Image Credit: Rhodeside & Harwell

2 STREET & STREETSCAPE DESIGN

INTENT

Streets are a vital component of livable, attractive communities and help to define the character of the CRDs and CRAs. How the streets and their associated components are implemented has an effect on the quality of life of the people who use them and on the economic vitality of their surroundings. Well-designed streets and their adjacent streetscapes can encourage the use of transit and support walking and bicycling, which results in healthier, more sustainable communities. Therefore, residents, employees, and visitors should have access to safe, convenient and attractive streets and streetscapes throughout their community–whether they are walking, driving, bicycling, or taking public transportation.

Streets are defined as the area between the curbs that is dedicated to vehicular and, in certain circumstances, bicycle travel, and may include medians between directional travel lanes. Streetscapes are the areas located between the building facade or build-to line and the curb. These areas are comprised generally of browsing areas (areas adjacent to buildings where activities such as window shopping and outdoor seating can occur), sidewalks, seating, lighting and landscaping, and may also include bicycle facilities. The character of individual streets and streetscapes will vary depending on the guidance in the Comprehensive Plan, as well as the scale and character of the adjacent land uses.

Excessive street widths and large amounts of pavement can detract from a compact pedestrian-oriented environment. A balance must be achieved between accommodating all components of the street and streetscape and minimizing the amount of land required for them to function. This is particularly true with redevelopment, where new buildings are fitted into an existing environment of streets and buildings. If all streetscape elements cannot be incorporated into a proposed project, designers should work with the County to understand street and streetscape priorities for the particular circumstance. In addition to the roadway's function between curbs, adequate sidewalk width and the provision of sufficient planting area for street trees within the Landscape Panel are frequently the priorities for constrained streetscapes in the CRDs and CRAs.

INSPIRATION

Fairfax, VA

Montreal, Canada

Washington DC

Shirlington, VA

Portland, OR

The design of streets and streetscapes incorporates many elements that contribute to a high-quality environment, including pedestrian and bicycle infrastructure, streetscape furnishings, trees, and sustainable design features, as depicted in these images

2A COMPLETE STREETS

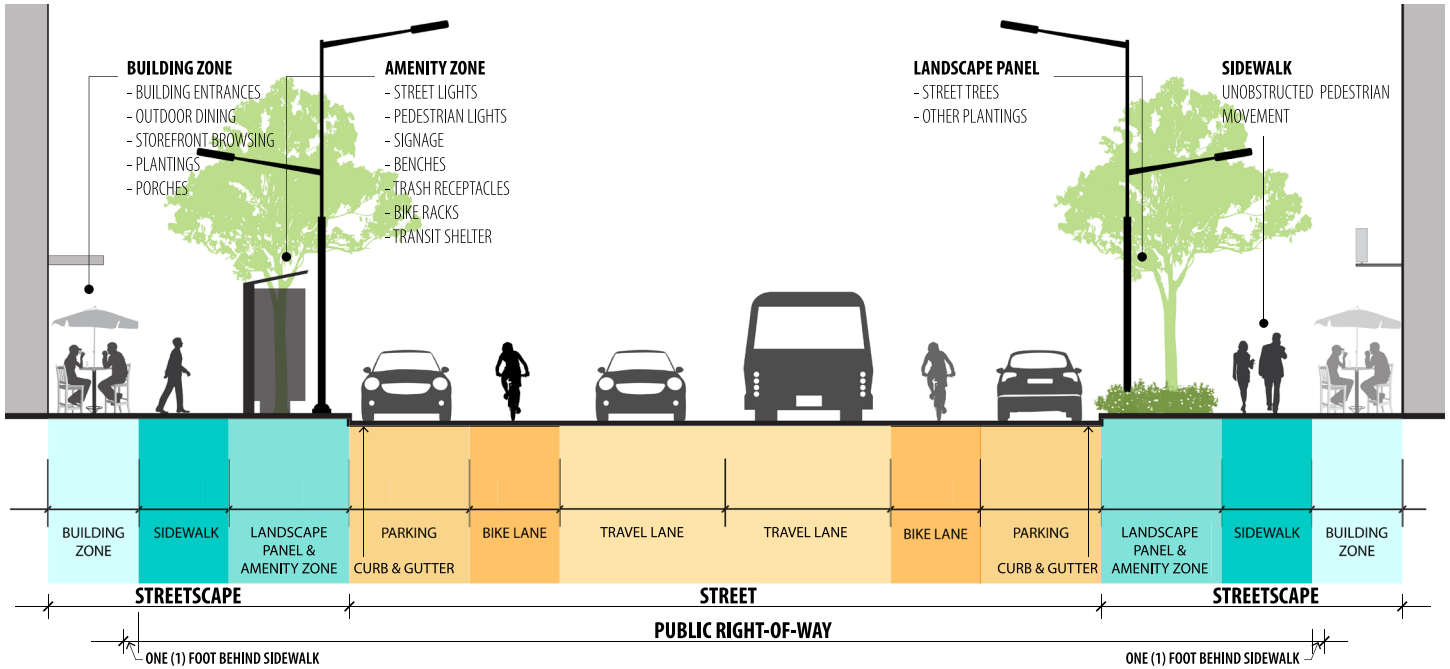
Since 2006, Fairfax County has maintained a policy to incorporate Complete Streets principles into the design of new or improved roadways. A Complete Street approach to street design integrates people and placemaking into the planning of the circulation networks to ensure that streets and their associated bicycle, pedestrian, and transit facilities are safe and comfortable for people of all ages and abilities. Complete Streets balance the needs of different travel modes and support land uses, local economies, and the environment. Complete Streets encompass both the streets and the streetscape in an integrated manner that is intended to place pedestrians, cyclists, and transit riders on equal footing with motor vehicle users. Complete Streets should be designed to respond to the community context and the needs of intended users. Furthermore, the use of innovative designs that address environmental impacts and promote active, healthy communities is encouraged in the design of Complete Streets.

The Volume II: District Design Guidelines for the individual CRD or CRA provides cross-sections for the design of streets and streetscapes in accordance with the Complete Street policy. The cross-sections illustrate the location and dimensions of each component of the street's configuration *(See Graphic 2: Street and Streetscape Components Section that represents a prototypical example of a street cross-section with its various components)*.

Additional resources for street design incorporating a Complete Streets approach include:

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Design and Safety of Pedestrian Facilities: A Recommended Practice of the Institute of Transportation Engineers
- Manual on Uniform Traffic Control Devices (MUTCD)
- National Association of City Transportation Officials (NACTO) Urban Street Design Guide
- VDOT and Department of Rail and Public Transportation's Multimodal System Design Guidelines

GRAPHIC 2: STREET AND STREETSCAPE COMPONENTS



2A.1 STREET AND STREETSCAPE COMPONENTS

STREET COMPONENTS

The following street components are located in the right-of-way:

- **Medians** are the strip of land located between the travel lanes of opposing traffic on a divided street. They can also be used as a buffer between modes (such as to provide a barrier between cyclists and moving vehicles) or to separate local and through traffic. Medians can include plantings and can accommodate transit facilities, pedestrian pathways and refuges, turn lanes, street lighting, and signage. Generally, medians range in width in from 4 to 16 feet, or wider, depending on the street type and desired function. A 1-foot buffer between the travel lane and the curb of the median is generally required.
- **Travel lanes and turn lanes** are lanes for the movement of vehicles. A turn lane may be incorporated within the travel lane or provided as an additional exclusive lane. On streets without dedicated bicycle facilities, vehicles must share the travel lane with cyclists. In CRDs and CRAs, the preferred width of travel lanes and turn lanes is 11 feet wide for most streets.
- **Bicycle facilities** are lanes and trails designed for the movement of cyclists. They can be designed as dedicated facilities for the exclusive use of cyclists or shared with other modes, such as a shared-use trail where pedestrians and cyclists co-mingle. A bicycle facility generally ranges from 5 to 10 feet in width depending on the facility type and roadway conditions.
- **Curb and Gutter** are a 2.5-foot-wide continuous element that separates the street from the adjacent streetscape and acts to control stormwater runoff. If on-street parking is provided, the 2-foot gutter can be included within the width of the parking lane.

STREETSCAPE COMPONENTS

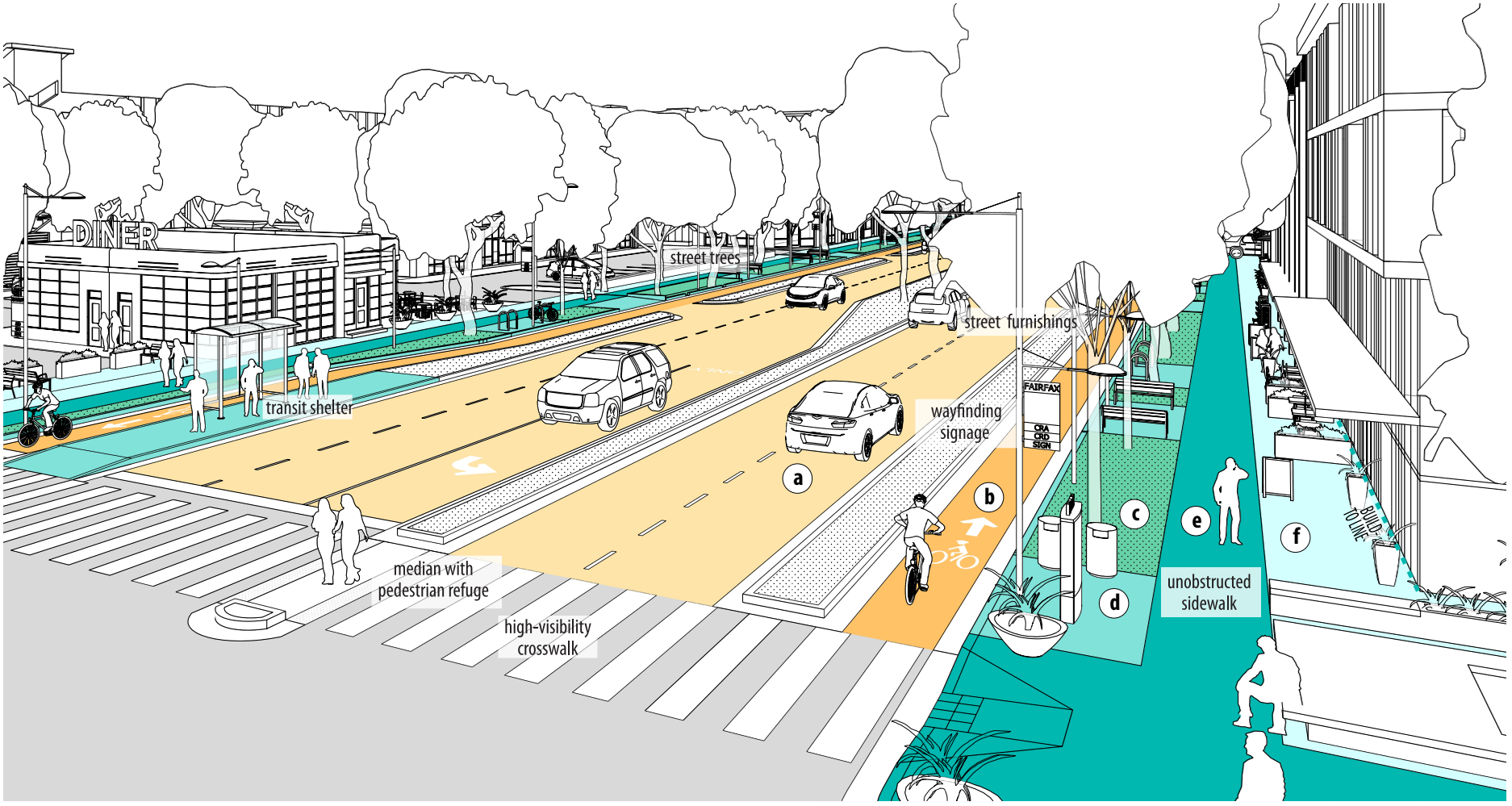
All streetscape types include components that are located within and outside of the right-of-way. The following are typically located within the right-of-way on public streets *(See Graphic 3: Elements of Complete Streets)*:

- **Landscape Panel**: the area adjacent to the street, which includes space for street trees, other plantings, street lights, and signage. In general, Landscape Panels should be 8-feet wide to accommodate street trees, but can be smaller depending on specific conditions.
- **Amenity Zone**: the paved area (constructed of porous or impermeable hardscape materials) located within the Landscape Panel that is designated for pedestrian and bicycle amenities including seating, bicycle racks, bus shelters, and other street furnishings. Amenity Zones are generally the same width as the Landscape Panel and can range in length depending on furnishing requirements.
- **Sidewalk**: the hardscape area reserved exclusively for pedestrian movement that is clear of any obstructions. New sidewalks generally range in width from 5 to 8 feet, but can be much wider, if needed to accommodate pedestrian activities.

The following is located outside of the right-of-way on private property:

- **Building Zone**: the area between the sidewalk and the face of the building that is designated for building-related elements including building entrances, outdoor dining, browsing, plantings, and residential porches or stoops. The width of the Building Zone varies depending on the street type. On all streets, a 1-foot VDOT maintenance easement should be included adjacent to the sidewalk in the Building Zone.

GRAPHIC 3: ELEMENTS OF COMPLETE STREETS



(a) TRAVEL LANE
Reserved for vehicular travel and turning movements

(b) BIKE LANE
Reserved for unobstructed bicycle travel

(c) LANDSCAPE PANEL
Retained for street trees and plantings

(d) AMENITY ZONE
Designated for seating, bike racks and furnishings

(e) SIDEWALK
Reserved exclusively for pedestrian movement without any obstructions

(f) BUILDING ZONE
Designated for building-related elements including outdoor dining, awnings, plantings, porches, etc.

2A.2 MULTIMODAL STREET TYPES

VDOT, in conjunction with the Virginia Department of Rail and Public Transportation (DRPT), has developed Multimodal System Design Guidelines to promote the integration of safe, functional and comfortable facilities for motorists, bicyclists, pedestrians and transit riders in Virginia's more urban areas. These guidelines support the principles of walkability, context-sensitive street design, and transit-oriented development. They include a functional classification system for public streets that is being applied in Fairfax County's activity centers, including its CRDs and CRAs.

The functional classification system in the Multimodal System Design Guidelines contains five multimodal street types, as described in this section. The Volume II: District Design Guidelines for a specific CRD or CRA and its street network map(s) should be consulted to ascertain the corresponding street classification for each roadway within the CRD or CRA.

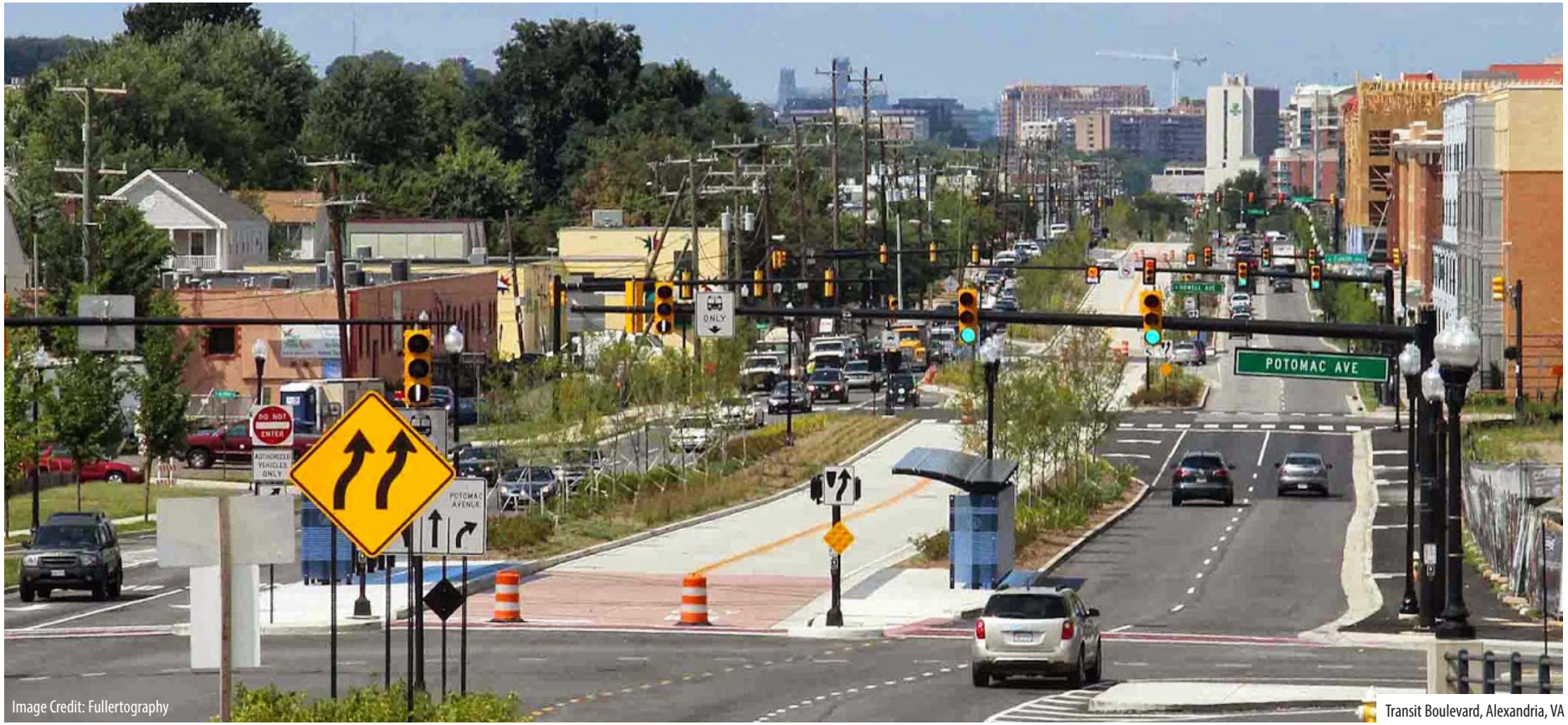


Image Credit: Fullertography

Transit Boulevard, Alexandria, VA

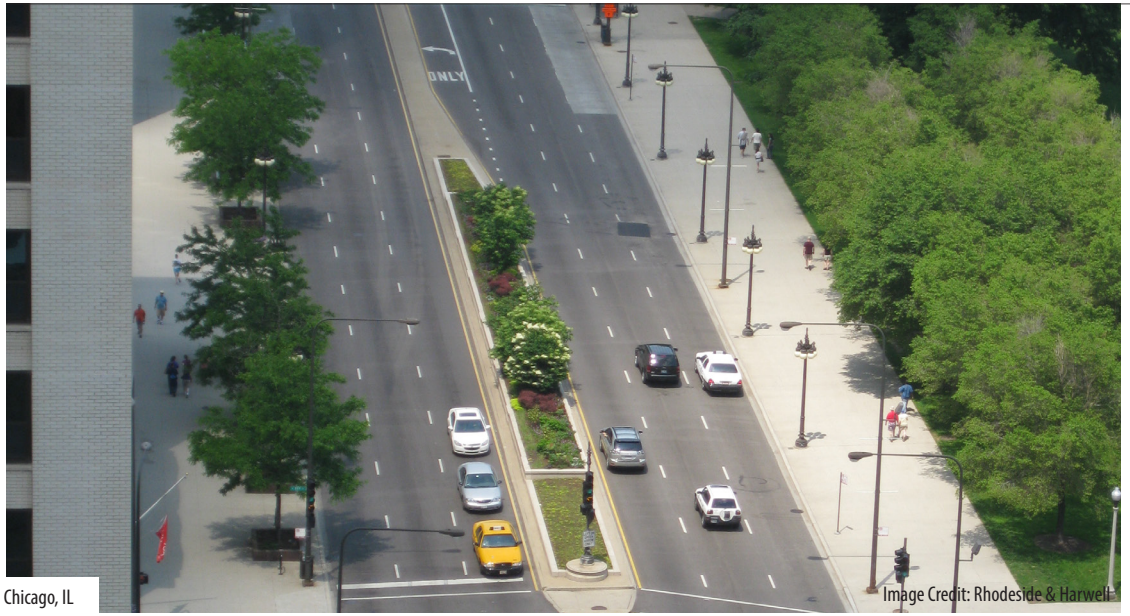
MULTIMODAL STREET TYPES

Fairfax, VA

Image Credit: VDOT

MULTIMODAL THROUGH CORRIDOR:

Multimodal Through Corridors are high-speed roadways that are designed to connect multiple activity centers. They are intended to accommodate through automobile traffic and bus service, and generally have limited intersections with other roads. Multimodal Through Corridors can accommodate high speed commuter transit because they are designed to have few impediments to traffic flow. However, high speeds limit pedestrian and bicycle mobility and, therefore, separated facilities such as multi-use trails and sidewalks should be incorporated into the design of this roadway type. Design speeds for Multimodal Through Corridors range from 35 to 55 mph.



Chicago, IL

Image Credit: Rhodeside & Harwell

BOULEVARD & TRANSIT BOULEVARD:

Boulevards, including Transit Boulevards, are high capacity roadways that accommodate multiple motorized and non-motorized modes of travel. Boulevards allow for higher traffic volumes and greater efficiency of vehicular movements than do Major Avenues, Avenues, and Local Streets. They typically have four to six travel lanes, but may have eight lanes in certain circumstances. Boulevards provide safe and convenient pedestrian and bicycle access to adjacent land uses and feature a median; their streetscapes typically include a Landscaped Panel, street trees, and wider sidewalks. Transit Boulevards are typically found in urban centers that have sufficient density and market demand to support transit and may contain a dedicated right-of-way for transit. Design speeds for Boulevards and Transit Boulevards range from 30 to 35 mph.

MAJOR AVENUE:

Major Avenues serve the highest density of destinations and intensity of activity, while accommodating the greatest mix of travel modes; as such, high levels of pedestrian and street activity are common. Major Avenues are characterized by wide streetscape areas to accommodate both pedestrians and a variety of outdoor activities, including retail and other street activities. Major Avenues are typically comprised of four or fewer travel lanes for motor vehicle trips, and provide facilities for bicycling. They can have high transit ridership for local bus routes and may include space dedicated to on-street parking. Vehicles and buses on Major Avenues travel at slower speeds as a result of frequent vehicular and pedestrian crossings. Design speeds for Major Avenues range from 30 to 35 mph.

Image Credit: Google Earth

Portsmouth, VA

AVENUE:

Avenues are relatively low-speed roadways that facilitate short trips. Avenues provide a balance between access to the adjacent land uses and the movement of vehicular, bicycle and pedestrian travel. While serving fewer destinations than Major Avenues, Avenues are also characterized by frequent pedestrian and bicycle activity and should have wide streetscape areas to accommodate a range of activities. Avenues typically have three (one lane in each direction with a center turn lane) or fewer lanes and do not exceed four lanes. Avenues may have on-street parking and often provide dedicated bicycle facilities. Avenues have a 25-30 mph design speed.

Image Credit: Google Earth

Fairfax, VA

LOCAL STREET:

Local Streets carry the lowest volumes of vehicle trips, have the slowest travel speeds and provide the highest level of access to and from the roadway. They frequently incorporate on-street parking. Bicyclists typically share the road with vehicles because travel speeds are slow and vehicular traffic is less constant; however, separate sidewalks are needed to accommodate pedestrians. Most streets in the planned street grids within the CRDs and CRAs are Local Streets. Single-family residential areas are primarily served by Local Streets. These streets generally connect to Avenues, Major Avenues, or Boulevards and funnel longer trips to these higher-capacity roadway types. Local Streets have a 25 mph design speed.

Image Credit: Re:Streets

Portland, OR

2B STREET NETWORK

The planned street networks in the CRDs and CRAs are designed to support local circulation, while accommodating through traffic. When well-connected, the street network provides alternative options for navigating an area by supporting travel by multiple modes of transportation and by reducing reliance on major roadways for all trips.

The planned street network should be considered early in the initial conceptual design phase of a development proposal. The Comprehensive Plan and the District Design Guidelines for the CRDs and CRAs describe both the existing and planned street network, including street cross-sections, street configurations and required rights-of-way for the various street types within the individual CRDs and CRAs.

The following recommendations are applicable to all street types. They supplement and further detail the street and streetscape guidance contained in the Comprehensive Plan for the individual CRDs and CRAs. It is also necessary to consult the guidance for the specific CRD/CRA in Volume II to determine whether there are specific recommendations for those areas.

RIGHT
An urban grid of streets that provides a well-connected street network with smaller scaled blocks to encourage walking and biking
Image Credit: Fairfax County

DESIGN PRINCIPLES

Establish a safe, multimodal circulation system as the primary organizing feature of a site. As specified in the Comprehensive Plan, the urban design vision for the CRDs and CRAs calls for the creation of a safe, multimodal circulation system consisting of a well-coordinated network of streets, sidewalks and bicycle facilities, with an emphasis on pedestrian, bicycle and transit mobility. The design of a site should fully consider the needs and convenience of the pedestrian through the provision of sidewalks and trails that encourage walking and biking and that reduce dependency on vehicular trips.

Prioritize public streets over private streets. Public streets, as opposed to private streets, are preferred for all new roadways based on maintenance, design, connectivity, law enforcement, and public access considerations. However, there may be instances where private streets are desired to achieve certain placemaking objectives. For example, larger, consolidated developments may choose to create a "festival street" which can be closed to vehicular traffic at select times for events. Private streets may also incorporate special features such as unique wayfinding, landscaping, streetscape components, and/or pavement materials that do not meet VDOT standards.

Create an efficient local street network with pedestrian-scaled blocks. In general, a network of local serving streets that form smaller, walkable development blocks is the most successful approach to improving local circulation and promoting walking. Pedestrian-scaled, well-defined development blocks also support the efficient layout of developments.

DESIGN STRATEGIES

1 MULTIMODAL AND COMPLETE STREETS

A. Proposed developments should incorporate the recommended multimodal street network that provides the necessary transportation infrastructure for all appropriate travel modes.

B. Particular attention should be paid to maximizing the use of non-vehicular travel modes including bicycle and walk-trips.

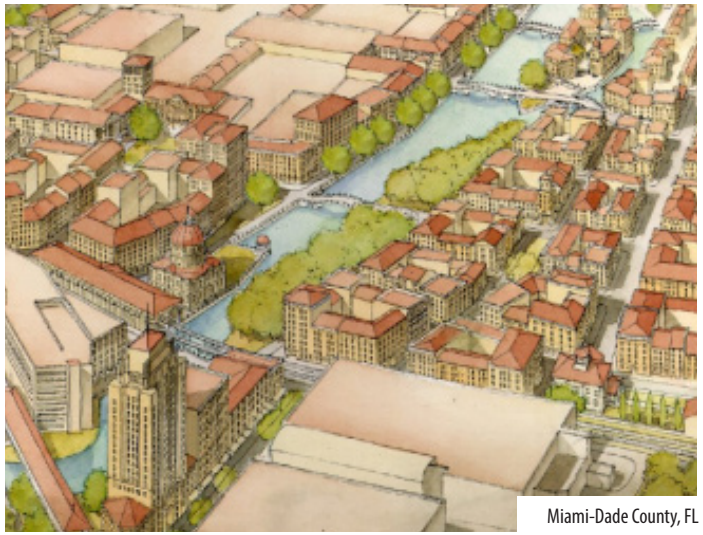
C. Development plans should indicate circulation routes for each transportation mode and should ensure that there are no gaps in the routes.

D. Streets should be designed to minimize and mitigate conflicts between travel modes (pedestrians, bicyclists, motorists and transit users) by, among other things, limiting the number of driveways and access points, determining the most suitable locations for frequent and convenient pedestrian crossings and signals, and ensuring that pedestrians can easily access uses without having to walk unnecessarily across travel ways.

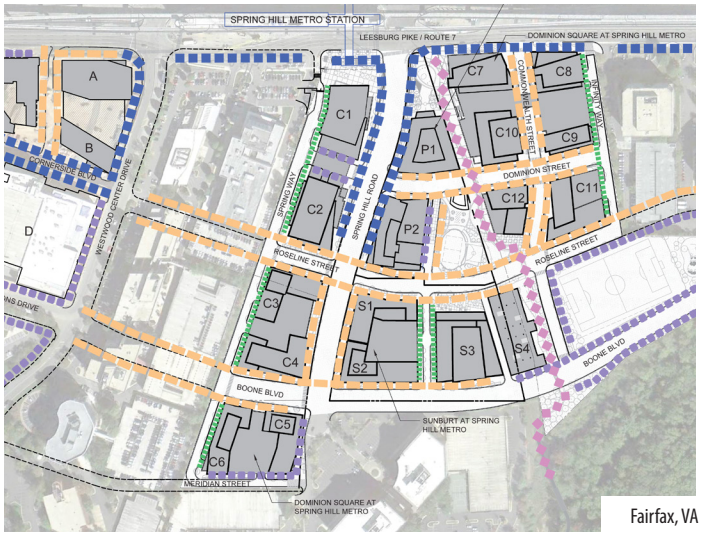
E. On-street parking should be incorporated on all streets where permitted to provide convenient parking for businesses and residents, disperse parking around the CRD or CRA, buffer pedestrians, and in certain instances, buffer cyclists from moving vehicles.

F. Lane widths for vehicle travel should be the minimum permitted to assist in managing roadway speeds, decreasing crossing distances for pedestrians, reducing the extent of impervious pavement, and increasing space for sidewalks and streetscape amenities.

G. Transit shelters should be provided at all transit stops. Transit amenities that benefit pedestrian safety and comfort as well as transit operations should be provided at key locations. *See section 2K ("Transit Shelters") for additional detail regarding the location and design of transit shelters.*



Miami-Dade County, FL



Fairfax, VA

LEFT
Kendall, a community replanned around natural features, existing uses, and a new grid of streets
Image Credit: Dover, Kohl & Partners

RIGHT
Pedestrian plan and street hierarchy organized within new street blocks in Tysons
Image Credit: Land Design

Boulder, CO

TOP
Projects can facilitate pedestrian movement by incorporating mid-block pedestrian pathways
Image Credit: rnldesign.com

DESIGN STRATEGIES (CONTINUED)

H. Pedestrian-scaled lighting and furnishings should be incorporated on all streets for pedestrian safety and comfort. *See section 2F ("Landscape Panel and Amenity Zone") for additional detail regarding pedestrian-scaled lighting and furnishings.*

I. Raised and planted medians are encouraged for stormwater collection, aesthetics and to provide an adequate buffer for waiting pedestrians. Center medians should be visually appealing using trees, plantings, and hardscape materials that are similar to those used in the streetscape, as may be permitted by VDOT.

2 EFFICIENT AND ADAPTABLE BLOCK DESIGN

A. New blocks formed by the street network should facilitate the efficient use of space. These should be regularly shaped, rectangular blocks that maximize the use of developable land, support walking, are adaptable, and are easy to navigate.

B. Blocks should generally be between 300–600 feet in length, while the perimeter of a bock should not exceed 2,000 feet. This block size, accompanied where necessary by mid-block connections (including breaks in buildings and pedestrian passages through buildings), provides the framework for a safe, pedestrian-oriented environment.

3 NEIGHBORHOOD PROTECTION

A. Changes in traffic patterns should not result in fostering cut-through traffic through existing neighborhoods. Mitigation measures should be provided if cut-through traffic is anticipated as a result of new development.

B. Strategies such as the addition of on-street parking, curb bulb-outs, and small traffic rotaries should be considered for existing neighborhood streets to manage the speed of traffic flow.

2C INTERSECTIONS

Intersections are a critical aspect of street design, as they are the point where vehicular, bicycle, and pedestrian movements converge. Most collisions on thoroughfares take place at intersections. In addition, in the CRDs and CRAs, intersections also serve an important placemaking function and may function as gateways, as they are frequently the first thing that people see when they enter a community. Prominent land uses and architecturally-significant buildings can be located to serve as focal points at intersections. As such, it is critical that intersection design serve a variety of purposes, including addressing potential conflicts between travel modes, supporting safety and mobility for all users of street, and contributing to a vibrant and accessible public realm.

Image Credit: NAIOP

Fairfax, VA

2C.1 INTERSECTION DESIGN

Planning for intersections includes not only the immediate intersection, but also the approaches to it, the median (if present), street signage and striping, and the adjacent land uses. Elements that need to be considered in an integrated manner in the design of an intersection include the vehicular capacity of the roadway; the number of travel ways; the level of service; large-vehicle turning requirements; safety; pedestrian and bicycle convenience; accessibility, including applicable ADA regulations; and, the efficiency of transit *(See Graphic 4: Intersection Design)*.

Design features described in this section assume signal-controlled intersections, although many design principles and strategies also apply to signage-controlled intersections and mid-block crossings, where permissible. Final decisions related to intersection design features on public roads are subject to approval by VDOT and FCDOT.

DESIGN PRINCIPLES

Design compact intersections to unify, rather than fragment, the surrounding blocks and minimize crossing distances. The design of intersections is a critical street design element that, to a great degree, determines whether a street ties together a neighborhood or functions as a physical barrier that divides communities. When designed compactly—with smaller corner radii to slow vehicle turning speeds and shorter crossing distances—streets can function as places for people that slow traffic, tie together surrounding blocks, and unify communities.

Ensure that an intersection's configuration and design promotes visibility and predictability, such that pedestrians, bicyclists and motor vehicles can see each other and predict each other's movements through the intersection. Making intersection operations visible and predictable entails minimizing visual obstacles that obscure oncoming traffic or street crossings by pedestrians and bicyclists. It also requires clearly-marked crosswalks and stop lines for vehicles, which in turn helps reduce the speeds of vehicles approaching the intersection.

DESIGN STRATEGIES

1 COMPACT DESIGN

A. Intersections should be designed as compactly as practical to minimize pedestrian crossing distance, crossing time, and exposure to traffic, while still accommodating vehicular movements.

B. Corner curb radii should be as minimal as possible to reduce the speed of turning vehicles and shorten the crossing distance for pedestrians.

C. Curb extensions should be considered for streets with on-street parking, provided that they do not impede adequate sight distance. Curb extensions, also known as bulb-outs, entail extending the curb into the roadway at the crosswalk to shorten the crossing distance, provide additional space for pedestrians, and allow pedestrians to see and be seen by vehicles before entering the crosswalk. Curb extensions can also provide an opportunity to extend the Landscape Panel and include planting and bioretention areas, as well as street furnishings such as seating, bollards, lighting, and wayfinding signage.

2 VISIBILITY

A. The ability of drivers to see pedestrians and cyclists should be addressed by limiting signage and parking near intersections, planting only low vegetation that does not exceed 3-feet in height, installing vehicular stop lines behind crosswalks, using high-visibility crosswalks, and/or installing curb extensions, where applicable.

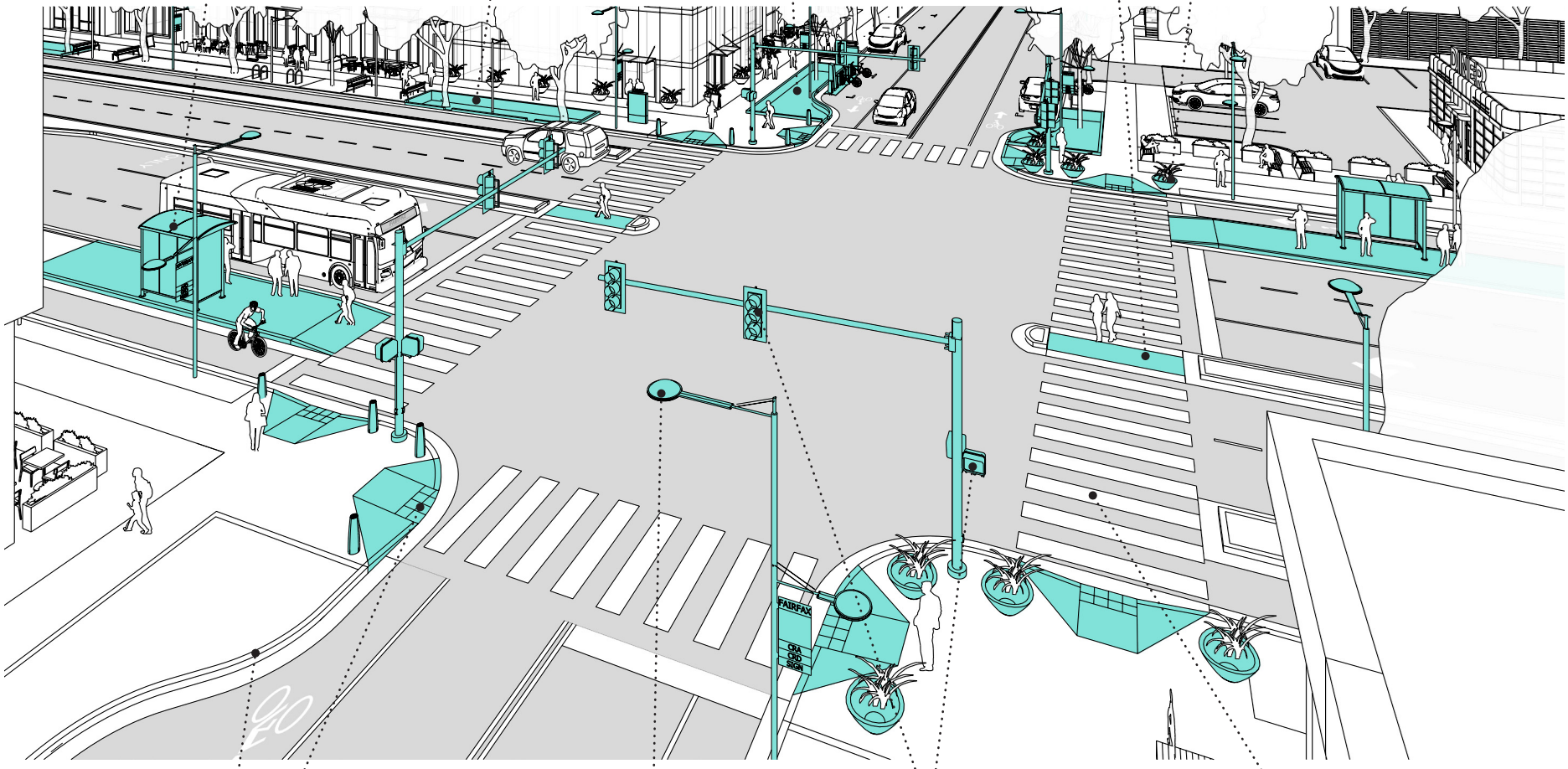
GRAPHIC 4: INTERSECTION DESIGN

TRANSIT SHELTERS
Provide waiting space, shelter, shade, and smart city technology

LANDSCAPE PANEL
Capture and filter stormwater runoff via bioretention planters

PEDESTRIAN REFUGES
Provide a safe place to wait for pedestrians crossing divided roadways

FREE-STANDING PLANTERS / BOLLARDS
Reinforce the physical separation between the pedestrian realm and the street to ensure pedestrian safety



CURB EXTENSIONS
Narrow the roadway at intersections to provide shorter crossing distances and improve visibility for pedestrians

CURB RAMPS
Facilitate access to crosswalks for pedestrians of all ages and abilities; ramps should align with crosswalks; material changes for visually impaired

LIGHTING
Improves visibility of crosswalks and pedestrians to drivers at nighttime or in low light

TRAFFIC & PEDESTRIAN SIGNALS
Control the movement of vehicles and pedestrians; attaching signals to a single pole minimizes visual and physical clutter at street corners

HIGH-VISIBILITY CROSSWALKS
Provide visibility to drivers and clearly indicate pedestrian pathways

2C.2 CROSSWALKS AND PEDESTRIAN SIGNALS

Crosswalk markings are used to define the pedestrian path of travel across a roadway and to alert drivers to locations where pedestrian traffic will occur. Pedestrian and vehicular points of conflict should be managed through appropriate design solutions, and all crosswalks, signals and associated infrastructure should be in compliance with the Manual on Uniform Traffic Control Devices (MUTCD), the Americans with Disabilities Act (ADA) standards, and the VDOT Road Design Manual. Proposals for non-standard intersection designs, should be discussed early with FCDOT in order to determine their feasibility.

Arlington, VA

LEFT
A high-visibility crosswalk is preferred at intersections, where permitted by VDOT
Image Credit: NACTO

DESIGN PRINCIPLES

Install high-visibility crosswalks. High-visibility crosswalks are recommended for all intersections where permitted by VDOT, particularly in commercial areas, at schools, at permitted mid-block crossings, and for crossings on roadways designated as Boulevards, as these are the locations where the greatest safety concerns exist.

Install pedestrian signals wherever warranted on public and private streets. Pedestrian signals should be installed at all intersections on public streets that meet VDOT warrants and on private streets that have either high vehicle traffic, high vehicle speeds, or transit service in order to increase safety and promote a walkable environment.

For midblock crossings, incorporate special safety elements and coordinate with VDOT. Subject to VDOT approval, midblock crosswalks should be considered where there is a specific need based on adjacent uses and where there are no existing or planned crosswalks within 300 to 400 feet of the desired crossing. Adjacent uses that may warrant a midblock crosswalk include: midblock bus stops, parks and plazas, grocery stores, schools, and other public institutions. Overhead signage and signalization of the midblock crosswalk will be determined by VDOT and are subject to MUTCD guidelines. Specific safety elements should be incorporated into midblock crosswalk designs, such as a median refuge (for a road with four or more travel lanes), street lighting, and landscaping to aid in distinguishing the crossing.

DESIGN STRATEGIES

1 CROSSWALKS

A. Crosswalks at roadway intersections should be located to provide the shortest route possible for pedestrians *(See Graphic 5: Crosswalk Configurations)*.

B. Crosswalks, where feasible, should be included on all four legs of an intersection so that walking distances are as short as possible.

C. Pedestrian crossings should be well-coordinated with vehicular traffic to provide for visible and fully accessible convenient pedestrian flow.

D. Streets should include frequent and conveniently-located pedestrian crossings to provide access to local destinations.

E. Any block greater than 600-feet in length should have an internal mid-block pedestrian connection, where feasible. Mid-block connections may include a pedestrian walkway, a service street with a sidewalk, a trail connection, a publicly-accessible walkway through a building, or other publicly-accessible connection.

F. Durable inlay or thermoplastic tape should be used for all crosswalk striping rather than paint. High-visibility markings should be spaced to avoid the wheel path of cars, thereby reducing wear-and-tear on the striping. Special crosswalk treatments or any other variations from this standard crosswalk striping are generally not permitted on public streets.

G. A minimum 4-foot wide pedestrian refuge should be included within medians, especially those where the total crossing distance is over 60 feet from curb to curb.

2 CURB RAMPS AND RAISED INTERSECTIONS

A. Curb ramps should be aligned directly with the crosswalk.

B. Curbless intersection corners (street corners that are sloped to the level of the roadway) and raised intersections (intersections elevated to the level of the sidewalk) are encouraged for local streets that are anticipated to have high volumes of pedestrian traffic, such as retail streets and intersections near parks and plazas, since they encourage motorists to yield and to prioritize pedestrians. These intersection treatments require bollards or other barriers to demarcate pedestrian waiting space to ensure a safe and comfortable area that is separated from vehicular traffic and so that less-abled bodied people can more easily cross the street.

3 PEDESTRIAN SIGNALS

A. Pedestrian signals should be installed at all signalized intersections, if warranted by VDOT.

B. Adequate crossing time should be provided for pedestrians and should be particularly considered on Boulevards.

C. For areas where a high volume of pedestrian traffic is anticipated, and with VDOT/FCDOT's approval, pedestrian signals should incorporate countdown timers.

D. The use of high-quality, single-pole traffic and pedestrian signals should be considered to reduce the number of poles and obstructions in the streetscape and to help achieve placemaking objectives.

E. On wide, multi-lane streets, even those with median refuges, pedestrians and cyclists should be provided sufficient time to cross the entire roadway in one signal cycle. On very wide Boulevards and Multimodal Through Corridors, median refuges should be designed to ensure that pedestrians and cyclists can safely and comfortably wait in the median if they can only cross half the distance of the roadway in one signal cycle. In these instances, the signal should automatically anticipate the need for another cycle so that pedestrians do not have to wait unnecessarily.

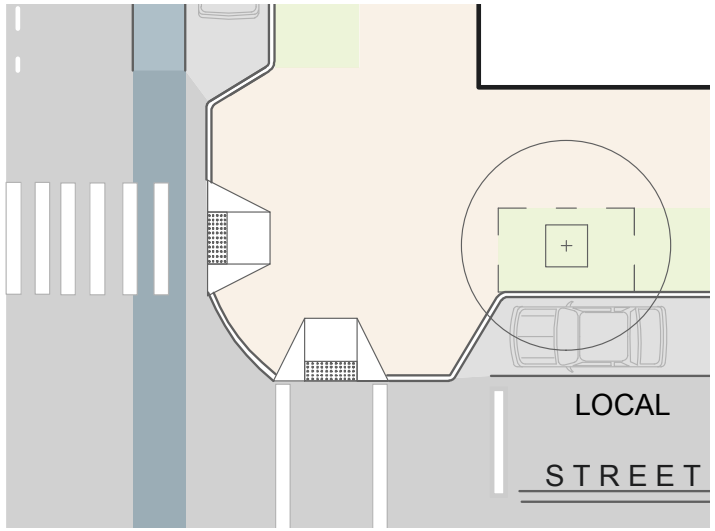
GRAPHIC 5: CROSSWALK CONFIGURATIONS

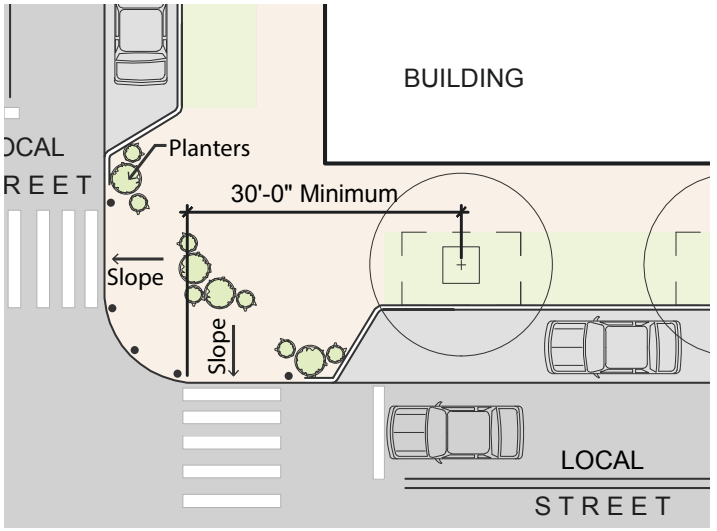
TOP LEFT
Acceptable curb ramp alignment where ramp is directly aligned with the crosswalk

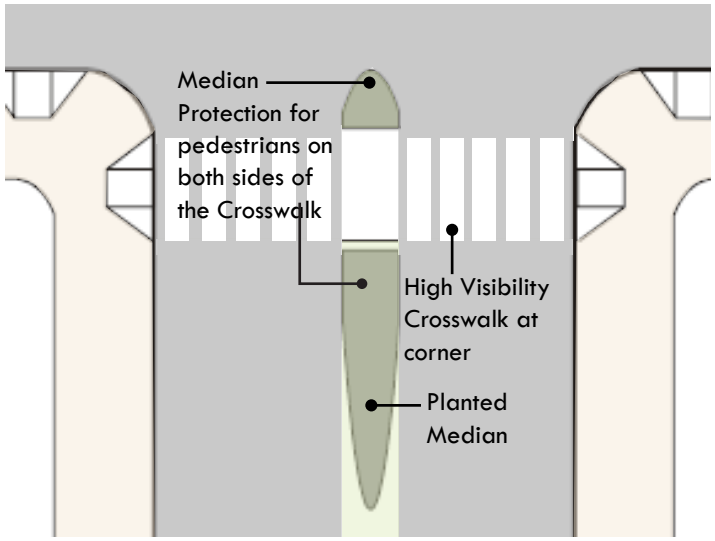
TOP RIGHT
Curbless corner design for intersections with high volumes of pedestrian traffic

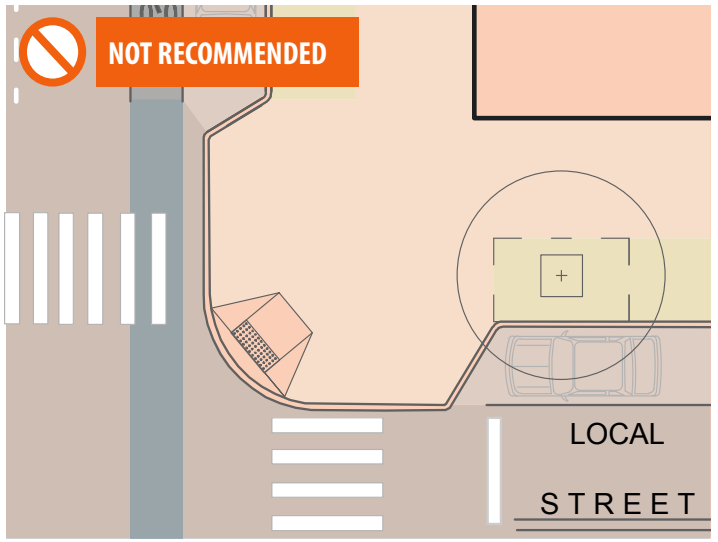
BOTTOM LEFT
Crosswalk through a median provides a pedestrian refuge for long crossings; raised medians on both sides of the crosswalk provide buffer for pedestrians

BOTTOM RIGHT
Unacceptable design where a single curb ramp is not aligned with crosswalks









PEDESTRIAN SIGNALS

Berlin, Germany

Savannah, GA

TOP LEFT
Distinctive pedestrian signals create character and interest
Image Credit: travelgumbo.com

TOP RIGHT
Less visually intrusive, combined traffic-pedestrian signal
Image Credit: Fairfax County

City of Fairfax, VA

Fairfax, VA

BOTTOM LEFT
Combined, single-pole traffic and pedestrian signal with street lighting is well-placed behind the pedestrian waiting area
Image Credit: Fairfax County

BOTTOM RIGHT
Poor access to pedestrian signal button; does not include ADA-compliant sidewalk paving abutting the signal button
Image Credit: Fairfax County

2D BICYCLE FACILITIES

Bicycles will play an increasingly important role in the movement of people (and goods) around and through the CRDs and CRAs, and, as such, are an essential component of a complete multimodal transportation network. In addition to the street cross-sections depicted in the Volume II District Design Guidelines, the following resources should be used to incorporate bicycle facilities into a site's design:

- Fairfax County Comprehensive Plan
- Fairfax County Bicycle Master Plan
- The National Association of City Transportation Officials (NACTO) Urban Bikeways Design Guide
- Federal Highway Administration (FWHA) Separated Bike Lane Planning and Design Guide

BICYCLE FACILITY TYPES

There are many potential configurations for bicycle facilities, depending on the available right-of-way and the needs of cyclists on a particular roadway. Some streets that are low speed and have low traffic volumes can be designed to accommodate cyclists within the vehicle travel lane. On these streets, pavement markings and/or signage may be incorporated to alert drivers that they are expected to share the roadway with cyclists. On other streets with higher speeds and levels of traffic, greater separation between bicycles and motor vehicles is preferable. Common types of dedicated lane bicycle facilities in Fairfax County include:

Montreal, Canada

Image Credit: Nelson\Nygaard

BIKE LANE

Bike lanes are travel lanes for the preferential or exclusive use of bicycles. Bike lanes are recommended along both sides of the roadway on Avenues, Major Avenues, and Boulevards to accommodate bicycle traffic moving in both directions. The standard minimum width of a bike lane is 5-feet or a minimum of 6.5-feet wide for cyclists to pass each other within the lane.

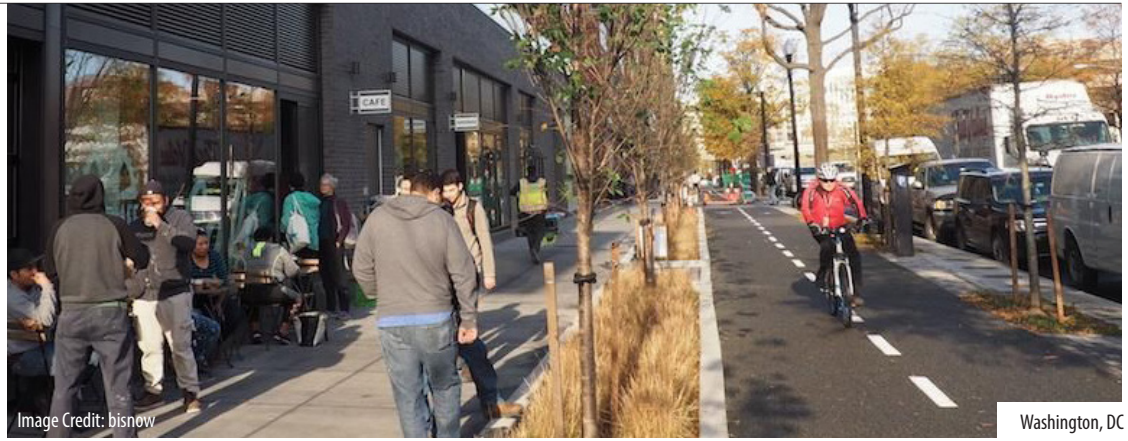
BUFFERED BIKE LANE

Buffered Bike Lanes are bike lanes that include a buffer space between the vehicle lane and the bike lane. Buffered bike lanes should be considered on roadways where there is excess pavement width or where vehicles speeds are 35 mph or greater. The buffer is generally striped using pavement markings.

Davis, CA

CYCLE TRACK

Cycle tracks are buffered bike lanes that are physically separated from both the roadway and the sidewalk. The physical buffer separates cyclists from vehicle traffic using a variety of methods including curbs, on-street parking, raised concrete medians, or landscaping. The buffer may also include flexible posts, bollards, or other vertical lane delineators. A cycle track may be at the roadway level or at the sidewalk level using space adjacent to the roadway. A cycle track can be one-way and located on each side of a roadway or two-way and installed on one side of the roadway. Cycle tracks are typically used on Boulevards with higher vehicle speeds or on high-volume, low-speed streets in commercial areas.



Washington, DC

TRAIL AND SHARED USE PATH

Trails and Shared Use Paths are off-street bicycle and pedestrian facilities that are physically separated from vehicle traffic. Typically, shared-use paths are located in the right-of-way and used by a variety of non-motorized users. They are commonly located alongside high-volume, high-speed roadways such as Multimodal Through Corridors and highways. Trails are usually located in an independent right-of-way or easement, such as a park, greenway, or utility corridor. Shared-use paths and trails require additional design considerations such as signage and/or striping to limit conflicts among different users.

Washington, DC

DESIGN PRINCIPLES

Design for safety, comfort and a range of users. Bicycle facilities must be properly designed and implemented in order to ensure that they are safe, comfortable, useful, and attractive to as broad a segment of the population as possible, across the spectrum of age, ability and cycling experience.

Incorporate a range of bicycle facility types, but prioritize separated facilities where feasible. Several types of bicycle facilities, ranging from on-street bicycle lanes to separated bicycle facilities such as cycle tracks and shared-use paths, are proposed in the CRDs and CRAs based on the specific roadway condition. Separated bicycle facilities are preferred on streets where they are deemed necessary for safety and user comfort.

Indianapolis, IN

TOP
Landscaped bioswale adjacent to the bike lane - creative addition to the infrastructure
Image Credit: Our Greenway

BOTTOM LEFT
Specialized buffered bicycle facility known as "Dutch Intersection" provides an enhanced, safe intersection treatment where a high-volume of cyclists is anticipated
Image Credit: John Greenfield

BOTTOM RIGHT
Buffered bike lane provides protection from vehicular travel lanes
Image Credit: bikearlington.com


Chicago. IL


Arlington, VA

DESIGN STRATEGIES

1 GENERAL NETWORK CONSIDERATIONS

A. A logical, comprehensive bicycle circulation system and associated on-site and off-site bicycle amenities should be incorporated and prioritized at the conceptual design phase for the development.

B. Bicycle facilities should provide continuous bicycle connections that transition between roadways, extend through intersections, and link one facility type to another (i.e. from a cycle track to a bicycle lane).

C. Bicycle facilities should be designed to minimize conflicts between cyclists and pedestrians. Potential conflicts can be minimized by incorporating separated facilities such as cycle tracks on higher speed, high volume roadways or by using features such as safety and awareness signage.

D. Policy Roads are designated in the Fairfax County Bicycle Master Plan as roadways where a bicycle facility is desired but the specific facility type has not been determined. In such instances, FCDOT and VDOT should be consulted to determine the appropriate bicycle facility.

Redwood City, CA

2 FACILITY DESIGN

A. The design of bicycle facilities should consider whether or not bicyclists are intended to pass each other within the lane. Minimum facility width and design considerations are described in section *2D ("Bicycle Facilities")*.

B. Intersections with bicycle facilities should be designed to reduce conflicts with vehicles by heightening the level of visibility, denoting a clear right-of-way, and facilitating eye contact and awareness among competing modes. Bicycle lane markings should be extended through the intersection.

C. When on-street parking and bicycle facilities are planned for a roadway, additional design features should be considered, including determining whether the on-street parking or the bicycle facility should be located adjacent to the vehicle travel lane; and, providing adequate space in a buffer between the parked car and the bicycle lane to prevent a cyclist from being hit by an open car door.

Alexandria, VA

LEFT
Buffered bike lane incorporates a door zone buffer to prevent conflicts between bicyclists and open car doors
Image Credit: bikesiliconvalley.org

RIGHT
Bicycle lane configuration at an intersection where pavement markings help define spaces for pedestrians, vehicles, and cyclists
Image Credit: Rhodeside & Harwell

2E PEDESTRIAN REALM

The pedestrian realm includes the public and private spaces that are designed to be frequented by people. High-quality, convenient and safe pedestrian environments will promote walk-trips, attract people and contribute to the economic success of the CRDs and CRAs. In CRDs and CRAs, the parks, plazas, and sidewalks along streets comprise most of the pedestrian realm. This section sets forth general design principles and strategies for creating a high-quality pedestrian realm; followed by greater detail on many of these approaches *(See Graphic 6: Pedestrian Realm)*.

LEFT
Streetscape emphasizes comfort and safety; curb extension reduces crossing distance; vertical elements between the vehicle lane and the pedestrian realm create a sense of enclosure and physical separation from vehicles
Image Credit: Design Workshop

Denver, CO

RIGHT
Rooftop outdoor space oriented to the street animates the pedestrian realm even though it is not located at the street level
Image Credit: downtowncharlottesville.net

DESIGN PRINCIPLES

Accommodate a high volume of pedestrian activity while serving the social, recreational and environmental needs of each community. Open spaces, land uses, building orientation, building setbacks, and a comprehensive sidewalk system should create an integrated pedestrian network that promotes walking and active living at both the neighborhood and site-specific scales. Streets and open space networks serve as connectors for pedestrians to the various parts of the area and should function as safe, accessible, convenient, direct, and comfortable connections between origin and destination points. Pedestrian accommodations and mobility should be considered when determining the most appropriate facility types and their design.

Take advantage of unique, site-specific opportunities to enhance the pedestrian realm. Whether it is the presence of environmental features, such as an adjacent stream corridor, or a site's role as a gateway to a CRD or CRA, existing conditions on a site can create opportunities for context-sensitive solutions that are tailored to the individual site while enhancing the larger pedestrian realm.

Charlottesville, VA

DESIGN STRATEGIES

1 SAFE AND UNOBSTRUCTED PEDESTRIAN MOVEMENT

A. Sidewalks and trails should create comfortable environments which are of an adequate width to contain, define and concentrate pedestrian activities for a range of users. Facility widths should anticipate pedestrian needs based on adjacent land uses and the projected volume of pedestrian traffic.

B. Public realm environments should be ADA accessible and accommodate users of all ages and abilities:

   i. Sidewalks and trails should be sufficiently wide and unobstructed, utilizing non-slip and even materials to promote access and usage by all users.

   ii. Curbs should be designed to accommodate safe mobility for users of all ages and abilities by incorporating ramps at crossings that are aligned with crosswalks.

   iii. Hardscape materials, landscaping and furnishings should be durable, low-maintenance and easy to repair or replace.

   iv. Maintenances should occur on a regular basis.

C. Pedestrian circulation should occur at the ground level. Above-grade bridges or below-grade tunnels are generally discouraged, except potentially when crossing Multimodal Through Corridors or for major recreational trails.

D. At locations where pedestrians and vehicles co-mingle, such as at intersections, clearly delineated crossings and pedestrian signals should be incorporated. Curb radii and curb extensions at intersections should be considered to slow traffic, shorten crossing distance, and enhance visibility.

2 PEDESTRIAN-ORIENTED SPACES AND AMENITIES

A. The pedestrian realm should incorporate interesting, safe, and properly sized spaces that include gathering areas, trees and landscaping, lighting and street furnishings, and other facilities to accommodate pedestrian-oriented programming.

B. Buildings should be designed to interact positively with the pedestrian realm by including features such as entryways, storefronts, awnings or overhangs, space for outdoor restaurant seating and merchant displays.

C. Retail and other land uses that require and/or are supportive of pedestrian traffic, such as at key intersections or buildings adjacent to plazas, should be served by high-quality public spaces, streetscapes and pedestrian amenities.

D. A mix of sunlit and shaded pathways, sidewalks and seating areas should be provided to address the impacts of weather on the pedestrian environment. Shaded areas should be provided along southern and western oriented building frontages, while sunlit facilities should be emphasized along northern and eastern oriented building frontages.

E. Pedestrian comfort and safety should be prioritized through the creative use of streetscape elements that both serve as amenities for pedestrians and guide pedestrian movement.

   i. Repetitive, evenly spaced streetscape elements should be used, including pedestrian-scaled light fixtures, furnishings, street trees, and a mix of hardscape and landscape areas.

   ii. The repetition and continuity of these streetscape elements can establish the overall feel and comfort level of a sidewalk, and can be used to direct pedestrian movement.

F. Locations for wayfinding signage and furnishings for pedestrians and cyclists should be considered when designing the pedestrian network.

GRAPHIC 6: PEDESTRIAN REALM

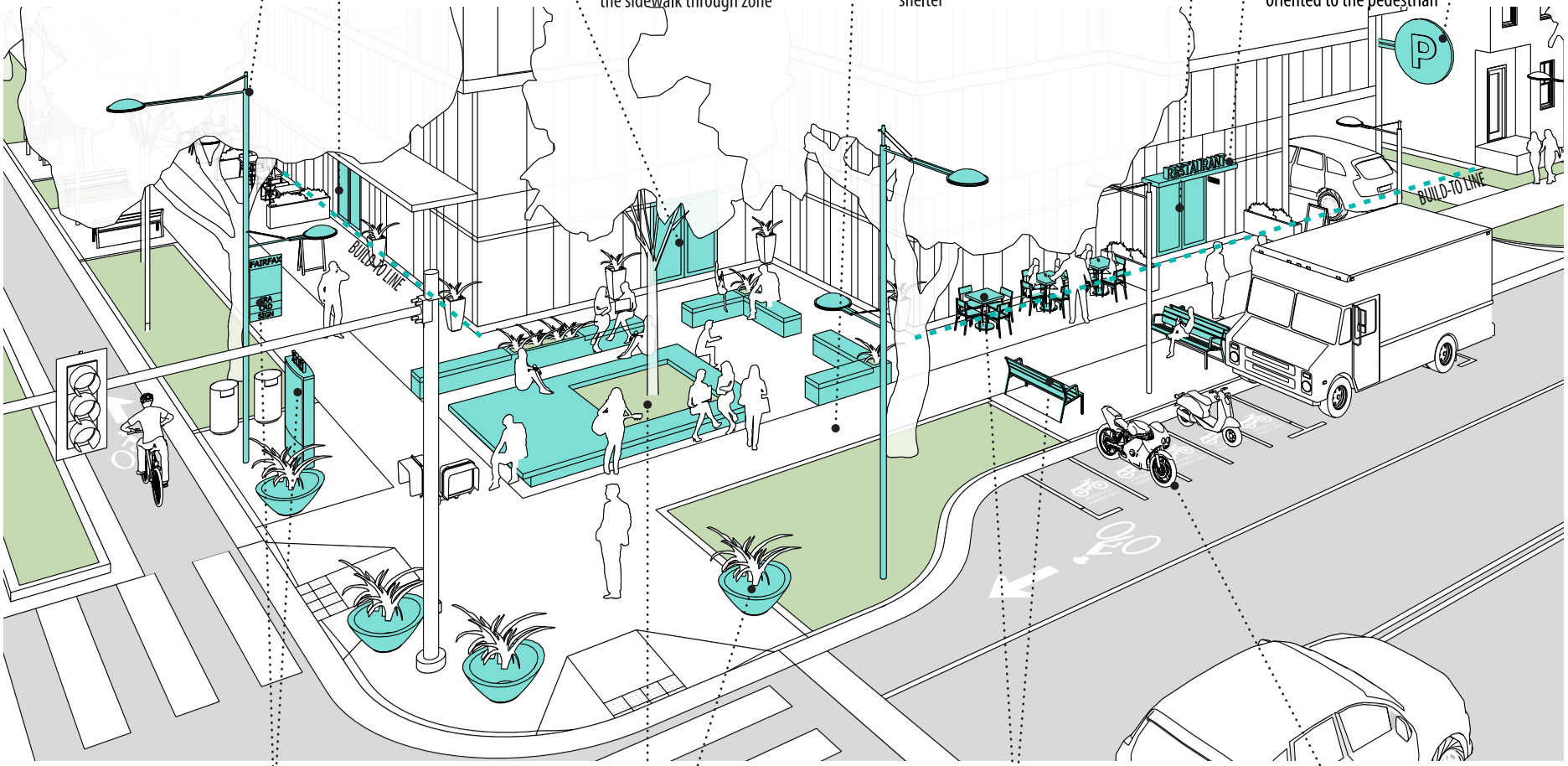
PEDESTRIAN-SCALED LIGHTING
Contributes to pedestrian safety and comfort at night

BUILDING ENTRANCES
Create an active street-level pedestrian environment along key streets and at corners

UNOBSTRUCTED SIDEWALKS
Allows continuous and unimpeded pedestrian movement when utilities and amenities are placed outside of the sidewalk through zone

STOREFRONT DOORS & WINDOWS
Provides facade transparency when facing the street; awnings highlight entrances and storefronts while providing shade and shelter

BUILDING SIGNAGE
Highlights individual businesses and destinations; scaled and oriented to the pedestrian



BRANDING & WAYFINDING
Provides information and area-wide identity through banners, signage, and kiosks

OPEN SPACE
Provides opportunities for public gathering spaces, particularly at gateways or special places, such as street corners; helps create a distinct character for the area and can be activated with programmed activities

TREES, LANDSCAPING & PLANTERS
Add shade and greenery to streetscapes to enhance pedestrian comfort; provide sense of enclosure and safety

FURNISHINGS & AMENITIES
Make the streetscape feel comfortable and welcoming to pedestrians when provided in Amenity Zone and Building Zone

ON-STREET PARKING
Provides convenient parking for area businesses while serving as a buffer between the sidewalk and the street

DESIGN STRATEGIES (CONTINUED)

3 STREET CORNERS

A. Special streetscape design treatments may be incorporated at intersections to highlight the importance of corners in the overall streetscape and to define the pedestrian realm.

   i. Street corners may be expanded with curb extensions, increasing the amount of pedestrian space while reducing the crossing distance between curbs.

   ii. Bollards, trees and/or enhanced landscaping should be located between the corner and the roadway to delineate pedestrian areas and provide safety buffers.

   iii. Special paving treatments may be incorporated to highlight and differentiate prominent street corners. Prominent corners can be designed to orient people and connect physically and visually to other design elements in the public realm. For example, a similar design language of materials and furnishings can be used while also incorporating unique features to distinguish the corner.

   iv. Streetscape design features may be continued around corners and onto connecting cross streets to provide a transition between different streetscape treatments.

   v. Buildings should embrace street corners with design elements such as entrances that open directly onto the street; fenestration to provide facade transparency; and, special paving to highlight building entrances. Where sufficient space exists, outdoor seating areas may be incorporated adjacent to buildings to further enliven street corners. For additional details on building corner treatments, *see section 2H ("Building Zone") and Chapter 4 ("Building Design")*.

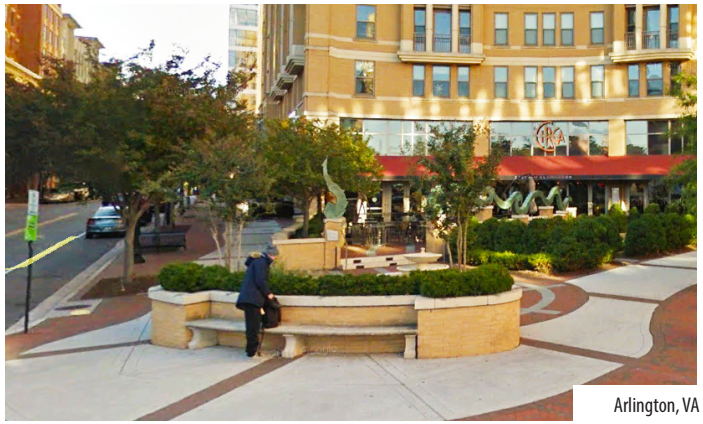
   vi. Where excess space exists outside zones of pedestrian movement, plantings and stormwater management features may be incorporated to provide sustainable management of stormwater runoff, reductions in the amount of impervious surfaces, and aesthetic benefits such as visual variety and the definition of spaces within the streetscape. *See section 2L ("Sustainable Street and Streetscape Design") and Appendix A2 ("Sustainable Design Toolbox") for additional information on incorporating stormwater management features into the streetscape.*

B. The design of corners should facilitate, rather than impede, safe pedestrian crossings and turning movements.

   i. Parking should be prohibited within 10-30 feet of a street corner to ensure that oncoming traffic and pedestrians are visible at intersections.

   ii. Curb ramps, aligned with crosswalks, should be provided, in compliance with ADA guidelines, to facilitate safe and comfortable crossings for pedestrians of all ages and abilities.

   iii. The path of pedestrian travel should be free of utility infrastructure and other potential obstructions, such as bicycle racks, trash receptacles, or other street furnishings.



Arlington, VA

LEFT
Street corner with distinctive paving, art and seating to accentuate the corner's importance and visual prominence
Image Credit: Google

DESIGN STRATEGIES (CONTINUED)

C. Where sufficient space exists, the design of street corners should foster safe, inviting and comfortable environments that encourage a variety of pedestrian activities and gatherings.

   i. In some instances, design features should be incorporated that enable the corner to feel like and function as a small open space—for example, landscaping and special plantings, seating, low walls with integrated seating, pergolas, shading devices, special lighting features, public art, and electronic kiosks displaying CRD/CRA-related information (businesses, transit, etc.).

   ii. In commercial areas, corner treatments should support and complement adjacent businesses (for example, incorporating seating where patrons can consume food and beverages purchased from nearby businesses.

   iii. For related design considerations pertaining to small open spaces, see the discussion of pocket parks and plazas in *Chapter 3 ("Open Space")*.

Alexandria, VA

RIGHT
Outdoor dining, building signage, lighting, and pedestrian amenities contribute to creating inviting street corner
Image Credit: Rhodeside & Harwell

2F LANDSCAPE PANEL AND AMENITY ZONE

The Landscape Panel and Amenity Zone together comprise the space between the curb and the sidewalk. These zones serve as a buffer between the street and the sidewalk, while housing many of the amenities that define a streetscape's character and support its many functions.

The Landscape Panel accommodates the variety of trees and other plantings that line a street and is adjacent to the sidewalk. These planted elements are important to the quality of life in CRDs and CRAs and offer a range of benefits. Plantings in the urban landscape provide cooling, shade, texture, color, and visual interest. Well-landscaped spaces also provide significant benefits to the urban ecology and the environment, including enhanced stormwater remediation, reduced heat island effects, improved air quality, and increased biodiversity. Trees and other plantings in the Landscape Panel also create a sense of enclosure in the pedestrian realm and can calm traffic by appearing to narrow the width of the roadway. Street lights and certain types of signage may also be located within the Landscape Panel.

The Landscape Panel may be largely continuous along some streets; however, particularly along streets in activity centers where pedestrian activity is greatest, the Landscape Panel frequently includes Amenity Zones, the paved areas with a variety of pedestrian and bicycle amenities—including seating, bicycle racks, transit shelters, parking meters, trash receptacles, street lights, signage, and other street furnishings. The Amenity Zone is typically paved and serves a variety of important functions, including providing places to sit, rest, park a bicycle or pay for parking, and wait for transit; it also reinforces the physical and visual separation between the sidewalk and the street. Above all, an effective Amenity Zone should make the streetscape more comfortable and appealing while supporting and enhancing the street's visual character and everyday functions.

The arrangement of the Landscape Panel and the Amenity Zone may vary depending on factors such as the amount of space available, the amount of furnishings required in a particular location, and the overall character of a particular street. Along some blocks, the Landscape Panel may be entirely or mostly continuous; along other streets, particularly streets with significant pedestrian activity, the Landscape Panel may be interspersed with Amenity Zones, with the two zones occupying the same linear space between the curb and sidewalk. In particularly constrained rights-of-way, the Amenity Zone may also be located within the Building Zone as space allows.

The sections of this chapter that follow provide detailed design principles and strategies for the various elements that comprise the Landscape Panel and Amenity Zone.

Washington, DC

LEFT
Streetscape with Landscape Panel and with seating in the Amenity Zone
Image Credit: Rhodeside & Harwell

2F.1 TREES AND LANDSCAPING

Trees in an urban environment are subject to harsh conditions which can affect their health; this includes inadequate soil volume in which to grow, exposure to salt used to treat roads during snow events, pedestrian traffic, and proximity to utility infrastructure. As such, final planting design and tree selection should be done in consultation with the Fairfax County Urban Forestry Management Division. The recommended tree and plant list can be found in the Appendix; the following resources specific to the Virginia climate should also be consulted:

- Fairfax County Public Facilities Manual (PFM), Chapter 12. In the PFM, Fairfax County classifies tree species based on the size of the tree at maturity.
  - **Category I** trees are 50-feet or less in height, with a spread that is half the size or smaller than their height.
  - **Category II** trees are approximately 20-feet in height and width.
  - **Category III** trees are 25 to 50-feet in height, with an equal or larger spread or trees over 50-feet in height with a smaller spread.
  - **Category IV** trees are 50-feet in height or taller, with a spread that is equal to or wider than their height.
- US Fish and Wildlife Service - Native Plants for Wildlife Habitat and Conservation Landscaping - Chesapeake Bay Watershed
- Plant NOVA Natives
- Virginia Department of Transportation's Northern Virginia Planting Guidelines

DESIGN PRINCIPLES

Utilize native plant materials and a diversity of species wherever possible. Native species provide multiple benefits including stormwater infiltration and management, improved air quality, reducing the urban heat island effect, erosion control and soil stabilization, noise buffering, climate change resilience, and support for native wildlife, including pollinators. Native species are important because they aid in the restoration of natural ecosystem services and may reduce long-term maintenance.

The use of native species for restoration of the natural ecosystem and plant communities, should be a priority, and designs should be encouraged to include sizable open spaces to support these species in the landscape. However, certain non-native, non-invasive species have shown good adaptability to tough urban conditions and contribute to the landscape. While non-native species provide little support for wildlife and pollinators, there are a number of environmental services that they do provide. For trees, the level of benefit will depend on its vitality, the suitability of its characteristics for the proposed location, and how it interacts with the use of the space around it.

Site and space trees to complement streets, streetscapes and adjacent land uses. Proper siting and spacing between trees are key elements to a successful street tree plan that benefits pedestrians and the environment, and reduces maintenance requirements. Tree planting designs should respect the overall street context and the local environment. Tree spacing should be designed to form a continuous canopy along a street while respecting adjacent land uses by complementing and not interfering with ground floor uses, entryways, restaurant seating, or other activities in the Building Zone. Trees and plantings can also be used to define different zones of the streetscape.

Ensure the long-term survival of trees through proper planting techniques and ongoing care and maintenance. When street trees are planted in a limited space, they have less chance to survive and are more susceptible to damage and disease, which affects their ability to reach their full growth potential. Key factors to maximize long-term tree survival include appropriate tree selection, suitable planting techniques—including the provision of sufficient, unobstructed soils—and immediate and continued aftercare. Pavement may also interfere with root expansion as the trees grow. The problem may begin as a crack in the surface of the pavement, which attracts growing roots and eventually results in the sidewalk section lifting out of the ground. Therefore, care must be taken when integrating pavement within tree planting areas. Appendix A1 provides guidance and details for the planting of street trees to limit these problems.

DESIGN STRATEGIES

1 TREE AND PLANT SELECTION

A. Large canopy (Category III or IV) trees which are 3-inch caliper or larger at the time of planting should be installed wherever possible in order for trees to have an immediate impact on pedestrian comfort and placemaking.

B. Tree and plant species of a similar size, scale, and form should be planted along the length of the roadway for consistency and to maximize visual impact.

C. Use of monocultures throughout a CRD or CRA or along the length of a street should be avoided as this makes an area susceptible to disease and insects. Grass is generally discouraged in the Landscape Panel; native and ornamental grasses are encouraged.

2 STREET TREE SITING AND SPACING

A. Street trees should be planted in the Landscape Panel to provide shade and act as a natural buffer for pedestrians. Planting large canopy (Category III or IV) street trees in the Landscape Panel between the sidewalk and the roadway should be a priority for all developments.

B. Category III or IV trees should be consistently spaced approximately 30-feet on-center. Category I or II trees may be spaced closer together, depending on the species *(See Graphic 7: Tree Locations and Spacing)*.

C. Where space allows, trees are encouraged to also be planted in the Building Zone.

D. Breaks in consistently spaced street trees should occur only to accommodate Amenity Zones, curb cuts, or intersections. Locations may have to be adjusted to provide adequate building access for fire trucks. Trees should not be planted within 30-feet of an intersection or 15-feet of a curb cut.

E. Trees are encouraged to be planted adjacent to trails and bike lanes to provide shade and support year-round use.

Santa Monica, CA

TOP
Continuous Landscape Panel; large canopy trees and understory plantings lining streets provide shade and buffer pedestrians from moving vehicles
Image Credit: scotland.landscapeinstitute.org

DESIGN STRATEGIES (CONTINUED)

3 STREET TREE PLANTING

A. The PFM–required tree well dimensions for Category III and IV street trees should be provided to safeguard tree health and growth potential. A minimum of 130 square feet of open soil area per tree should be provided, and no curb or pavement should be located within 4-feet of the centerline of the tree trunk (for a total minimum planting width of 8-feet).

B. Where PFM guidance is not feasible due to constrained urban environments, site-specific conditions, or where Landscape Panels of less than 8-feet wide exist, the alternative planting design strategies listed below and the diagrams in the Appendix may be considered as an alternative to the recommendations in the PFM, depending on available space, specific streetscape conditions, and desired character. In addition, there is flexibility for innovative planting techniques that can achieve better environments for tree growth and go beyond the alternatives contained in this document. Final determination of appropriate tree planting methods should be done in consultation with the County's Urban Forestry Management Division.

i. Alternative Strategy 1: Minimum Soil Volume:

a. Soil volume should be a minimum of 700-cubic feet per tree for single trees.

b. For two trees planted in a continuous planting area, a total soil volume of at least 1,200-cubic feet should be provided. A contiguous area is defined as any area with a soil depth of 4-feet and where lateral root growth is unrestricted.

c. For three or more trees planted in a contiguous area, the soil volume should be at least 500-cubic feet per tree.

These soil volumes are typically met by providing trees within planting strips. Planting strips are long sections of non-compacted soil without pavement on top. Sidewalks that bisect the strips may be necessary to keep pedestrian traffic off of the open soil around the trees. Planting perennials, ornamental grasses, and shrubs at the base of the tree within the planting strip will help reduce foot traffic and soil compaction, thereby creating a more favorable condition for tree roots.

ii. Alternative Strategy 2: **Structural Cell Supporting Sidewalk:** Structural cells typically consist of a plastic/fiberglass grid of columns and beams that support paving above uncompacted planting soil. If paving is proposed over the tree well, suspending the paving over structural cells should be employed to avoid issues with soil compaction so that roots can spread without interrupting the hardscape. This allows the planting area to be filled with well-aerated, quality topsoil where roots are provided the proper space in which to grow.

iii. Alternative Strategy 3: **Cantilevered Sidewalk:** Sidewalks may also be cantilevered over the tree well as long as there is a minimum of 3-feet of space between the tree trunk and the edge of pavement; and, the tree well has a minimum opening of 6-feet wide.

iv. Alternative Strategy 4: **Reduced Soil Volume/Smaller Tree:** If the soil volumes set forth above cannot be provided, a reduced amount of soil volume may be used in conjunction with a lesser category of street tree. Category I or II street trees may be used in such instances. The recommended tree list in the Appendix provides information on the classification and category of such street trees.

v. Alternative Strategy 5: **Shift Street Trees from the Landscape Panel to the Building Zone:** If significant site constraints exist, the Building Zone may be used

DESIGN STRATEGIES (CONTINUED)

for trees in lieu of locating trees in the Landscape Panel, provided adequate space exists to avoid conflicts with buildings. This alternative may be more appropriate on low traffic Local Roads where trees located between the sidewalk and the roadway may not be needed to buffer pedestrians from moving vehicles. On-street parking also helps to serve as a buffer when trees cannot be planted in the Landscape Panel.

Image Credit: Fairfax County

Alternative Strategy 3

Amenity Zone cantilevered over a tree well

Image Credit: Kim Hartley Hawkins

Alternative Strategy 1

Continuous tree wells provide adequate soil volumes by sharing soil among multiple trees

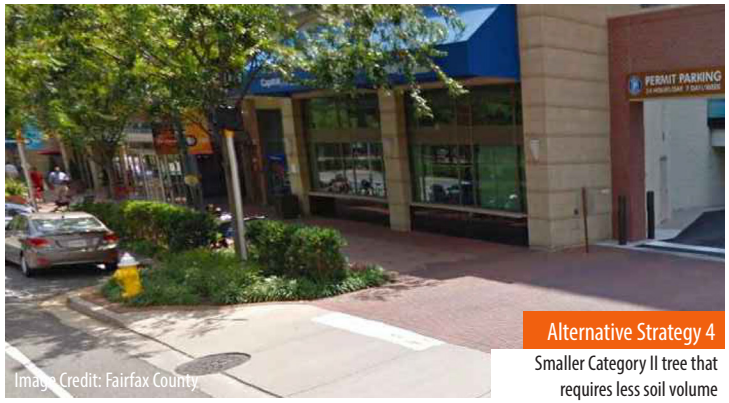


Image Credit: Fairfax County

Alternative Strategy 4

Smaller Category II tree that requires less soil volume

Image Credit: Keep Indianapolis Beautiful

Alternative Strategy 2

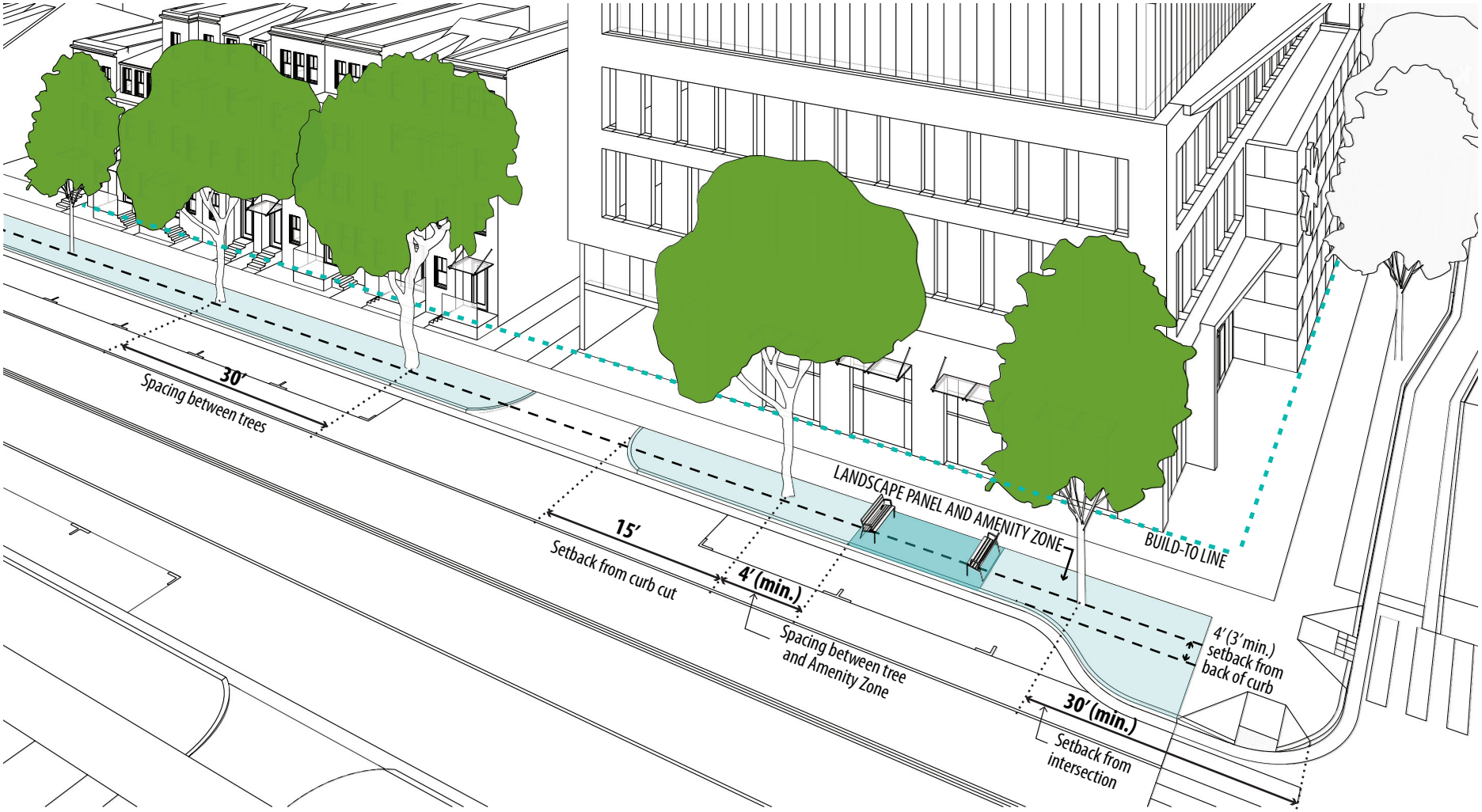
Structured soil system in a tree well

Image Credit: Fairfax County

Alternative Strategy 5

Street trees located in the Building Zone

GRAPHIC 7: TREE LOCATIONS AND SPACING



See tree planting details in Appendix A1 for more information

DESIGN STRATEGIES (CONTINUED)

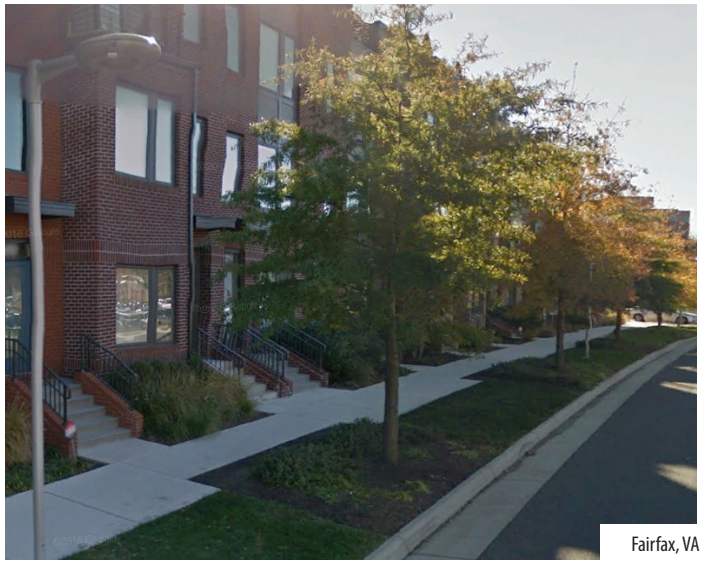
4 PLANTING, CARE AND MAINTENANCE

A. Automatic drip irrigation should be provided whenever possible, particularly when ideal planting conditions cannot be met.

B. Tree planting areas may be constructed with open or covered soil. Covered soil area should utilize methods for structurally supporting pavement over the planting soil as shown in the Covered Tree Well Planting Detail in the Appendix.

C. Tree grates are generally not recommended due to their potential to constrain tree growth; however, if tree grates are necessary, they should be installed so as to provide a clearance of at least 2-feet on all sides of a tree trunk.

D. Under-story landscaping, or small plants under and around street trees, should be incorporated whenever feasible to promote the long-term health of the tree, provide a buffer between pedestrians and vehicles, and enhance the visual character of the street.



Fairfax, VA

TOP
Street trees spaced 30 feet apart; the sidewalk width is reduced to accommodate proper open soil area for trees
Image Credit: Google Earth

Fairfax, VA

BOTTOM
Eight-foot-wide planting area accommodates two trees with understory landscaping
Image Credit: Fairfax County

2F.2 STREET FURNISHINGS

Street furnishings provide important amenities for pedestrians by adding functionality and vitality to the pedestrian environment. They can help to make pedestrians feel welcome and comfortable. These amenities provide a functional service as well as visually enhancing the sense of place.

Street furnishings encompass the following elements among others: benches and seating, bicycle racks, bollards, signs, lights, transit shelters, and trash and recycling receptacles. Performance specifications for each furnishing element is detailed in the Volume II: District Design Guidelines for each CRD or CRA.

DESIGN PRINCIPLES

Prioritize street furnishings in certain pedestrian environments. Furnishings should be emphasized on streets with high levels of pedestrian activity; where pedestrians may linger in the public realm, such as on commercial, mixed-use, or special streets; and, on streets with a recreational component, including linear parks. Other streets should include furnishings at corners and on busier blocks, or where warranted by adjacent land use and pedestrian activity. Street furnishings should also be clustered near transit stops. On residential streets, alleys and curb extensions, less frequent clusters of street furnishings can create attractive and inviting public spaces where neighborhood residents or customers of local businesses can sit and rest, play, eat, or enjoy people watching.

Arrange street furnishings in coordination with street trees and street lighting. Street tree and street lighting placement should define the major rhythm of design elements along the street; site furnishings should be coordinated with the locations of trees and lights.

Kitchener, ON, Canada

RIGHT
Street furnishings such as benches, bollards, signs, etc. add to the vitality and comfort of the pedestrian environment
Image Credit: placestogrow.ca

DESIGN STRATEGIES

1 FURNISHING PLACEMENT

A. Furnishings should be located in the Amenity Zones or in the Building Zone. Furnishings should never be placed within the sidewalk, where they could impede pedestrian flow.

B. On heavily traveled streets, seating clusters generally should be spaced 90-feet apart.

C. On residential streets, seating clusters should be spaced approximately every 150-feet, but there should be a minimum of one seating cluster per block.

D. Placement of site furnishings should consider car overhangs and door swings. When placed near the curb, furnishings should be located at the ends of the on-street parking stalls rather than at the center.

E. Street furnishings may also be placed within curb extensions where sidewalk widths are extended into the parking lane.

2 FURNISHING STYLE AND MATERIALS

A. Furnishings should be considered as part of the overall family of elements within the streetscape so that there is a cohesive appearance to the public realm.

B. Seating and trash and recycling receptacles in the Amenity Zone should generally be permanently fixed to the ground.

C. Street furnishings should strive to use environmentally responsible materials, including materials with recycled content, regionally-harvested materials, or certified wood.

D. Furnishing materials should be durable to withstand long-term exposure to the elements, limit opportunities for graffiti, and be easy to keep clean.

3 ACCESSIBILITY REQUIREMENTS

A. All street furnishings must meet ADA guidelines.

B. Furnishings should not interfere with pedestrian access to the entrance of any building.

C. Wherever possible, street furnishings should be of a contrasting color to the sidewalk to aid pedestrians with visual impairments.

D. A minimum of 8-feet clearance should be provided between street furnishings and adjacent accessible parking and passenger loading zones.

Berwyn, IL

LEFT
A family of street furnishings with a common design language and district branding creates a cohesive appearance along the streetscape
Image Credit: firebellydesign.com

2F.3 STREET LIGHTING

Although its primary purpose is to provide nighttime visibility for security and safety, successful lighting design plays a role in how people use a street or public space. All lighting should be energy efficient; as such, use of LED fixtures is expected. Street lights in the right-of-way can be provided by Dominion Energy using a palette of fixtures that they will own and maintain; however, other fixtures may be installed with private maintenance.

Budapest, Hungary

TOP
Exterior lighting in the Building Zone can create an inviting ambiance when varied in placement and style
Image Credit: Fairfax County

DESIGN PRINCIPLES

Do not over-light or under-light the public realm. In many situations, particularly when people are concerned about security, there is a tendency to over-light a space. However, too much lighting can be just as bad as too little lighting. A good lighting strategy addresses the type, placement, height, color, wattage of lighting, and the effect on how the public realm is perceived and used, while minimizing glare that unnecessarily illuminates the night sky. The amount and color of light emitted from all exterior sources including street lights should be evaluated as part of a comprehensive lighting strategy for both aesthetic and functional reasons and to avoid potentially under-lit or over-lit areas.

Ensure that street lights fit within a larger family of light fixtures and other furnishings within an individual CRD or CRA. Street lights are one component of the overall illumination of an area. Other lighting may include pedestrian lighting, accent lighting, and site and building-mounted lighting. When selecting the lighting for streets and streetscape areas, all fixtures should be considered as part of the overall family of furnishings, so that there is a cohesive appearance to the streetscape.

Fairfax, VA

BOTTOM
Family of pedestrian lighting, landscape lighting, and building lighting creates a safe and vibrant environment without over-lighting the street
Image Credit: mosaicdistrict.com

DESIGN STRATEGIES

1 STREET LIGHT TYPE AND PLACEMENT

A. Street lights should illuminate both the roadway and the streetscape such that all areas within the right-of-way are sufficiently lit but not overly illuminated. Roadway and pedestrian street lighting is encouraged to be co-located on the same pole.

B. Street lights should be sized to the scale of the roadway. Lights, generally 16 to 24 feet high, should be located on Local and Avenue street types; taller lights, generally 24 to 35 feet high, should be located on Major Avenues and Boulevards.

C. Street lighting should be coordinated with building mounted and accent lighting. Building and accent lighting should complement the style of street lights recommended in the Volume II: District Design Guidelines.

2 STREET LIGHT FEATURES

A. Full cutoff fixtures are required by the Zoning Ordinance to reduce light glare from parking garages, parking lots, and buildings onto walkways, streetscapes, and streets. All lighting on both public and private property should use full cutoff fixtures or have a shield that controls the light so that it is focused only on the object that is being illuminated.

B. Fixtures should utilize LED bulbs.

C. Most lighting should use lower color temperature bulbs (3000K or below) for neutral white or warm white color light. The color rendition index (CRI) should be 70 or greater.

D. Smart technologies, such as the ability to dim the lights and self-report outages, is encouraged to be incorporated into street lights.

Bilbao, Spain

LEFT
Street and pedestrian lighting co-located on the same pole
Image Credit: Santa Cole

2G PAVEMENT TREATMENTS

Existing pavement materials vary in the CRDs and CRAs, but primarily consist of a mix of poured concrete, brick, and concrete and stone pavers. New paving in the public realm should be designed and selected based on durability, ease of maintenance, aesthetics, environmental considerations, and the ability to meet accessibility requirements.

Specific paving materials and locations for the individual CRDs and CRAs are provided in the Volume II: District Design Guidelines.

Oklahoma City, OK

LEFT
Paving pattern variations relate to adjacent tree placement
Image Credit: Fairfax County

RIGHT
Complementary paving patterns interchanged with poured concrete to create an interesting hardscape
Image Credit: fotsos.com

DESIGN PRINCIPLES

Select paving materials based on the context and character of the street. Certain materials are better suited for specific zones and street types; as such, designs and material selections should be chosen based on the context in which the paving materials will be located and should reflect the character of the street.

Emphasize durability and maintenance. Durable, low-maintenance and readily available materials should be used for sidewalks in the CRDs and CRAs.

Highlight special features and transitions. Sidewalks may be accented with specialty materials to highlight features. Special paving patterns in the streetscape should be used to delineate the different zones and their related functions. Shifts in patterns should be employed to indicate different uses, highlight entrances, and frame seating areas. Materials can be used to define the edges of spaces and to visually enhance entire spaces, such as plazas. Creativity is encouraged, particularly in the Building Zone, where there is greater flexibility in material choices.

Portland, OR

DESIGN STRATEGIES

1 PAVING MATERIALS

A. Durable paving materials, such as poured-in-place concrete, should be used as the primary paving material in the sidewalks in the CRDs and CRAs, unless otherwise specified in design guidelines for the individual CRD/CRA.

B. Stamped concrete is generally discouraged as a sidewalk and crosswalk material because it is prone to cracking and fading, and may be difficult to repair.

C. The use of permeable paving materials (including soft paving, porous unit pavers with open joints, and permeable concrete) is encouraged in appropriate locations such as the Amenity Zone, in order to allow stormwater runoff to infiltrate through the material into the ground instead of being diverted into the storm drain system. Refer to *section 2L ("Sustainable Street and Streetscape Design") and Appendix A2 ("Sustainable Design Toolbox")* for more information on permeable paving applications and other sustainable design approaches.

D. Sidewalk materials should extend across driveway aprons to maintain a consistent streetscape material for the length of the sidewalk.

E. Where desired by the community, light colored paving is encouraged to be used to reduce urban heat island effects.

2 PAVING DESIGN

A. Paving design should create a dynamic, layered effect through the use of multiple patterns, varying paver sizes and materials, as well as through changes in color and the use of scoring patterns. Paving patterns and materials should provide visual texture and function as a backdrop for the other elements found in the public realm.

B. Paving patterns in the Building Zone can be the same or different from those in the sidewalk and in the Amenity Zone and should be complementary to both the adjacent building and the other streetscape elements.

C. Paving patterns should reflect the adjacent uses and provide visual cues that help define individual streetscape areas or mark transitions between different uses. For example, paving patterns can change in front of building entrances or help frame outdoor seating areas.

San Francisco, CA

LEFT
Durable poured-in-place concrete sidewalk; paving variations between the sidewalk and Amenity Zone help define streetscape areas and provide texture
Image Credit: asla.org

2H BUILDING ZONE

The Building Zone, located between the sidewalk and the face of the building, is the area that transitions between the public sidewalk and the space within buildings. It is a component of the streetscape that is located on private property and is designated for elements including entrances, outdoor dining, browsing, plantings, and residential porches or stoops.

DESIGN PRINCIPLES

Utilize street cross-sections in Volume II to determine dimensions. Each street type has its own defined dimension for the width of the Building Zone. Widths were determined based on the adjacent land uses, the overall size of the street, and the anticipated volume of pedestrian traffic. Ranges are typically provided to accommodate flexibility in the design of a project. Dimensions and unique design features for the Building Zone are specified in the street cross-sections depicted in Volume II: District Design Guidelines for each CRD and CRA.

Emphasize character in Building Zone design features. Creativity is encouraged in the Building Zone, where there is greater flexibility than in the right-of-way to incorporate unique features and material choices, including distinctive paving materials and patterns, movable seating and tables, landscaping, awnings and other shading devices, to name a few. The Building Zone design should coordinate with the sidewalk and the Amenity Zones so that there is harmony within the streetscape.

DESIGN STRATEGIES

1 USES AND FEATURES

A. The Building Zone may be used for outdoor displays, café or restaurant seating, and plantings.

B. Architectural elements such as awnings, canopies, and marquees may also occupy this zone.

C. Where there is insufficient width in the Landscape Panel to accommodate amenities, elements such as benches, trash cans, and bicycle parking may be located in the Building Zone to keep the sidewalk clear.

2 DESIGN CONSIDERATIONS

A. On residential streets, the Building Zone should be wide enough to accommodate porches, stoops, steps, low walls, pedestrian gates, and landscaping to provide an effective transition between the public sidewalk and private residences. These features should not obstruct pedestrian movement along the sidewalk.

B. On commercial streets, particularly streets with ground-floor retail, the Building Zone should be wide enough to allow for café tables and seating, benches, plantings, merchandise displays, door swings, ramps, steps, and other building access elements, among other amenities.

C. Where there is relatively little pedestrian traffic, or where there are continuous building setbacks, the Building Zone may be decreased, as determined on a case-by-case basis.

LEFT
Activated Building Zone with sidewalk seating and awnings.
Note: the Landscape Panel does not meet the Fairfax County minimum planting requirements
Image: Locallygrownnorthfield.com

2I WALLS, BOLLARDS AND PLANTERS

Low walls, bollards and planters are hardscape elements that introduce additional visual and functional features into the streetscape and contribute to the pedestrian experience. They create edges, delineate spaces and can buffer views of parking or utilities. They increase safety by incorporating vertical elements into the urban landscape, acting as a buffer between travel modes. Some offer places to sit and encourage people to linger.

Determining which hardscape element should be used is dependent on a number of factors. VDOT limits hardscape features in the right-of-way and should be consulted before proposing a particular element. Low walls should be used to create transitions between grade changes, mark entrances, and serve as raised planters, generally outside of the public right-of-way. Masonry walls that are at a comfortable seat height can serve both as a structural element and a seat wall. With permission from VDOT, bollards, planters, and other barriers may be placed within the right-of-way to function as a buffer between the roadway and the streetscape, providing visual cues to both drivers and pedestrians. Planters may be considered provided that provisions are made for consistent maintenance and replacement of plant materials as needed.

DESIGN PRINCIPLES

Introduce verticality and define spaces. Low walls, raised planters, and bollards introduce verticality to the streetscape and can be used to define spaces in the public realm, provide seating, and establish the street wall edge.

Enhance pedestrian and bicycle safety. When located between the sidewalk and the roadway, raised planters and bollards can serve as vertical barriers to stop off-course vehicles from entering the pedestrian space or as a visual element that increases pedestrian comfort and safety. They can also separate zones of vehicular and pedestrian circulation in locations where the vehicles and pedestrians share space or pass in proximity to one another—for example, at intersections where pedestrians are expected to wait or in other locations adjacent to higher speed roadways.

Provide visual buffers and transitions. Low walls, raised planters, and bollards can also serve as visual buffers to conceal surface parking lots or to shield loading and utility areas. They can also be used to create transitions or mitigate grade changes along the streetscape, building zone, or in public spaces.

Complement the public realm as part of the overall landscape design. Planters introduce landscaping and decorative elements to enhance and soften the appearance of a streetscape. In addition, free-standing planters provide an opportunity to extend the architectural character of a development into the streetscape when they are constructed of similar materials, colors and styles as the building and/or other street furnishings. They can also serve to reduce, or humanize, the scale of large streets or developments by adding pedestrian-scaled elements to the streetscape. Free standing planters can also be used to introduce landscaping in places where in-ground planting is absent or not feasible.

2I.1 LOW WALLS AND RAISED PLANTERS

DESIGN STRATEGIES

1 LOCATION AND DIMENSIONS

A. Low walls and raised planters should be considered around parking lots, along the edge of the Building Zone, and in plazas and pocket parks and other gathering spaces.

B. If walls are to be used for seating purposes, they should be 18 to 24 inches high and a minimum of 18 inches deep.

C. Walls above 5-feet in height should be avoided along street edges and within public spaces.

2 DESIGN ELEMENTS AND MATERIALS

A. Consideration should be given to integrating signage into walls and concrete planters that are located at prominent corners or gateways.

B. The style, material and details of walls and raised planters should complement the architectural character of the adjoining streetscape and building. Concrete, brick or stone is suggested for the face of the wall, with a decorative cap consisting of stone or cast concrete.

C. Innovative design elements such as metal decorative features should be used for aesthetic enhancements and to discourage damage from skateboards, bicycles, or maintenance equipment.

Fairfax, VA

TOP
Street corner defined by low wall that also functions as a planter
Image Credit: Fairfax County

Fairfax, VA

BOTTOM
Low brick wall with a concrete cap functions as visual and physical barrier between surface parking and the sidewalk
Image Credit: Fairfax County

2I.2 BOLLARDS

DESIGN STRATEGIES

A. Bollards can be used to emphasize the separation between pedestrian, vehicular and bicycle traffic. Bollards can be located near the edge of the curb to create increased lane awareness for drivers and to act as a reminder of the location of the edge of the curb for pedestrians, particularly at intersections.

B. In locations where street trees are absent or cannot be planted along a roadway, such as on bridge overpasses or underpasses, placing bollards between the sidewalk and the roadway curb is strongly encouraged as a means of demarcating pedestrian space and protecting pedestrians. If bollards are proposed within the right-of-way, breakaway bollards, or bollards that collapse when struck by a moving vehicle, may be required by VDOT.

C. If a 2-foot pedestrian refuge is designed along the curb and adjacent to on-street parking, bollards should be located behind the refuge area in the Landscape Panel.

D. Bollards should not be placed in open soil tree wells.

Kitchener, ON, Canada

RIGHT
Bollards create safe amenity area by visually and physically separating the pedestrian realm from vehicular travel lanes
Image Credit: completestreetsforcanada

2I.3 PLANTERS

DESIGN STRATEGIES

1 LOCATION AND USES

A. Planters should be placed to highlight entrances or define outdoor areas; for example, a series of planters could be used to separate an outdoor dining area from sidewalk traffic.

B. Planters should not be placed in locations where they block pedestrian circulation or obstruct vehicular sight lines.

2 PLANT MATERIALS

A. Appropriate planting materials for planters include perennials, ornamental grasses, small evergreen trees, and/or small shrubs.

   i. Annuals and other high maintenance landscape materials should be installed only when on-going maintenance is assured.

   ii. Trees and larger shrubs are not appropriate plantings for free-standing planters.

B. Four-season plantings should be considered so that planters have an attractive appearance all year long, particularly during the fall and winter. All plants, except for those that are evergreen plantings, should be removed (or deadheaded) once their season has ended.

C. Irrigation systems for planters should be used where feasible because plant materials installed in free-standing planters tend to dry out more quickly than those installed in the ground.

Redwood City, CA


Fairfax, VA

LEFT
Planters create an enclosure for an outdoor dining area
Image Credit: DeepStream

RIGHT
Row of planters buffer pedestrians and sidewalk diners
Image Credit: Fairfax County

2J UTILITIES

Transformers, meters, telecommunications equipment, and other utilities can negatively impact the pedestrian experience by obstructing pedestrian circulation and adding visually unappealing elements within the streetscape.

Early planning of utility easements during the conceptual design phase of a development is critical to ensure that utilities are appropriately located.

LEFT
Utility vaults hidden by consistent paving material and integrated within the sidewalk
Image Credit: Fairfax County

Vienna, VA

RIGHT
Poor placement of utilities obstructs pedestrian flow and detracts from the visual character of the streetscape
Image Credit: Fairfax County

DESIGN PRINCIPLES

Locate utilities underground to avoid obstructing pedestrian travel and to minimize impacts on the visual character of the streetscape. Utilities can have major impacts on the pedestrian realm. Overhead utilities are unsightly, can obstruct pedestrian movement, and can interfere with the provision of trees in the streetscape. Service lines should be placed underground. Transformers and utility equipment should be located in vaults either under the sidewalk or in the Building Zone.

Minimize conflicts with, or impacts on, street trees. Conflicts between street trees and overhead wires, as well as between street trees and underground facilities, such as trunk and service lines should be minimized. If installed in the wrong locations, underground facilities may preclude planting trees, particularly those with deep roots, or may result in the removal of, or damage to, vegetation during repairs or upgrades to underground facilities.

Fairfax, VA

DESIGN STRATEGIES

1 LOCATION OF UTILITIES

A. A conceptual utility plan should be prepared to designate and organize easements and utility equipment.

B. To the extent feasible, all utility lines should be buried underground and co-located in common trenches.

C. At grade utility equipment and vaults should be located as unobtrusively as possible. They should be located outside of the sidewalk, either within the building or in the Building Zone, so as not to obstruct pedestrian travel. Vaults and electric transformers may be located below the sidewalk; however, locating utility infrastructure under the sidewalk will require a maintenance agreement with VDOT.

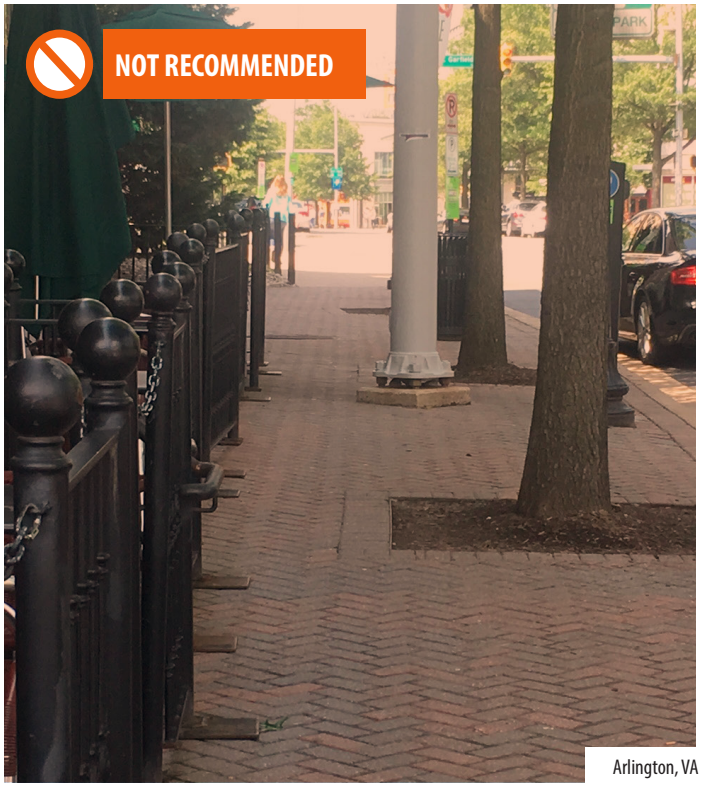
D. In general, no building-serving utility infrastructure should be located within or below the Landscape Panel in order to avoid conflicts with street tree placement and to preserve the health of trees.

E. Street lights should be located within the Landscape Panel and at least 15 feet from the nearest tree. The primary underground electric line for streetlights should be placed outside the Landscape Panel, either under the sidewalk or Building Zone, with only minor lateral lines extending into the Landscape Panel. *[See section 2F ("Landscape Panel and Amenity Zone") for additional guidance on street lighting].*

2 MATERIALS

A. If located adjacent to the sidewalk, vault covers and access points to below-grade equipment should be finished in the same material as the adjacent sidewalk surface and should have ADA accessible surfaces that are attractively incorporated into the streetscape.

B. Equipment that is visible from the street should be screened using walls, landscaping, or other materials.



Arlington, VA

LEFT
Utility pole and trees placed in the middle of the sidewalk obstructs pedestrian flow
Image Credit: Fairfax County

2K TRANSIT SHELTERS

There are a variety of transit shelter types currently in use in the CRDs and CRAs. Some of these shelters are no longer recommended and should be phased out over time to allow for new, more visually appealing shelters that include modern technology and improved features. Ease of maintenance and graffiti-prone designs are chief concerns in the selection of shelter styles.

DESIGN PRINCIPLES

Incorporate FCDOT-approved shelters to achieve area-wide consistency. New shelters should meet specifications set forth by FCDOT, and are subject to review by the state of Virginia and FCDOT. Unless otherwise indicated in the Volumne II: District Design Guidelines for each CRD or CRA, developments should incorporate one of the two state- and FCDOT-approved transit shelter models to ensure that shelter styles are consistent across an area.

Ensure that transit shelters are accessible and served by range of amenities for riders. Paved, accessible pathways between the sidewalk and the transit shelter entrance are an essential design feature for all transit stops. In addition, amenities such as benches, signage, lighting, and real-time technology are critical to ensuring rider comfort, safety, and ease of navigation.

Portland, OR

RIGHT
Accessible transit shelter located in the Amenity Zone; shelter includes rider amenities and displays real-time information
Image Credit: asla.org

DESIGN STRATEGIES

1 LOCATION AND CONTEXT

A. Transit shelters should be located within Amenity Zones. If necessary, due to space constraints, shelters may be located within the Building Zone or may encroach into the sidewalk zone as follows:

   i. If there is insufficient space for the transit shelter in the Amenity Zone, such that it protrudes in to the sidewalk, the shelter may be integrated into the Building Zone provided that there is a clear physical and visual pathway between the transit shelter and the bus entry point. This can be accomplished by installing a free-standing transit shelter in the Building Zone or by integrating the transit shelter into the design of the building itself through the use of building overhangs or recesses. Transit shelters in the Building Zone may require additional pedestrian signage to adequately identify the facility.

   ii. On certain streets where the Amenity Zone is not wide enough to accommodate the transit shelter, the sidewalk may be realigned around the transit shelter structure if the width of the sidewalk is not reduced.

   iii. In certain limited instances, it may be appropriate to narrow the sidewalk adjacent to the transit shelter in order to accommodate it largely within the Amenity Zone, provided that the sidewalk is no less than 5 feet wide.

B. Areas around transit shelters should be well lit to provide greater visibility and safety at night.

C. Sidewalks should connect directly to the transit shelter.

D. Bus stops should be co-located with pedestrian and bicycle amenities such as benches, bicycle parking, shaded areas, wayfinding signage, and trash receptacles. Benches (in addition to the bench located within the transit shelter) should be placed near the transit shelter if the bus stop will have a high volume of transit riders.

2 SHELTER STRUCTURE DESIGN

A. Transit shelters and pads should be designed in accordance with manufacturer's specifications described in the accompanying graphic.

B. Transit shelter structures should incorporate innovative technology to provide up-to-date, real-time rider information and other features to enhance rider experience, whenever possible.

C. Transit shelter structures should incorporate sustainable elements, including solar power or LED lighting, whenever possible.

TRANSIT SHELTER SPECIFICATIONS

Unless otherwise specified in the Volume II: District Design Guidelines for an individual CRD or CRA, the following shelters should be used.

Image Credit: Fairfax County

TRANSIT SHELTER: EURO

- Tolar Manufacturing – Euro Shelter with integrated bench
- Transit shelter dimensions: 6-feet wide by 10-feet long
- There are many available options for mounting, lighting, materials, and other technologies. Developers should work with FCDOT on the specific transit shelter features.

SHELTER PAD

- 6-inch thick, reinforced concrete pad that is a minimum of 15-feet long by 6-feet wide and that is connected directly to the sidewalk for accessibility purposes.
- If the transit shelter is to be located on a street with an 8-feet wide Amenity Zone, the transit shelter pad should be 8-feet in width to provide a contiguous surface from the curb to the sidewalk.

Image Credit: Tolar Manufacturing

TRANSIT SHELTER: NIAGARA

- Tolar Manufacturing – Niagara Shelter with integrated bench
- There are many options for mounting, lighting, materials, and other technologies that are available from the manufacturer. Developers should work with FCDOT on the specific shelter features.

SHELTER PAD

- 6-inch thick, reinforced concrete pad that is a minimum of 18-feet long by 6-feet wide and that is connected directly to the sidewalk for accessibility purposes.
- If the transit shelter is to be located on a street with an 8-feet wide Landscape Panel, the transit shelter pad should be 8-feet in width to provide a contiguous surface from the curb to the sidewalk.

2L SUSTAINABLE STREET AND STREETSCAPE DESIGN

The low impact development (LID) approach to stormwater management, described in greater detail in Appendix A2, offers a variety of opportunities for incorporating small-scale, natural drainage features and methodologies into the streets and streetscapes of CRDs and CRAs. In the context of the public right-of-way, appropriate tools may include planted medians and traffic islands; bioretention planters and cells; structural cell techniques to support pavers and plantings; swales; porous or permeable pavement; impervious surface reductions; and, pavement removal and infill tree planting where excess pavement exists.

While these opportunities will vary depending on the design of each street and the amount of right-of-way available, the integration of LID features into the public right-of-way can help to slow, capture and filter urban stormwater runoff before it reaches the public stormwater system and regional waterways. These measures benefit the County's water resources by reducing water pollution and replenishing local aquifers. At the same time, when applied creatively in tandem with other streetscape elements, LID measures can also enhance the character of the streetscape and pedestrian environment.

VDOT requires most urban roadways to contain a curb and gutter if they will be accepted into the public roadway system; therefore, designs that direct stormwater into vegetated swales or bioretention planters should be coordinated closely with VDOT. For specific guidance related to drainage design for VDOT projects, refer to the VDOT Drainage Manual.

For general guidance regarding sustainable design strategies, refer to Appendix A2 and to the following sources of stormwater management best practices:

- The Sustainable Sites Initiative (SITES)
- Leadership in Energy and Environmental Design (LEED) rating system created by the US Green Building Council

For specific applications to streets and streetscapes, see the Urban Street Stormwater Guide by the National Association of City Transportation Officials.

Portland, OR

LEFT
Sustainable streetscape with bioretention facilities and permeable paving materials in the Amenity Zone
Image Credit: City of Portland, OR

Washington, DC

TOP
LID features help to define the streetscape and enhance the pedestrian experience while providing stormwater management benefits
Image Credit: Rhodeside & Harwell

DESIGN PRINCIPLES

Rethink streets as part of larger urban natural systems. Streets can be more than simply mobility corridors with expanses of pavement; rather, they can also perform important ecological functions. When designed to incorporate nature, streets can help manage the quantity and quality of water entering the underground public stormwater system and waterways, regulate ambient temperatures and air quality, and serve as wildlife corridors and habitats. As the conduits that direct much of our urban runoff into the stormwater system, streets and streetscapes can play a particularly important stormwater management function when designed to incorporate facilities to capture, filter and collect rainwater before it outfalls into the stormwater system.

Limit the amount of paved and impervious surfaces along the public right-of-way. One of the most cost-effective ways to stem the flow of runoff into sewers and waterways is to reduce and/or limit the amount of pavement and impervious surfaces in the public right-of-way. Streets and streetscapes can be designed to incorporate features such as a continuous Landscape Panel, trees planted at regular intervals, planted medians in the center of the roadway, and porous pavements that allow water to drain into the ground. They can also be retrofitted by removing unneeded expanses of impervious surfaces and replacing these areas with natural surfaces and plantings.

Strive for design synergies that benefit the street and the CRD/CRA in multiple ways. Just as streets can serve ecological as well as mobility functions, the stormwater management facilities along streets and streetscapes can also serve multiple functions. When designed thoughtfully and creatively, with attention to appropriate plantings, LID strategies can improve the pedestrian's safety, comfort and overall walking experience by calming traffic, buffering pedestrians from passing cars, and decreasing temperatures or heat island effects along the street. Moreover, LID features can enhance a street's overall visual character and sense of place by contributing color and texture to the streetscape, defining zones within the streetscape, and creating a garden-like character.

DESIGN STRATEGIES

A. Stormwater management methods should be incorporated prominently as design features that provide multiple benefits, including environmental, habitat creation, species diversification, traffic calming, educational, and aesthetic benefits.

B. LID strategies in the public right-of-way should focus on space-efficient facilities that do not impede pedestrian or vehicle travel, and that achieve a reduction in the amount of impervious surfaces. Appropriate locations for bioretention facilities include street medians and traffic islands, within the Landscape Panel, as part of curb extensions at intersections, or within midblock crossings.

   i. Porous materials, such as porous concrete or porous structural pavers, should be used whenever feasible to reduce the amount of impervious surfaces, particularly on sidewalks, parking lanes, within the Amenity Zone, and in the Building Zone.

   ii. Bioretention facilities with native groundcover plantings, shrubs or trees (i.e., bioretention planters or bioretention cells) should be incorporated to filter stormwater as a first layer of treatment. The use of native vegetation within bioretention facilities provides multiple benefits including nutrient cycling, energy transfer, improved water quality, support for wildlife and insects including bees, and enhanced aesthetics.

   iii. Linear swales, wet or dry, may be installed where sufficient space exists.

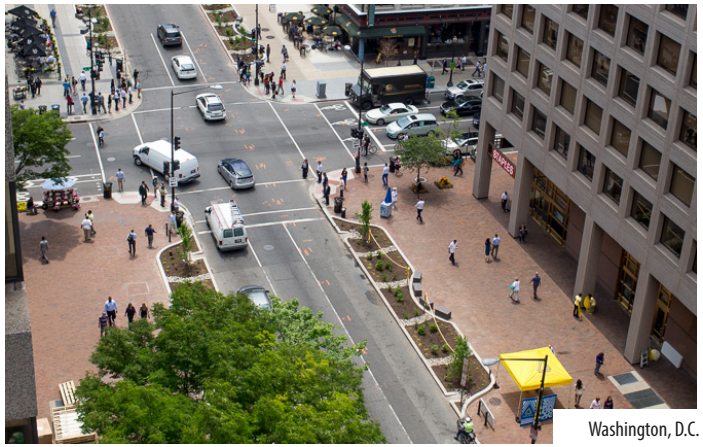
   iv. Removal of paved surfaces and infill tree planting should be considered in areas where the extent of paved areas exceeds that which is necessary for pedestrian movement and furnishings.

   v. Structural cell technology may be incorporated to support the sidewalks while allowing more water and air to reach tree roots in the uncompacted soil below, as *described in section 2.F.1 ("Trees and Landscaping")*.

C. During design and prior to installation, all LID measures in the public right-of-way should be coordinated with local utilities to identify potential conflicts with underground utility infrastructure.

D. Before installation of LID measures, a maintenance plan and agreement should be in place, assigning clear roles and responsibilities for conducting and funding the maintenance of plantings and porous pavement. Regular inspections should be conducted to maintain the function of LID facilities; for example, regular vacuuming is necessary to maintain the permeability of certain porous pavement types.

E. Stormwater management facilities in the public right-of-way should maximize opportunities to educate the public about the benefits of such facilities. Incorporating interpretive displays or other innovative, multimedia information explaining stormwater management functions and the implications for local and regional watersheds can help build support for future LID projects and recruit volunteers to care for plantings—which can be beneficial so long as coordination and oversight is provided.



Washington, D.C.

LEFT
Landscape Panel with rain gardens for capturing stormwater, increasing landscaping, and providing space for outdoor seating
Image Credit: Golden Triangle BID