures 38 and 39 on page 96).
 - c) Major Collectors. Travel lane widths are typically 11' wide on Major Collector streets, although wider lane widths may be required for industrial areas or other areas with significant amounts of large truck traffic. (See Figures 41 and 42 on page 98).
 - d) Neighborhood Collectors. Typical travel lane widths on Neighborhood Collector streets range from 10' to 14'. The design width shall be determined by the use of the street: narrower lane widths are permitted on streets used only by motor vehicles; wider lane widths may be needed on streets which are used by a mix of motor vehicles, bicycles, and/or transit vehicles. (See Figures 44 through 52 on pages 100 through 105).

Vehicle Travel Lane Width Design Standards

- 1) The minimum travel lane width on Major and Minor Arterial streets is 11'.
- 2) The minimum travel lane width on Major Collector and Neighborhood Collector streets is 10'.



Sidewalks

Design Guidelines

1) Sidewalks and other pedestrian improvements are vital to the function of arterial and collector streets designed for multi-modal use. Walking can serve as a sole transportation mode or function as a link in a multi-modal trip. Sidewalks promote transit use by providing the link from home to bus (and vice versa). Sidewalks provide critical access to all properties; commercial, residential, industrial and public.

2) Sidewalks and other pedestrian improvements are essential components of all new street projects as well as major reconstruction projects.

3) Setback sidewalks on both sides of the street are the preferred pedestrian design choice for arterial and collector streets. Setback sidewalks:

- a) provide for physical separation of pedestrians from vehicle traffic, an important consideration where pedestrians must walk next to higher speed traffic,
- b) provide a safe and comfortable environment for pedestrians,
- c) provide a safe and comfortable environment for motorists by fully separating pedestrians from vehicles,
- d) provide for compatibility with Americans with Disability Act requirements for curb ramps and driveway aprons,
- e) provide space between the sidewalk and the curb for street trees, and landscaping plantings,
- f) provide a distinct green edge to the street, further distinguishing the different uses of the street and contributing to traffic calming by presenting a more attractive area of travel,

4) Alternating setback and curbside sidewalks or meandering sidewalks are an acceptable design alternative in areas where constraints (like significant trees and other natural features) and right-of-way limitations exist. In such places, on-street parking or bicycle lanes mitigate the negative impacts of curbside sidewalks.

5) Sidewalks should be located on both sides of arterial and collector streets. Where sidewalks exist on only one side of the street, access to transit is difficult and pedestrian safety as well as motorist comfort is compromised by requiring the pedestrian to cross the street to gain access to a sidewalk. This is particularly true on arterial and collector streets that have higher traffic volumes that move at higher speeds.



Missing sidewalk segment makes access to transit difficult

6) To promote pedestrian use and access to transit, sidewalks should be continuous along all arterial and collector streets. Existing gaps in the pedestrian system should be closed.

7) Sidewalks should be designed with adequate width to accommodate all existing or anticipated uses, including loading and unloading of people from on-street parking, walking traffic, window shopping traffic, bicycle parking, and use of street furniture.



Wider sidewalks accommodate more intensive pedestrian traffic in areas where pedestrian volumes are higher

Sidewalk Design Standards

1) Setback sidewalks with a minimum width of 5 feet (see Figure 6) are the standard except for the following situations:

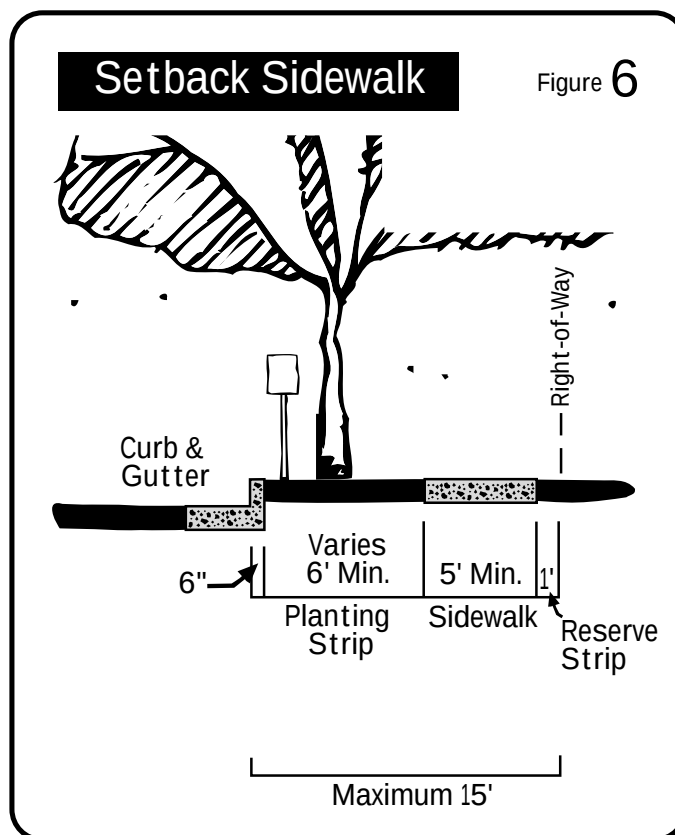
a) Alternating setback and curbside or meandering sidewalks shall be permitted in areas where constraints (like significant trees and other natural features) and right-of-way limitations exist.

b) Sidewalks in commercial areas shall be designed to provide adequate space for pedestrian travel, street furniture, and related uses. Curbside sidewalks in pedestrian-oriented commercial areas shall be a minimum of 10 feet wide, and shall incorporate tree wells in lieu of landscaped planter strips.

2) Sidewalks shall not have obstructions such as mailboxes, signs or utilities that reduce the usable width of the sidewalk below 5'.

3) Sidewalks shall be continuous along the full frontage of a development.

4) All driveway entrances and other curb cuts shall be constructed flush with the adjacent street surface.



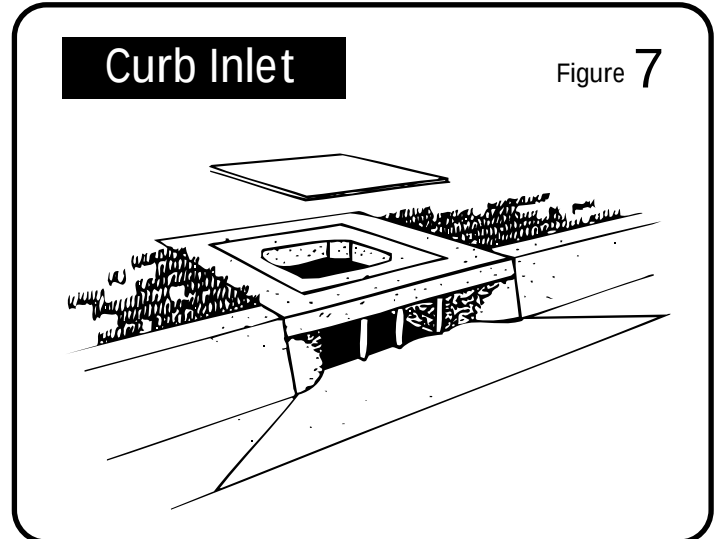
Setback sidewalks are the preferred pedestrian design choice for Eugene's streets

Bikeways

These standards address on-street bicycle facilities. See Appendix A and B for off-street bicycle path and accessway facility requirements.

Design Guidelines

- 1) Striped bicycle lanes are the preferred bikeway design choice for arterial and major collector streets to provide a high level of mobility for bicyclists. A shared roadway generally is sufficient for Neighborhood Collector streets.
- 2) An interconnected street system is an important factor in providing convenience and continuity of travel for bicyclists.
- 3) On-street bicycle lanes and off-street paths will be constructed in those locations indicated in adopted plans.*
- 4) Bicycle signing and pavement markings should be consistent throughout the bikeway system per the 1995 Oregon Bicycle and Pedestrian Plan guidelines.
- 5) Curb inlets are the preferred design option for storm water facilities. Where installation of curb inlets is not possible, catch basins with approved bike-proof covers are an acceptable alternative. (See Figure 7)



- 6) Avoid designing continuous right turn lanes on major streets with bicycle lanes.

** Striped bicycle lanes will be added to existing arterial and major collector streets which are already improved to urban standards only in cases where such bike lane projects on specific streets are included in the adopted TransPlan.*



On-street bike lanes provide a high level of mobility for bicyclists

Bicycle Lane Design Standards

1) Striped bicycle lanes are required on Major and Minor Arterial streets and Major Collector streets when those streets are newly constructed, are constructed to urban standards, or are widened for major vehicular capacity increases.* (These situations are defined elsewhere in this document as Major Projects, and are considered projects which may be initiated by the City if they have been included in the adopted TransPlan.)

2) Bicycle lanes shall be a minimum of 5' wide and shall be free from obstacles such as drainage grates and utility covers.

** On Neighborhood Collector streets, bicycles generally share the travel lane with motor vehicles, therefore, striped bicycle lanes are not usually required on these streets. Exceptions to this standard may occur on particular Neighborhood Collector streets, if specified in city-adopted plans or policies.*

On-Street Parking

Design Guidelines

1) Appropriate levels of on-street parking should be provided on certain streets to:

- a) increase pedestrian comfort and safety by buffering pedestrians from automobile traffic;
- b) support increased economic activity by increasing the visibility of storefronts and signage to motorists parking on the street;
- c) support increases in development density and reduction of development costs for small business by reducing the need for on-site parking;
- d) support traffic calming efforts on a street by introducing “friction” and narrowing the perceived width of the street;
- e) provide spaces for on-street passenger and freight loading and unloading in intensively developed areas;
- f) provide space for visitor parking in residential areas; and
- g) reduce speeding by reducing the width of overly-wide streets.

2) On-street parking decreases the capacity of the adjacent travel lanes between 3% and 30% depending on the number of lanes and the frequency of parking maneuvers. Balance the demand for through-traffic movements, with local access requirements, and with the attributes listed in On-Street Parking Guideline #1, when deciding where to provide on-street parking.

3) Parallel parking is the preferred parking layout for on-street parking on Eugene’s streets. On-street diagonal parking can be considered as an option in certain circumstances and on a case-by-case basis. Optimal circumstances for provision of diagonal parking include adequate overall street width and low volume, low speed vehicular traffic.

4) To avoid expensive retrofits, provide for on-street parking based on the planned, rather than the existing, land use pattern and densities.

5) Parking lanes on arterial streets may need to be wider than other streets to provide an extra margin of safety between parked cars and adjacent bicycle lanes or vehicle travel lanes.

6) On-street parking may be provided on major arterial streets only after a parking demand and supply study has been completed and the desirability and feasibility of on-street parking has been verified. A parking study shall



Parking bays, like this one on 5th Avenue, allow on-street parking while reducing overall street width

consider, among other factors, the nature of adjacent land uses, the degree to which the street is nearing design capacity, and the presence of bicycle lanes on the street.

7) As a general rule, parking lanes should be marked at 7' to encourage motorists to park closer to the curb.

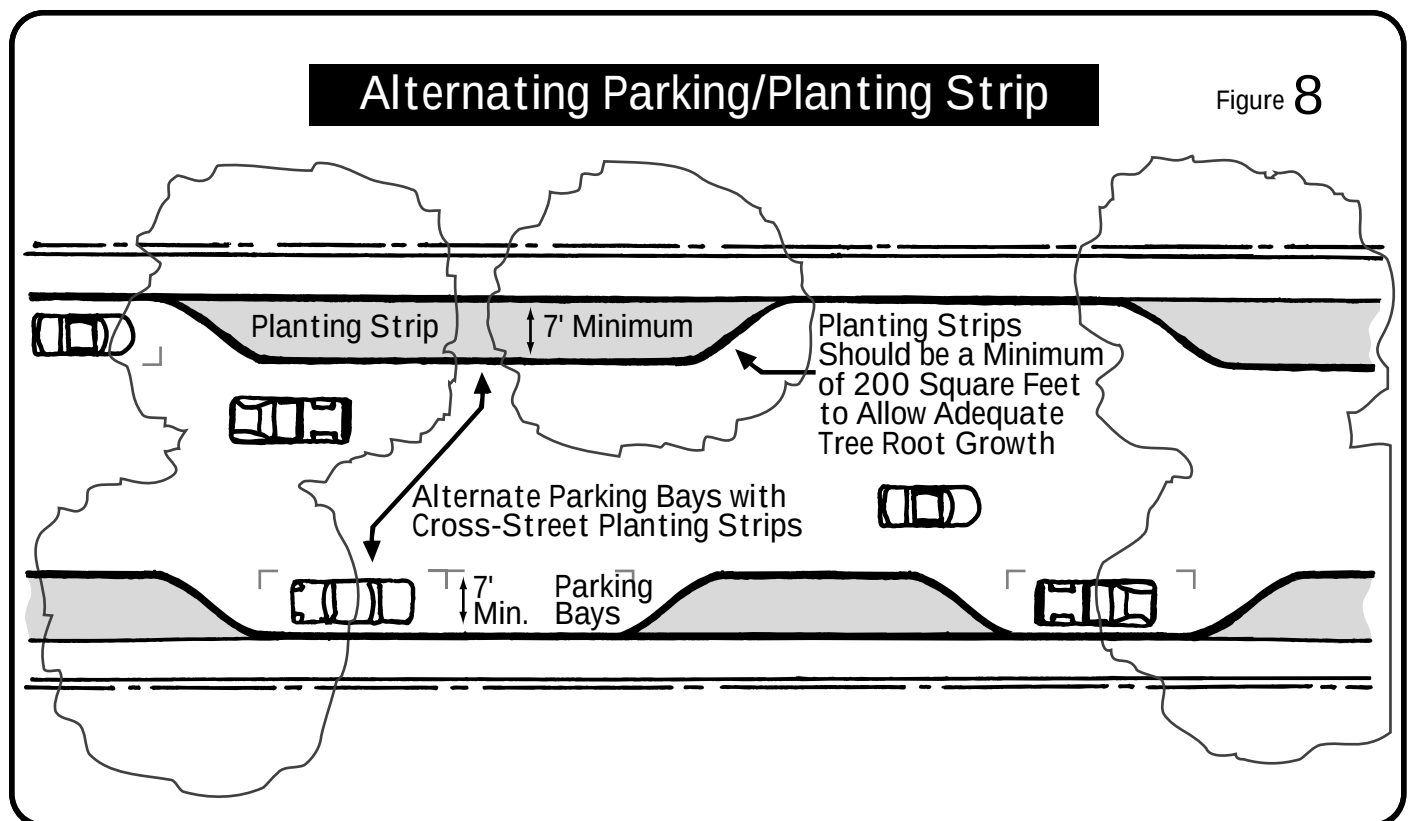
8) When parking is permitted on arterial or collector streets, it may be provided in parking bays which are interspersed with curb extensions and planting strips. The parking areas shall alternate with the planting strip areas as shown in Figure 8.

On-Street Parking Standards

- 1) Parking lane widths on arterial and collector streets shall be a minimum of 7' in width.



Major arterial streets, like Coburg Road, are designed with no on-street parking



Planting Strips and Street Trees

Design Guidelines

1) Street trees should be provided along all arterial and collector streets to:

a) Separate and define the boundaries between pedestrian areas and vehicle use areas. This separation reduces the impacts of traffic volumes and speeds on pedestrians and adjacent land uses;

b) Provide tranquility on the street, slowing the pace and intensity of street activity and enhancing the well being of pedestrians and motorists;

c) Provide shade in the summer and allow sunlight in the winter;

d) Reduce the automobile scale of major streets to human scale;

e) Provide the motorist with a vertical wall, helping motorists to gauge their speed;

f) Create an outdoor room which helps provide a sense of enclosure and security;

g) Reduce air pollution;

h) Provide identity to the street, orientation of the street within the system of streets within a city, and provide a status and prestige to addresses along the street;

i) Reinforce the design and hierarchy of the arterial and collector street system; and

j) Intercept rainfall and absorb stormwater runoff.

2) Provide continuous, uniformly and closely spaced tree plantings to create a continuous canopy along the length of and across the width of the street. Tree spacing should connect to form a continuous tree canopy over the street. A minimum spacing as low as 10 feet is possible depending on the tree species. Closer tree plantings can be achieved when the diameter of the tree trunk will remain relatively narrow.



Planting strips allow for planting of large-scale, high- canopy street trees on major streets

Motorists and bicyclists on the approach to a street must be able to clearly see between trees.

3) Street trees should be planted within center medians. Trees planted within the median reduce the perceived width of the street. This guideline does not apply when there is a strong terminating view, or in downtown areas where strong architectural features should be allowed to dominate the streetscape.

4) Plant street trees in planting strips in areas with less intensive pedestrian and commercial activity, or in tree wells with or without tree grates in areas with more intensive pedestrian and commercial activity.

5) Street trees should be of mixed rather than uniform species to reduce the potential for disease killing off whole populations of trees along a street.



Trees planted within median islands reduce the perceived width of the street.



Tree grates are sometimes used in more urban settings

- 6) Large-scale, deciduous, canopy trees are preferred for street tree plantings
- 7) Select tree species whose canopies do not encroach into pedestrian headroom or into tall curbside vehicles such as buses.
- 8) Preserve existing mature trees through flexible street designs, where possible.
- 9) Encourage agreements with private developers and landowners to plant and maintain trees and other right-of-way plantings.
- 10) Ensure proper sight distance and other safety considerations in designing and landscaping planting strips. Maintenance of street trees within planting strips and medians should be ensured to avoid reduction of sight distance. Certain trees with small trunk diameters can be brought forward, especially in conjunction with the use of curb extensions.
- 11) Consider the potential for utilizing planting strips and medians for stormwater treatment purposes.
- 12) The width of a planting strip between curb and sidewalk should be based on the cross section drawings (Figures 36-56 in this document). The minimum planting strip widths shown in these figures shall be regarded as strongly preferred. Total width will be determined by available (or obtainable) right-of-way, other design features, and site-specific constraints.
- 13) Generally, street trees shall be spaced at intervals between 10 and 50', depending on the species. The average spacing of street trees is 30'.
- 14) Trees at the ends of medians should be maintained with a high canopy to maintain sight distance and permit space for traffic control devices on the median nose. Median tree planting should be extended to the intersection if median widths permits and the median is not required for traffic control devices.



Routine tree maintenance is necessary to ensure healthy street trees

- 15) Along Minor Arterial, Major Collector and Neighborhood Collector streets, planting strips and parking lanes may be constructed within the same area, as depicted in Figure 8.
- 16) Street trees should be planted a minimum of 35' from the midpoint of the tangent of the curb radius at any intersection.

Planting Strip and Street Tree Design Standards

- 1) Planting strips at least 6 feet wide, measured from face of curb to near edge of sidewalk, are required on both sides of arterial and collector streets.
- 2) Planting strips shall be used for the placement of street trees, signs, street furniture, and, to a limited degree, utilities.
- 3) Street trees shall be planted within the planting strip on arterial and collector streets. The planting of street trees is governed by standards and specifications in Public Works Administrative Rule R-7.280 which:
 - a) establishes policies and requirements for planting and establishment of street trees;
 - b) establishes application procedures;
 - c) establishes Street Tree Plan requirements;
 - d) establishes standards and procedures to be utilized in development of a Street Tree Plan, including standards for tree selection; tree quality; tree size; tree condition; planting location; planting procedures; establishment requirements; and tree trimming, pruning and removal; and
 - e) identifies trees that are permitted to be planted within the street right-of-way.

Raised Medians

Design Guidelines

1) Arterial and collector streets may have a raised median area to decrease the potential for accidents, restrict turning movements, limit land access, furnish an aesthetic separation between opposing traffic, encourage lower vehicle speeds, provide a refuge area for pedestrians or vehicles, increase the efficiency and capacity of the street, and provide space for tree and landscape plantings.

2) Medians can be used as part of an overall corridor access management strategy to reduce vehicle conflicts, increase capacity, and reduce accidents.

3) Ensure that U-turns can be negotiated at downstream intersections or median breaks when medians are used for access management.

4) Wide streets can present an impediment to pedestrian crossings. Pedestrian refuge medians and/or landscaped medians with pedestrian refuges should be designed into arterial and collector street intersections with more than three lanes, whenever possible, to reduce crossing distances and improve safety and comfort for pedestrians.

5) Medians that function to limit turns, limit land access, or reduce mid-block accidents can be relatively narrow and still provide the necessary channelization.

6) On streets with constrained right-of-way where it is desirable to provide a median for access management, pedestrian refuge, or aesthetic purposes, consider reducing the

number of travel lanes in each direction, or the width of the lanes.

7) Medians should be used in conjunction with major driveway consolidations.



Medians can be relatively narrow and still provide their intended function

8) Medians should be used for access management on main corridors and on streets with heavy traffic volumes to improve capacity and distribute traffic to side streets and to parking.

9) Coordinate placement and design of medians to accommodate maintenance operations (such as street light maintenance, utility work, etc.) and to insure adequate operating space for fire and emergency medical equipment.

10) Medians at critical intersections can have a specialized dropped, low curb where emergency responders require specialized access.

11) Landscaped medians are used to provide an aesthetic separation between travel lanes and must provide adequate room for tree root growth. The width of landscape medians is variable, depending on the varieties of trees and shrubs planted in the median. (See Figure 11)



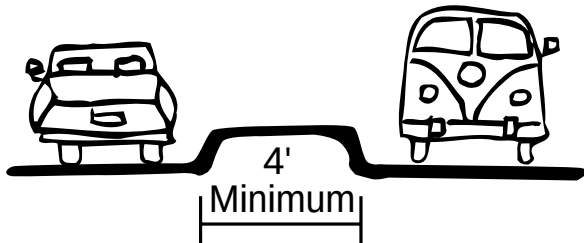
A landscaped median on Terry Street

Raised Median Design Standards

- 1) Standards for raised medians are the same for both arterial and collector streets.
- 2) The preferred raised median width is 10' when used to limit land access or control turning movements. The minimum width of medians used for this purpose shall be 4'. (See Figure 9).
- 3) Medians used as a pedestrian refuge shall be a minimum of 6' in width to enhance pedestrian safety. (See Figure 10). Medians used as a pedestrian refuge or to facilitate pedestrian and bicycle movements shall be designed with at-grade cuts at all intersections.
- 4) The preferred raised median width for provision of turning bays is 14'; the minimum width for this type of median is 12'.
- 5) Raised medians shall be designed at standard (6") curb height.

Channel Median

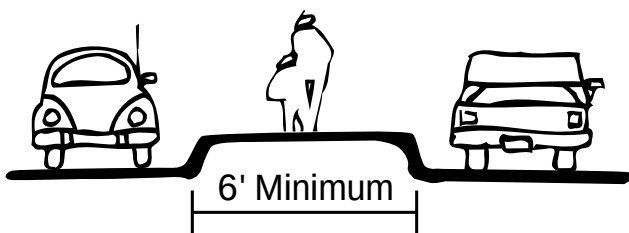
Figure 9



3) Medians used as a pedestrian refuge shall be a minimum of 6' in width to enhance pedestrian safety. (See Figure 10). Medians used as a pedestrian refuge or to facilitate pedestrian and bicycle movements shall be designed with at-grade cuts at all intersections.

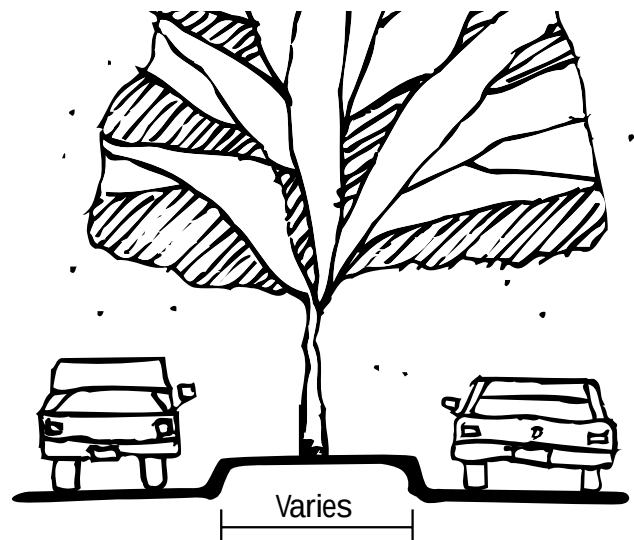
Pedestrian Refuge

Figure 10



Landscaped Median

Figure 11



Left Turn Lanes

Design Guidelines

- 1) Arterial and collector streets may have a continuous two-way left turn lane to channelize and remove turning traffic from through traffic lanes, or to provide additional separation between traffic moving in opposite directions.
- 2) Continuous two-way left turn lanes are most useful on streets where driveways and intersections are frequent.
- 3) The preferred width for provision of a painted continuous two-way left turn lane is 12 feet.
- 4) Left turn lanes at intersections and continuous left turn lanes may be required on major collector streets in commercial, industrial, and multi-family residential areas.
- 5) Neighborhood collector streets shall not be designed with continuous left-turn lanes but left turn lanes at intersections with higher volume streets may be required.

Left Turn Lane Design Standards

- 1) All left turn lanes on collector and arterial streets shall be a minimum of 10' in width.



A center turn lane on River Road

Mid-block Crossings

Design Guidelines

1) The preferred location for pedestrian crossings is at intersections. However, mid-block pedestrian crossings can be considered and installed under certain conditions. Decisions to install mid-block crosswalks and refuges should be based on appropriate traffic “warrants” to minimize potential adverse effects of inappropriately placed crossings.

b) provide pedestrians reasonable crossing places when there are long distances between signalized intersections;

c) meet the needs of pedestrians crossing between high pedestrian generators, such as a parking lot on one side of the street serving an office complex or hospital on the other side of the street;

d) provide visual cues that allow approaching motorists to anticipate pedestrian activity and unexpected stopped vehicles;

e) help channel pedestrians to the nearest available crossing point;

f) help facilitate access to and use of public transit;

g) help motorists identify important school crossings; and

h) make pedestrian behavior more predictable.

4) Generally, an engineering evaluation will be used

to determine the need for mid-block crossings on major streets where one or more of the following conditions exist:

2) Mid-block crossings may be used to provide street-crossing points for pedestrians on major streets in areas with infrequent intersection crossings or where the nearest intersection crossing creates substantial out-of-direction travel.

3) Where warrants are met, mid-block crossings can be used to:

a) provide pedestrians with reasonable opportunities to cross streets during periods of heavy traffic, and when there are few naturally occurring gaps in the approaching traffic streams;

a) protected intersection crossings are spaced greater than 600 feet, or so that crosswalks are located more than 400 feet apart in high pedestrian volume locations, or areas with frequent elderly and school pedestrian traffic, and

b) speeds on the roadway are 40 m.p.h. or less with pedestrian crossing volumes (for peak four hours) exceeding 25 on streets with average daily traffic (ADT) volumes exceeding 10,000. At locations where significant numbers of pedestrians are children, elderly, or disabled, minimum crossing thresholds are 10 pedestrians per hour (peak four hours) on streets with average daily traffic (ADT)



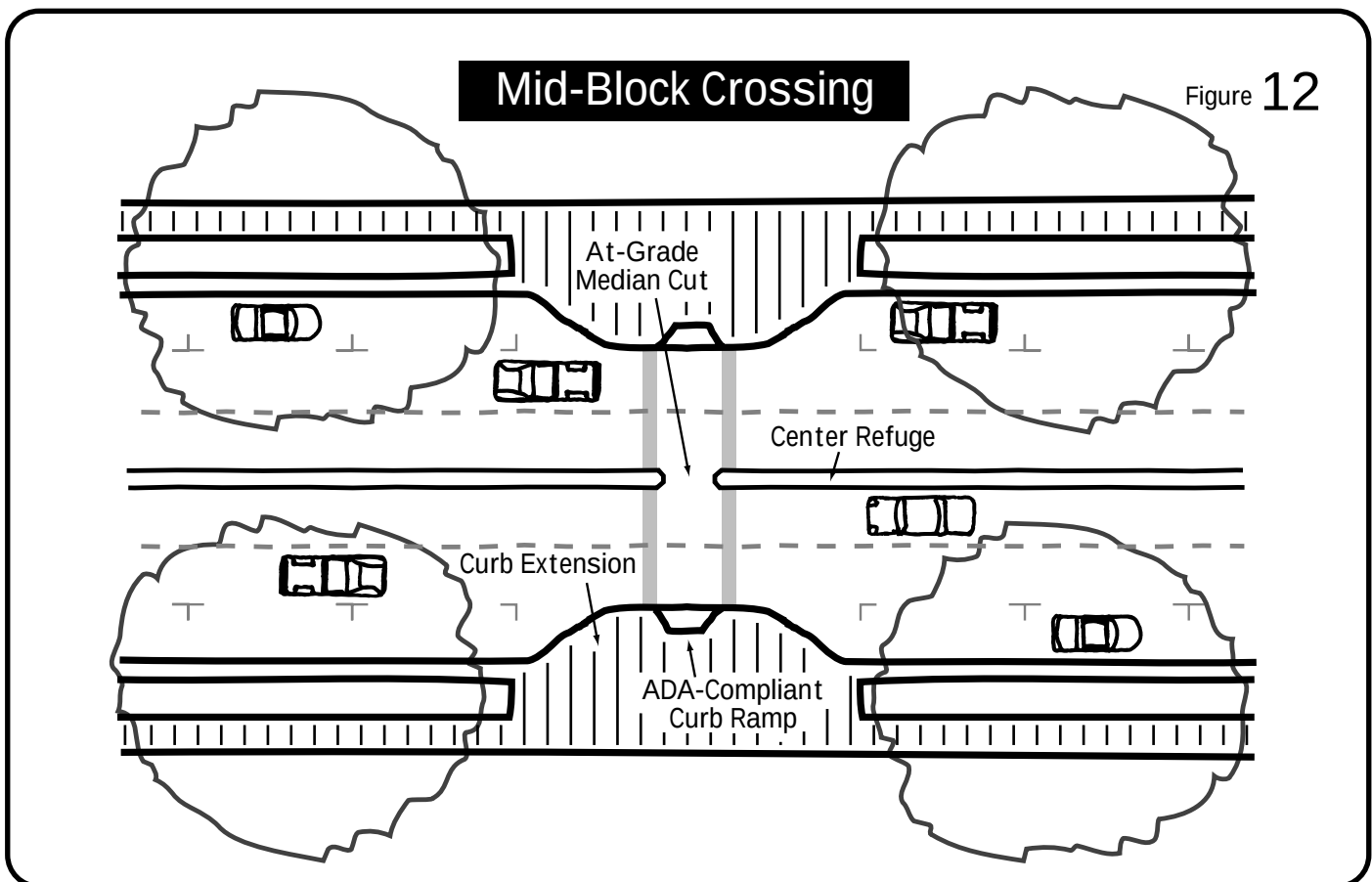
This mid-block crossing improves pedestrian safety on Willakenzie Road near Sheldon High School

volumes exceeding 10,000. An engineering investigation to determine adequate sight distance, traffic speeds, gap availability and pedestrian volumes shall determine the applicability of the above criteria.

5) Where right-of-way, travel lane, and bike lane configuration allow for their construction, curb extensions and/or raised median islands should be provided at mid-block crossings to increase pedestrian and driver visibility, and to reduce pedestrian crossing distances. (See Figure 12).

6) Mid-block crossings should be marked with ladder-style (continental) markings to increase visibility.

7) The need for mid-block pedestrian crossings will be evaluated by the City of Eugene Public Works Transportation Division. A determination of the need for a mid-block crossing will be issued by the Division and will be based on relevant factors established by the Manual on Uniform Traffic Control Devices (MUTCD) including sight distance, vehicle speed, accident records, illumination, traffic volumes, type of pedestrian, nearby pedestrian generators, and other factors that are used to satisfy a warrant. Mid-block crossings may be provided with pedestrian-activated signals and appropriate advance warning devices upon a finding, based on traffic engineering study, that the location satisfies warrants established in the Manual for Uniform Traffic Control Devices. Established school crossings are high-priority locations for such studies.



8) Mid-block crossings will be illuminated.

9) Where mid-block crossings penetrate raised medians, the median will be provided with at-grade cuts or with Americans with Disabilities Act ADA-compliant wheelchair ramps. (See Figure 12)

10) Crossing points shall be supplemented with advance crosswalk warning signs for vehicle traffic.



Ladder-style markings increase driver awareness of pedestrian crossing areas

Intersections

Design Guidelines

- 1) Intersection design should consider the trade-offs between increasing vehicle capacity, transit needs, and improving pedestrian and bicycle mobility and safety in situations where conflicts are evident.
- 2) Multi-modal intersection design should consider and accommodate appropriate level of service, design speed, and types of traffic.
- 3) All modes of travel should be accommodated in multi-modal intersections. Intersection widening for additional turn lanes to relieve congestion should provide for and encourage transit movements, as well as safe pedestrian and bicycle movements.
- 4) The preferred location for pedestrian crossings is at intersections. However, mid-block pedestrian crossings can be installed if warrants are met. (See Mid-Block Crossing Standards).
- 5) Wide streets can present an impediment to pedestrian crossings. Pedestrian refuge medians and/or landscaped medians with pedestrian

refuges should be designed into arterial and collector street intersections with more than three lanes, whenever possible, to reduce crossing distances and improve safety and comfort for pedestrians.

6) Generally, provide striped crosswalks at stop controlled intersections when the minimum hourly pedestrian crossing volume (for peak four hours) exceeds 25 on streets with average daily traffic (ADT) At locations where a significant number of pedestrians are children, elderly, or disabled, minimum crossing thresholds are 10 pedestrians per hour on streets with average daily traffic (ADT) identified in the above cited references. Use this guideline as long as the basic criteria governing sight distance speeds, etc. are met. For details regarding this guideline, see references cited in the Mid-Block Crossing section.

7) Median signal heads and pushbuttons should be considered for placement on unusually wide intersections.

8) Provide right lanes at intersections for buses to use for “queue jump” operations. The lane may be exclusive to transit or could include other

vehicles sharing the right turn lane. Additional widening on the far side of the intersection should be considered for far-side bus stops and bus merge areas.

9) Avoid intersection designs with dual right-turn lanes, particularly with one of the lanes being a shared through-right turn lane.



Areas with multiple curb cuts increase accident potential and reduce the efficiency of the street

10) Reduce crossing widths at intersections by either providing curb extensions into the street equal to the width of on-street parking (but not interfering with bicycle lanes) or reduce curb return radius to the maximums stated under the curb return radius section. Exceptions include narrow streets with short crossings, intersections with exclusive right turn lanes, or intersections with a high volume of right turning trucks and buses. (See Figure 13).

11) Extend bicycle lanes up to intersection stop bars or crosswalks. Where bicycle lanes cross through intersections, “skip” markings shall be used to delineate the lane.

12) At intersections with exclusive right-turn lanes, the bicycle lane should be placed to the left of the right-turn lane.

13) Provide bicycle crossing intervals at signalized intersections to accommodate a 10 m.p.h. crossing.

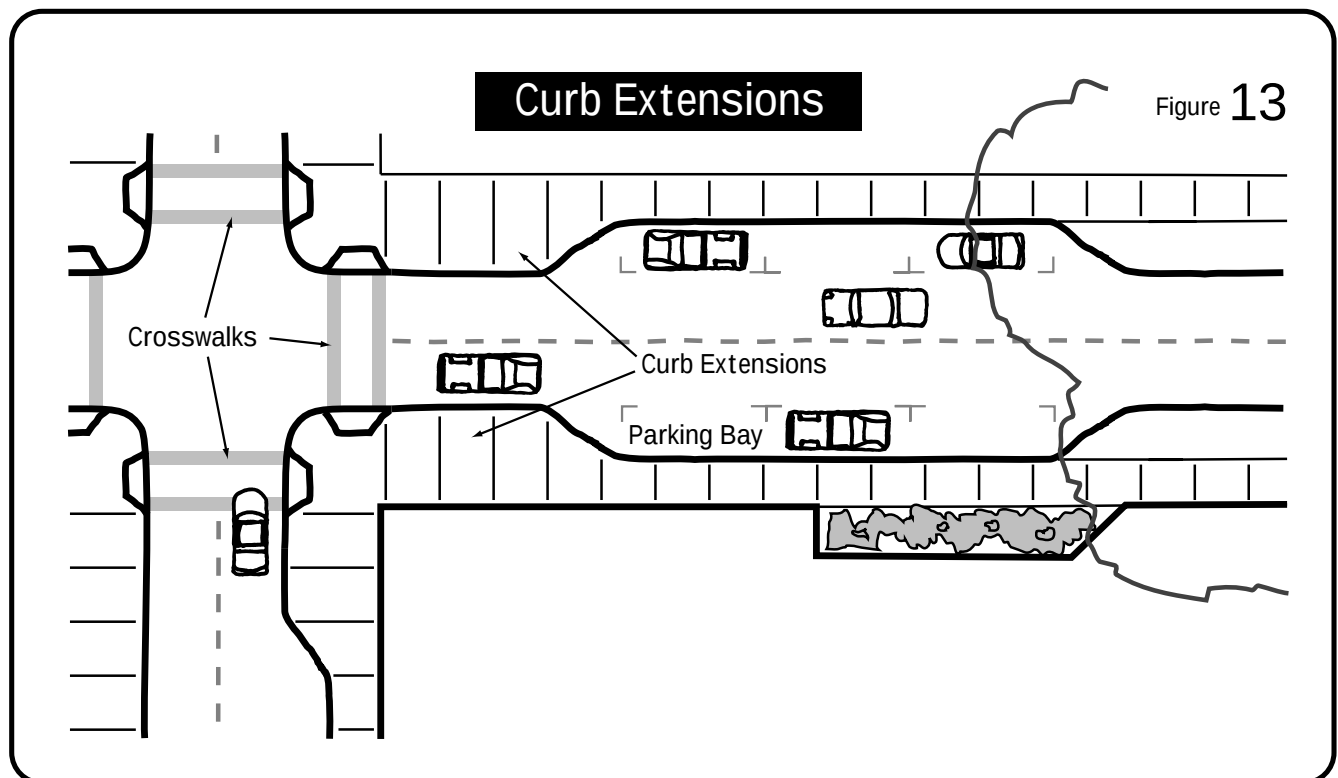
14) Design of any curb return should consider its “effective” radius provided by the presence of

bicycle lanes, parking, and other details before increasing radius size to accommodate bus or truck use.

15) The design of curb return radii should take into account the width of the two intersecting streets, the design vehicle (such as an LTD bus), lane widths, presence of bicycle lanes or on-street parking, etc. In each case, LTD staff and Transportation Division staff shall be consulted to determine the smallest acceptable radius for the benefit of pedestrian and bicycle movement, that adequately provides for bus and truck turns at the intersection. (See Figure 26 in Transit Facilities section of Design Standards and Guidelines).

16) Design of channelized right turn islands (slip lanes) can be considered in locations where street crossing distances, traffic volumes or traffic speeds jeopardize pedestrian safety or comfort. (See Figure 15).

17) Striped crosswalks are to be used:



- a) at all signalized pedestrian crossings
- b) at all intersections on designated school routes

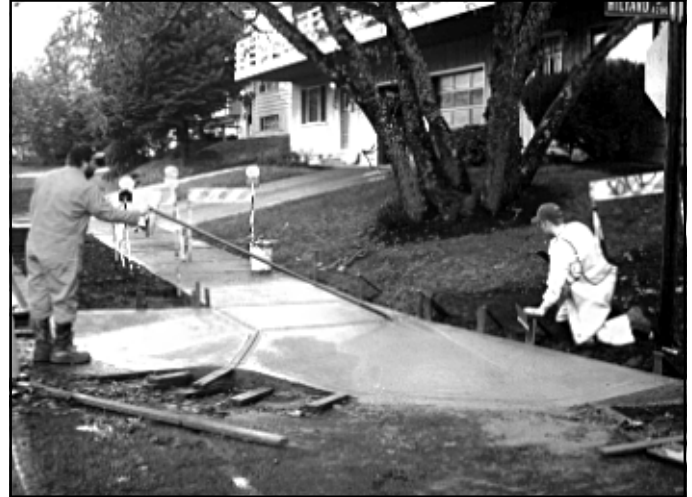
18) Avoid striping crosswalks at unsignalized intersections with inadequate sight distance. Either mitigate the inadequate sight distance or direct pedestrians to alternative crossing locations. Minimum intersection sight distance is based on local, state, or AASHTO guidelines.

19) If a raised median nose extends into the crosswalk, provide an ADA-compliant channel through the median.

20) Use local, state, or AASHTO guidelines to determine decision and stopping sight distance triangles at uncontrolled and stop controlled intersections before striping a crosswalk.

21) Provide illumination for intersections with striped crosswalks.

22) Signal timing for pedestrians shall be based on MUTCD standards.



Curb ramps improve street access for those who use wheelchairs

23) Provide signal heads (Walk/Don't Walk) at all signalized intersections, except where pedestrian movements are prohibited.

24) Provide pedestrian pushbuttons at all vehicle activated signals except where pedestrian movements are prohibited.

25) Provide pedestrian pushbuttons and signal heads on median refuges at signalized intersections where median refuges are used.

26) Provide ADA-compliant wheelchair ramps (two per corner) at all intersections.

27) Install bicycle detectors at traffic-actuated intersections. Provide pavement markings



Push buttons at signalized crossings improve conditions for pedestrians

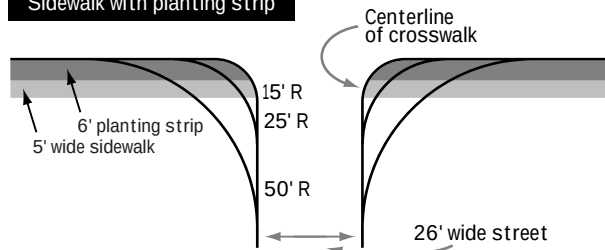
Curb Return Radii Design

Effect of Corner Radii on Pedestrian Crossing Distances

Figure 14

Setback Sidewalk

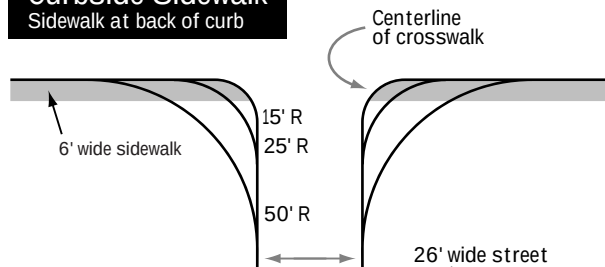
Sidewalk with planting strip



Radius	Crossing Distance	Increase Crossing	Percent Increase
15 feet	26 feet	+0 feet	0%
25 feet	36 feet	+10 feet	38%
50 feet	65 feet	+39 feet	150%

Curbside Sidewalk

Sidewalk at back of curb



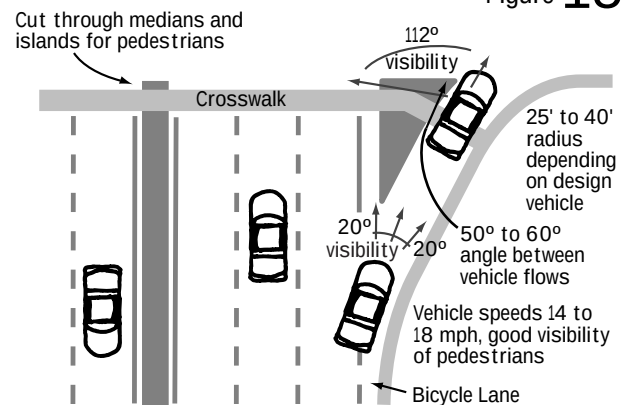
Radius	Crossing Distance	Increase Crossing	Percent Increase
15 feet	37 feet	+11 feet	42%
25 feet	50 feet	+24 feet	92%
50 feet	89 feet	+53 feet	203%

identifying the location of the detector. If bicycle detectors cannot be installed, provide pedestrian pushbuttons accessible from bicycle lanes.

28) Curb return radii and the configuration of medians must be designed to facilitate pedestrian crossings, while accommodating bus and major freight movement. Primary design consideration shall be for pedestrian movements. (See Figure 14).

Right Turn Slip Lane Design

Figure 15



Adjacent Land Use

Design Guidelines

- 1) Site planning and design of buildings adjacent to arterial and collector streets can significantly contribute to the creation of environments that support walking, bicycling, and transit use. Site and building design is an opportunity to redirect private investment to support multi-modal transportation and increase transit ridership.
- 2) Buildings should face the street in all transit oriented development and nodal development areas within the city. Orienting the front entrance of buildings to the street is fundamental to increasing regional and local accessibility to transit, walking and bicycling. It also facilitates pedestrian access and supports pedestrian activity on the street.
- 3) Discourage residential fencing along arterial and collector streets that isolates the development from the street. Encourage residential building orientation to the street by providing for on-street parking wherever possible, and by encouraging on-site parking access via alleys.
- 4) Attempts should be made, wherever possible, to consolidate multiple driveways on arterial streets into single access points.

Design Standards

- 1) To minimize the visual and circulation impacts of extensive sections of fencing along major streets, bicycle and pedestrian accessways or street connections shall be provided at intervals not to exceed 600 feet.



Residential fencing that isolates development from the street is discouraged in the plan

Traffic Calming

Design Guidelines

1) Traffic calming techniques should be applied on selected arterial and collector streets throughout the city, as funding and opportunity permits, to address a variety of quality of life and traffic operations concerns. Traffic calming devices can be used on major streets to:

- a) Keep traffic flowing at a reasonable level of service;
- b) Reduce traffic speeds;
- c) Reduce traffic-related noise levels;
- d) Reduce traffic volumes in selected areas;
- e) Ensure fair and appropriate distribution of traffic throughout a neighborhood;
- f) Improve safety and travel conditions for motorists, pedestrians and bicyclists;
- g) Improve traffic circulation;
- h) Reduce the need for traffic regulation and heightened law enforcement in problem area;

i) Reduce air pollution levels; and

j) Provide increased opportunities for neighborhood revitalization.

2) Traffic calming techniques should not be applied in isolation. Neighborhood-wide traffic calming studies should guide the placement and choice of traffic calming devices.

3) Traffic calming devices used on major streets should not significantly reduce emergency response times or impede delivery of transit services.

4) All new major street projects and major street reconstruction projects should be evaluated for potential application of traffic calming devices and techniques to those streets.

5) All traffic calming devices should be planned and designed in keeping with sound engineering and planning practices, and with careful consideration of long-term, cost-effective maintenance.

6) All traffic calming devices should be planned and designed with significant input by residents and businesses in the affected areas.

A narrow median, curb extensions, and recessed parking calm traffic on E. Broadway, a downtown collector street



7) The following table (Figure 16) should be used as a guideline for initial evaluation of appropriate traffic calming strategies for various types of streets.

Traffic Calming on Major Streets

Figure 16

Traffic Calming Device	Major Arterial	Minor Arterial	Major Collector	Neighborhood Collector
Roundabouts	Yes	Yes	Yes	Yes
Traffic Circles	No	No	No	Yes
Raised Crosswalks	No	No	Yes	Yes
Curb Extensions	No	Yes	Yes	Yes
Parking Bays	Yes	Yes	Yes	Yes
Chicanes	No	Yes	Yes	Yes
Street Closure	No	No	No	No
Half Diverter	No	No	No	No
Diagonal Diverter	No	No	No	No
Star Diverter	No	No	No	No
Raised Median	Yes	Yes	Yes	Yes
Pavement Surface Modification	Yes	Yes	Yes	Yes
Speed Actuated Signing	No	No	No	No
Speed Humps	No	No	No	No
Speed Tables	No	No	No	Yes
Landscaped Roadway	Yes	Yes	Yes	Yes
Midblock Neckdown	No	No	Yes	Yes
Angled Slow Point with Median	No	No	Yes	Yes

Street Lighting and Streetscape Features

Design Guidelines

- 1) The streetscape is defined as the built and planted elements of a street which define the street's character.



Street design features such as these light fixtures along 5th Ave. help define the street's character

- 2) Provide continuity of streetscape features along the length of any street identified as a specific district or area.
- 3) Provide street lighting on arterial and collector streets to:
 - a) Enhance safety for all modes of travel.
 - b) Illuminate the street and sidewalks but minimize unwanted spillover light.
 - c) Enhance the overall safety and appearance of the street and its immediate environment.
- 4) Provide pedestrian-scale lighting, where appropriate, to provide a separation from street traffic and spatial definition that is human scale. Pedestrian-scale street lights should be lower than conventional street lights, should be spaced more closely, and should provide more illumination of the sidewalk. To provide identity to certain districts, consider special light standards such as antique replicas.
- 5) Provide kiosks, benches, newspaper racks, trash cans, bus shelters, cafe tables, hanging flower baskets and chairs to increase the number of opportunities for people to socialize and spend leisure time outdoors along public streets.
- 6) Provide opportunities for "stationary" pedestrian activities. Stationary activities are either standing or sitting, where people choose to stay in a place to observe or participate in public outdoor activities. Seating can be either primary (chairs and benches, such as those found at a cafe or transit stop), or secondary seating (low walls, steps, or fountain edges, where people spontaneously collect).

Design Standards

- 1) Street lighting shall be provided on arterial and collector streets, in accordance with standards of the Illumination Engineering Society of North America (IES).

Streetscape Features

Design Guidelines

- 1) Transitions occur in areas where land use type, right-of-way width, or street type change. Transitional areas provide opportunities for gateways or other design treatments that mark or signify change.
- 2) Street transition treatments should be located at intersections or at the boundaries of significant changes in land use.
- 3) Use transitional treatments to improve unattractive “leftover” areas, and to provide identity and continuity to street design.
- 4) Use curb extensions as a landscaped transition from wider streets to narrower streets. (See Figure 17).

