

LIGHTING



Getting Started

Lighting creates safe and desirable streetscapes at night and during daytime. Lighting selection can add value and aesthetic character to neighborhoods and commercial districts.

4a

Street lighting is an essential part of the Complete Streets network. Well-designed street lighting enhances the public realm, creates a more hospitable environment, and provides safety and security on roadways, paths, alleys, and stairways. Adequate street lighting promotes active transportation options after dark, especially during the winter months. Lighting design also can help to define neighborhoods or add to historic significance.

SOME CONSIDERATIONS FOR STREET LIGHTING INCLUDE:

HISTORIC LIGHTING Historically accurate or complementary street light poles and fixtures should be used where appropriate.

LOCATION AND SPACING Street and pedestrian lighting should be installed in the sidewalk furniture zone. Light fixtures should not be located next to tree canopies that may block the light. Lighting should be spaced to minimally assure complete coverage of the pedestrian realm.

LIGHT COLOR Light sources should provide a warm, white-color light (yellow-spectrum, not blue).

LIGHT POLES AND FIXTURES Design should be coordinated with the design of other streetscape elements and should reflect the history and character of the surrounding neighborhood.

DARK-SKY COMPLIANT LIGHTING Where appropriate, dark sky-compliant lighting should be selected to maximize light cast onto the ground and minimize light pollution cast into the sky.

LIGHTING FOR SAFETY Lighting placement should prioritize illumination of public gathering areas and public spaces, as well as areas with high incidences of index crimes.



4.1

PEDESTRIAN-SCALE LIGHTING 4.1

Pedestrian-scale lighting is essential for creating safe street environments. Conventional street lighting, designed primarily to light the vehicle way, often is inadequate for pedestrian needs, leaving unlit areas and dark shadows on walkways. Pedestrian-scale lighting is especially important in cold-weather climates with long winter nights. Pedestrian-scale lighting illuminates potential tripping hazards, helps to deter crime, and makes pedestrians more visible to drivers. Pedestrian-scale lighting also can illuminate bikeways near walking areas. Retrofits of existing streetlights and new installations should provide lighting on sidewalks and multi-use paths. Pedestrian-scale lighting should be coordinated with building and property owners to include building-mounted lighting for sidewalks, alleys, paths, and stairways where poles would obstruct the pedestrian zone. Land use context should be considered to achieve optimum lighting levels in pedestrian areas, and care must be taken to avoid light trespass into the windows of nearby residential units. Common examples of pedestrian-scale lighting include acorn, globe, and lantern lamps.

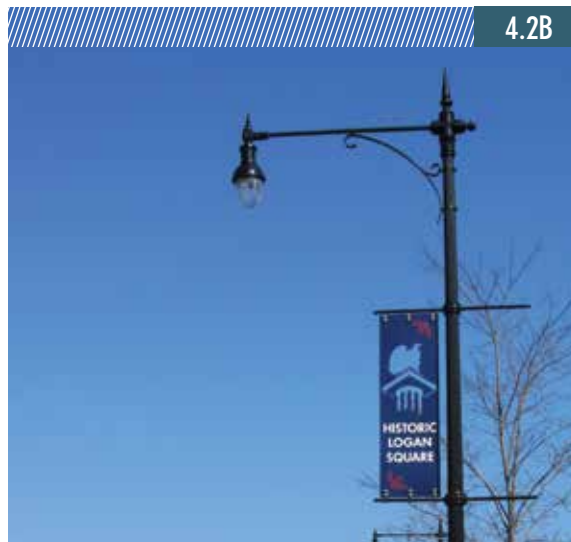


4.2A

FIGURE 4.1
PEDESTRIAN SCALE
LIGHTING
Chicago, IL

FIGURE 4.2A
VEHICLE SCALE
LIGHTING
Chicago, IL

FIGURE 4.2B
HISTORIC VEHICLE
SCALE LIGHTING
Chicago, IL



4.2B

VEHICLE-SCALE LIGHTING 4.2

Vehicle-scale lighting is an important element in streetscapes. In certain contexts, pedestrian-scale lighting is sufficient to provide adequate lighting for safe and secure walking, bicycling and driving. On major roadways, however, vehicle-scale lighting is needed to illuminate the travel way. Vehicle-scale lighting should be located in the furnishing zone and should never block the pedestrian way.

FIGURE 4.3A
COMBINATION
PEDESTRIAN AND
STREET SCALE
LIGHTING
Chicago, IL



4.3A

COMBINATION PEDESTRIAN & VEHICLE- SCALE LIGHTING 4.3

In many settings, vehicle-scale lighting is sufficient to light the pedestrian way. In some cases, however, street lighting can be supplemented with pedestrian-scale lighting to create a better multimodal environment. Where feasible, conventional streetlights can be retrofitted by hanging a pedestrian-scale lighting arm from the existing pole at a height of 12 feet to 17 feet. If streetlight spacing is not adequate for pedestrian needs, pedestrian-scale lights can be added between existing streetlight poles.

FIGURE 4.3B
PEDESTRIAN AND
STREET SCALE
LIGHTING
Chicago, IL



4.3B

Going the Distance

This section presents practices for lighting design that go beyond the widely accepted tools listed above. Standards for using these new technologies are in development and need further testing, but limited applications are currently in use.



SOLAR/LED LIGHT FIXTURES 4.4

Solar and LED (light-emitting diode) fixtures are now readily available in most street lamp designs. While the initial investment for these fixtures is usually higher than for traditional technologies, total life-cycle cost should be considered; for example, solar lighting may reduce the need to lay costly new utility conduit. Wherever possible, solar light fixtures should be used for new installations and retrofit projects. If solar is not feasible, LED or other energy-efficient lighting technologies should be used.



IN-PAVEMENT LIGHTING 4.5

In-pavement lighting is one of many new technologies that can be used to illuminate the streetscape. In-street lighting can include simple solar-lamp bricks installed in walkways or crossings, as well as lights placed in the travel way to further delineate bikeways, crosswalks, or vehicle lanes. Examples of in-street lighting include flashing yellow in-roadway lights used to supplement crosswalk markings, and internally illuminated yellow, white, blue or red raised-pavement markers. Although in-street lighting can increase safety in travel ways, they can be difficult to see in daylight and should supplement, not replace, traditional pavement markings.

FIGURE 4.4
NORTH BRANCH
SOLAR PANELS
Chicago, IL
Image credit:
Eliezer Appleton

FIGURE 4.5
IN-PAVEMENT
LIGHTING
Chicago, IL

FIGURE 4.7
CATENARY LIGHTING
Oak Park, IL



4.7

CUSTOM-DESIGNED LIGHTING 4.6

Custom lighting can be a unifying element of urban design, helping to define a place and give it a unique identity. In districts with distinctive characters, custom lighting designs should be considered to assure a cohesive streetscape design aesthetic.

CATENARY LIGHTING 4.7

Catenary lighting is suspended from wires affixed to poles or buildings. This lighting technique can reduce infrastructure costs, such as installation of utility poles or underground conduit. Catenary lighting can be useful in pedestrian priority areas, cultural districts, and other areas designed for placemaking, giving a ceiling to the “outdoor room” and reducing the need for light poles that can clutter or obstruct the pedestrian way.

TABLE 4A LIGHTING						Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays For Planned Contexts								
Getting Started	Design Type	STYLE OPTIONS	DIMENSIONS	SPACING	DESIGN CONSIDERATIONS	COMMERCIAL/MIXED USE	RESIDENTIAL	SINGLE USE	COMMERCIAL	RESIDENTIAL	VILLAGE MIXED-USE	SINGLE USE	RESIDENTIAL/AGRICULTURAL	VILLAGE MIXED-USE	PEDESTRIAN PRIORITY AREAS	TOD	ENTERTAINMENT AND CULTURAL DISTRICTS	GREEN STREETS	SCHOOLS ZONES AND CAMPUSES	PARK ZONES	HOME ZONES/SOCIAL ZONES		
	4.1 Pedestrian Scale	Straight pole	12-17 ft. H	20 ft. to 40 ft.	Lamps: acorn, globe, lantern, historic	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿
Arm		4 ft. L	20 ft. to 40 ft.	Width of sidewalk	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	
Dual arm		8 ft. L	20 ft. to 40 ft.	Presence of bikeway or on-street parking	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	
4.2 Vehicle Scale		Pole	27 ft.-30 ft. H	40 ft. to 80 ft.	Lamps: shoe box, historic	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿
		Arm	4 ft.-8 ft. L	40 ft. to 80 ft.	Lamps: cobra, historic. Width of travel way for arm length.	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿
		Dual arm	8 ft.-16 ft. L	40 ft. to 80 ft.	Median: width of travel way for arm length	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿
4.3 Combination	Dual arm	4 ft.-12 ft. L	40 ft. to 80 ft.	Ped arm placed at 12 ft.-17 ft. Width of travel way for arm length	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	
Going the Distance	4.4a Solar Lamps	Same as conventional	Same as conventional	Lamps can replace conventional	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	
	4.4b LED Lamps	Same as conventional	Same as conventional	Lamps can replace conventional	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	
	4.5 In-Pavement Lighting	Varies	Varies	District identity	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	
	4.6 Custom Design	Varies	Varies	District identity	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿
	4.7 Catenary	Varies	Varies	District identity	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿	⦿

TABLE 4B PEDESTRIAN LIGHT LEVELS BY CONTEXT		
Land Use Context for Urban, Suburban, and Rural Environments	Light Level	Notes
Commercial	10.75 lx	Note: Light levels are measured in lumens (lx).
Mixed-Use	5.4 lx	Suggested light levels are consistent with
Residential	4.3 lx	ANSI/IES RP-8-00 American National
Single Use (Office/Industrial)	3.2 lx	Standard practice for roadway lighting
Special Districts	Varies	—

KEY

- ⦿ Encouraged
- ⦿ Permitted
- ⦿ Discouraged
- ⦿ Required



FURNISHINGS

4b



Getting Started

Street furnishings add comfort, vitality and usefulness to the streetscape environment, prioritizing the needs of pedestrians and encouraging recreation and social interaction in the public space. Street furnishings serve as important tools in urban design, establishing and strengthening neighborhood character and providing visual consistency across the streetscape. Furnishings should be placed in the sidewalk furniture and/or frontage zones. Although utilities serve different functions than traditional furnishings, they are commingled with furnishings in the streetscape and are discussed in this section as well.

FIGURE 4.8A
BENCHES
Chicago, IL



FIGURE 4.8B
BENCHES
Oak Park, IL



FIGURE 4.9
RECYCLE RECEPTACLES
Chicago, IL



PUBLIC SEATING 4.8

Benches and other seating areas are essential elements of the walking environment, providing comfortable places for people to rest, eat, socialize, or read in a public space. A properly sited bench creates a sense of place for the immediate surrounding area. Some considerations for the design and placement of benches include:

Seating should be located under trees or other shaded areas, with adequate lighting nearby.

Seating should be oriented toward points of interest, such as adjacent buildings, open spaces, or the street itself. Where sidewalk width permits, seating can be perpendicular to the curb.

Informal seating areas, such as low planter walls, wide stairways or other architectural elements, may be used as alternatives to freestanding benches. Benches and other seating should be made of durable, high-quality materials and designed in a style that integrates with other streetscape elements and visually complements and reinforces the streetscape design.

REFUSE RECEPTACLES 4.9

Refuse receptacles should accept both trash and recyclables. Where there is a demand, separate receptacles should be provided for recyclable materials. Some considerations for the location of refuse receptacles include:

Place receptacles near high-activity generators, such as major civic institutions, commercial destinations and transit stops.

Place receptacles near street corners but outside of the sidewalk pedestrian zone and curb ramps.

Refuse receptacles should be placed no less than 200 feet apart along commercial streets.



4.10

FIGURE 4.10
BOLLARDS
Chicago, IL

FIGURE 4.11A
PARKING STATION
Chicago, IL

FIGURE 4.11B
PARKING METERS
Oak Park, IL

BOLLARDS 4.10

Bollards are short vertical posts primarily used as safety elements to control access and separate pedestrians and/or bicyclists from motor vehicles. Thoughtful design and location of bollards can add visual interest, strengthen street character, and define pedestrian spaces. Bollards can be 4 to 24 inches wide and 3 to 4 feet high, with articulated sides and tops to provide distinct design details and coordinate with other street design elements. Bollards can be permanent or removable; if removable, they should be designed to appear permanent. Some bollards are equipped with electric mechanisms that retract the post completely into the pavement to allow occasional vehicle access to otherwise closed areas. Bollards are commonly placed in the furniture zone.



4.11A



4.11B

PARKING STATIONS & METERS 4.11

Parking meters are a standard element in commercial streetscapes; they can be traditional single-space meters, or preferably, consolidated multi-space pay stations. Single-space meters, which can double as bike parking, should be placed at the front end of the individual stalls. Multi-space meters should be placed approximately 150 to 200 feet apart, with signs every 100 feet clearly directing patrons to the meters. If municipalities have sufficient bike parking, they should encourage conversion of single-space meters to multi-space units to reduce visual clutter. The multi-space units should be selected and sited to minimize their impact on the pedestrian zone.

FIGURE 4.12
NEWS RACK
Chicago, IL

NEWS RACKS 4.12

Most municipalities set out guidelines for news rack placement. Multiple news racks can be consolidated into a standard decorative stand so they visually blend with their surroundings and complement the architectural character. Some additional considerations include:

When news rack doors are open, racks located within the sidewalk furniture or frontage zones should not encroach into the pedestrian zone.

News racks should be placed no closer than 2 feet from adjacent street signs and 4 feet from bike racks.



4.12

FIGURE 4.13A
BUS SHELTERS
Chicago, IL

TRANSIT SHELTERS 4.13

Transit shelters should be provided in any area prioritized for transit, especially in districts that are major regional destinations. Transit shelters should be designed to fully shield waiting passengers from inclement weather; prevailing winds and storm directions must be considered in design and siting. While custom designs can be developed, all designs should meet the specifications of the servicing transit agencies. Generally, shelters should be at least 5 feet deep and long enough to provide space for a minimum of three seats, plus wheelchair accessibility. Bus transit shelters typically are placed in the furniture zone, so patrons can board more readily; if the furniture zone is not wide enough, the frontage zone may be used. Transit shelter placement should never limit the pedestrian way to less than 5 feet.



4.13A

FIGURE 4.13B
BUS SHELTERS
Kenilworth, IL



4.13B



4.14A

BIKE PARKING 4.14

This section discusses the three primary types of bike parking: on-street, on-sidewalk, and off-street. (A fourth type, covered bike parking, is discussed in the “Going the Distance” section.)

FIGURE 4.14A
ON-STREET BIKE
PARKING
Chicago, IL

FIGURE 4.14B
ON-STREET BIKE
PARKING
Oak Park, IL

FIGURE 4.14C
SIDEWALK BIKE
PARKING
Chicago, IL

FIGURE 4.14D
OFF-STREET RACKS
Chicago, IL

ON-STREET

On-street bike parking, sometimes called a “bike corral,” uses an on-street parking space for bike racks. Up to 12 bike racks can be placed in a single motor vehicle space, maximizing the effective customer parking area in business and office districts. On-street bike parking can be considered in areas where sidewalk space is limited or in spaces unusable by motor vehicles, including areas near intersections and crosswalks.



4.14B

SIDEWALK

The best choices for sidewalk bike parking are inverted-U or ring designs, which maximize the potential locking area and can stand alone or be grouped together. Sidewalk bike parking structure designs can be integrated with the design aesthetic of other street furnishings and public art. Sidewalk bike racks should be placed in the frontage or furniture zones, so bicyclists using them do not interfere unduly with building access or the pedestrian zone. Sidewalk bike parking structures can do double duty by substituting for bollards.



4.14C

OFF-STREET

Off-street racks should be located within clear view of a destination’s entranceway, preferably no further than the closest motor vehicle parking space and usually no more than 50 feet from the entrance. Multiple racks in a visible, signed location can be placed up to 100 feet from the entrance. When off-street racks are placed far from entranceways, cyclists tend to ignore them and find closer places to secure their bikes.



4.14D

FIGURE 4.15
UTILITIES
Chicago, IL



4.15

FIGURE 4.16
TRAIL CAMERAS
Chicago, IL



4.16

UTILITIES 4.15

Telecommunications, electric, street lighting, traffic signal and fiber optic conduits are often located under the sidewalk, with lateral lines extending from utility mains in the public right-of-way to serve adjacent properties. When utilities are being newly installed or retrofitted, care should be taken to improve pedestrian safety, reduce clutter in the streetscape, minimize maintenance conflicts, and maintain – or preferably, expand – adequate planting areas to support tree growth and stormwater infiltration. When placing utilities within the furniture zone, consider the following:

Wherever possible, small utility boxes (such as residential water vaults and meters, gas vaults and valves, and street lighting access,) should be aligned or clustered at the back of the curb to minimize conflicts with existing or potential landscaped areas and tree locations.

Generally, utility boxes are sited in the direction of the pipe. Where possible, utility boxes sited parallel with the curb should be in the sidewalk furniture zone; vaults perpendicular to the curb should be placed between existing or potential street trees or sidewalk landscape locations, such as walkways to parking areas.

Wherever possible, utility lateral lines should not run directly under landscaped areas; instead, they should be placed under driveways and walkways.

If necessary, utility access can be placed in the pedestrian realm under slip-resistant covers that are flush with the pavement.

SURVEILLANCE CAMERAS AND CRIME PREVENTION 4.16

In areas with high incidences of index crime, it may be appropriate to consider use of cameras to deter crime and maintain “eyes on the street.” Cameras should be placed in a prominent, visible location to maximize video capture, but should not become a visual nuisance. Surveillance cameras can be attached to utility poles. Intersections with red-light cameras visible from sidewalks and storefronts do not require additional surveillance cameras for crime prevention.

Going the Distance

This section presents practices for street furnishings that go beyond the tools discussed above. These practices are typically used in special districts, such as downtowns, historic neighborhoods, entertainment districts, or transit areas.



4.17A



4.17B

FIGURE 4.17A
CUSTOM SEAT
FURNISHINGS
New York, NY

FIGURE 4.17B
CUSTOM SEAT
FURNISHINGS
Chicago, IL

FIGURE 4.17C
CUSTOM SEAT
FURNISHINGS
Chicago, IL

FIGURE 4.17D
CUSTOM SEAT
FURNISHINGS
New York, NY

FIGURE 4.17E
CUSTOM SEAT
FURNISHINGS
Chicago, IL



4.17C



4.17D



4.17E

CUSTOM-DESIGNED FURNISHINGS 4.17

Custom designs using high-quality materials and uniform aesthetics can transform chairs, interpretive signage, bike racks and other furnishings into functional art, maximizing their placemaking effects, especially in special districts. Business groups and other private interests may serve as partners in creating and installing distinctive custom-designed furnishings. Custom furnishings can be used in addition to public art to establish, reflect and promote district and neighborhood character.

FIGURE 4.18A
SIDEWALK DINING
Oak Park, IL



4.18A

FIGURE 4.18B
SIDEWALK DINING
Oak Park, IL



4.18B

SIDEWALK DINING 4.18

Outdoor café and restaurant seating adjacent to the sidewalk adds vitality to the street environment and encourages economic development. Ideally, tables and chairs should be placed in the sidewalk frontage or furniture zones directly in front of the restaurant; if those spaces are not adequate, dining areas can be slightly offset. Sidewalk dining areas should not encroach into the pedestrian way. Since the public purpose of allowing restaurants to have dining on the sidewalk is to stimulate activity on the street, municipalities should prohibit restaurants from fully enclosing the dining area. Parklet cafes also can be used as sidewalk dining. If sidewalk space is limited, parking spaces sometimes can be transformed into outdoor dining areas.

4.19



STREET VENDOR STANDS 4.19

Street vendor stands, such as flower, magazine, and food vendors, rely on regular pedestrian traffic to sustain their business. Some vendors catering to commuters operate only during daytime work hours; in areas with vibrant nighttime environments, street vendors may operate in the evening as well. Street vendor stand sites should provide at least 6 feet of clear pedestrian passage between the edge of the display area and any other sidewalk elements. In some areas, street vendor stands may be permitted in on-street parking spaces or in off-street parking lots. (Street vendors with stands in private lots generally pay nominal rent to the parking lot operator.) The details and features of stand designs should be coordinated with other street elements and the architectural character of the district.



4.20A



4.21A

FIGURE 4.20A
COVERED BIKE
PARKING
Oak Park, IL

FIGURE 4.20B
INDOOR BIKE PARKING
Des Plaines, IL

FIGURE 4.21A
BIKE SHARE STATION
Chicago, IL

FIGURE 4.21B
BIKE SHARE STATION
Washington, DC



4.20B



4.21B

COVERED BIKE PARKING 4.20

Covered bike parking addresses the long-term parking needs of bicyclists who frequently park for eight or more hours, such as daily commuters and bicycle tourists, and should be considered in transit-oriented areas and other special districts. Covered bike parking options include bike lockers, vertical bike parking, and bike parking structures.

BIKE SHARE STATION 4.21

Bike share systems connect high-use destinations, such as transit stations, public parks, tourism sites and job centers, and can be deployed with bikeways to integrate transit, land use and economic development goals. Stations can be located off-street where public access is provided; where adequate space is available for a clear pedestrian way, bike share stations also can be placed in the sidewalk furniture or frontage zones.



ON THE REVERSE >>

TABLE 4C FURNISHINGS

TABLE 4C FURNISHINGS					Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays for Planned Contexts							
Getting Started	Furnishings	Dimensions	Spacing	Design Considerations	Commercial/Mixed Use	Residential	Single Use	Commercial	Residential	Village Mixed-Use	Single Use	Residential/Agricultural	Village Mixed-Use	Pedestrian Priority Areas	TOD	Entertainment and Cultural Districts	Green Streets	Schools Zones and Campuses	Park Zones	Home Zones/Social Zones	
	4.8	Public Seating	6 ft. L X 2.5 ft. W X 3 ft. H	Every 1/4 mile min	Typical bench dimension. Place according to pedestrian system design.	Encouraged	Permitted	Encouraged	Encouraged	Permitted	Encouraged	Permitted	Permitted	Encouraged	Required	Required	Required	Encouraged	Required	Required	Required
4.9	Refuse Receptacles	2 ft. Diameter X 3 ft.	Every 200 ft. max	Place at intersections for maximum efficiency.	Required	Encouraged	Permitted	Required	Encouraged	Required	Permitted	Permitted	Required	Required	Required	Required	Encouraged	Required	Required	Required	Encouraged
4.10	Bollards	4 in. to 24 in. diameter and 3 ft. to 4 ft. H	Varies	Place to increase vehicle separation from bicycles and pedestrians.	Permitted	Discouraged	Discouraged	Permitted	Discouraged	Permitted	Discouraged	Discouraged	Permitted	Permitted	Encouraged	Encouraged	Permitted	Permitted	Permitted	Permitted	Encouraged
4.11	Parking Stations & Meters	3.5 ft. H	Meters every space. Stations every 125 ft. to 200 ft.	Stations are preferred to remove street clutter; however, need to provide adequate bike parking if removing meters.	Required	Permitted	Permitted	Permitted	Discouraged	Required	Permitted	Discouraged	Encouraged	Required	Required	Required	Permitted	Encouraged	Encouraged	Encouraged	Permitted
4.12	News Racks	2 ft. L X 1.5 ft. W X 3 ft. H	Varies	Dimensions for single unit. Place according to pedestrian demand.	Encouraged	Discouraged	Discouraged	Encouraged	Discouraged	Encouraged	Discouraged	Discouraged	Encouraged	Encouraged	Encouraged	Encouraged	Discouraged	Encouraged	Discouraged	Discouraged	Permitted
4.13	Transit Shelters	13.5 ft. L X 6.5 ft. W	Varies	Average dimensions for wheelchair access. Place where space allows along high use transit routes.	Encouraged	Permitted	Permitted	Encouraged	Permitted	Encouraged	Permitted	Discouraged	Encouraged	Required	Required	Required	Permitted	Permitted	Permitted	Encouraged	Encouraged
4.14	Bike Parking	6 ft. L X 2.5 ft. W X 3 ft. H	Varies	Average dimensions account for space required to park a bicycle. Place according to demand.	Required	Encouraged	Permitted	Encouraged	Discouraged	Encouraged	Permitted	Discouraged	Encouraged	Encouraged	Required	Required	Encouraged	Required	Encouraged	Encouraged	Encouraged
4.15	Utilities	Varies	Varies	Placement should not block the pedestrian way.	Permitted	Permitted	Encouraged	Permitted	Permitted	Discouraged	Encouraged	Permitted	Discouraged	Discouraged	Discouraged	Discouraged	Discouraged	Permitted	Permitted	Permitted	Discouraged
Going the Distance	4.17	Custom Designed Furnishings	Same as conventional design	Same as conventional design.	Permitted	Discouraged	Discouraged	Permitted	Discouraged	Permitted	Discouraged	Discouraged	Permitted	Encouraged	Required	Required	Encouraged	Encouraged	Encouraged	Encouraged	Required
	4.18	Sidewalk Dining	Frontage or furniture zone (width) by storefront (length)	Require permits to assure regulation of clear pedestrian way.	Encouraged	Discouraged	Discouraged	Permitted	Discouraged	Encouraged	Discouraged	Discouraged	Permitted	Encouraged	Encouraged	Required	Permitted	Permitted	Discouraged	Discouraged	Permitted
	4.19	Street Vendor Stands	8 ft. L X 4 ft. W X 8 ft. H	Minimum dimensions	Require permits to assure regulation of clear pedestrian way.	Encouraged	Discouraged	Discouraged	Permitted	Discouraged	Encouraged	Discouraged	Permitted	Encouraged	Required	Required	Permitted	Permitted	Permitted	Encouraged	Encouraged
	4.20	Covered Bike Parking	Varies, min: 13.5 ft. L X 6.5 ft. W	Varies according to demand	Varies depending on racks and site location. Minimum dimensions based on transit shelter.	Permitted	Permitted	Permitted	Encouraged	Discouraged	Permitted	Permitted	Discouraged	Permitted	Permitted	Required	Permitted	Permitted	Encouraged	Required	Permitted
	4.21	Bike Share Stations	Varies, similar to covered bike parking	Varies according to demand	Should be designed as part of a comprehensive bike share system.	Encouraged	Encouraged	Permitted	Permitted	Discouraged	Encouraged	Permitted	Discouraged	Permitted	Encouraged	Required	Required	Permitted	Required	Required	Encouraged

KEY

	Encouraged		Permitted		Discouraged		Required
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GREEN INFRASTRUCTURE



Getting Started

Green infrastructure includes all trees, shrubs, and other understory plantings on both public and private lands. Street trees and landscaping are essential parts of the urbanized ecosystem, enhancing the comfort and safety of people who live and travel along the street.

4C

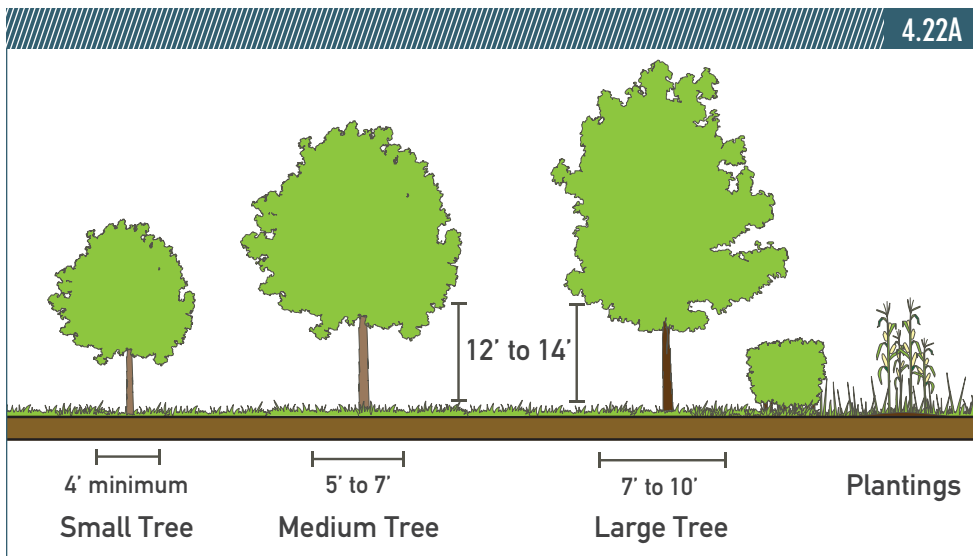
A healthy urban forest also is a powerful tool for streetwater management and climate control. Leaves and branches catch and slow rain as it falls, allowing it to soak into the ground instead of flowing into storm drains. The plants themselves take up and store large quantities of water that would otherwise further contribute to surface runoff. Part of this moisture then returns to the air through evaporation to help cool the city.

TREE ROWS & PLANTINGS 4.22

Trees and other plantings are important elements along sidewalks. In many urbanized settings, however, trees are planted in constricted, unhealthy locations that limit their lifespan and usefulness. To thrive, street trees must have adequate uncompacted soil, water, and air. The location of underground and above ground utilities also must be considered when planting trees and other landscape elements. This section provides guidance for appropriate selecting, siting, planting, and care of street trees.

TREE SELECTION CRITERIA

Tree selection for streetscapes should be based on climate, roadway conditions and land use context, and should consider the mature tree's need for light, water, canopy space and root extension. Most jurisdictions have forestry guidelines detailing which trees may be planted in public spaces. It is best to select native, hardwood trees that are resilient to inclement weather. Multiple species should be used to avoid localized devastation from species-specific diseases and parasites, such as the Emerald Ash Borer. Fruit trees should be avoided in most settings because they require extra maintenance and annual harvesting.



For streetscape design purposes, tree species can generally be grouped by size to allow for initial roadway design placement.

In all cases, larger trees can be planted in oblong instead of square-shaped wells to fit them into fairly narrow furniture zones.

DESIGN REQUIREMENTS FOR TREE SELECTION:

SMALL TREES can thrive in planters and tree wells. They require a well or furnishing zone at least 4 feet wide, and can thrive with a tree grate on a commercial/mixed-use sidewalk. Small trees include: Dogwood, Prunus, Service Berry, Crabapple, and Fir.

MEDIUM TREES generally require a planting area at least 5 to 7 feet wide; they may thrive in large tree planters. Medium trees also thrive in residential tree lawns. Medium trees include: Maple, Cherry, Bradford Pear, Honey Locust, and White Pine.

LARGE TREES generally require a tree lawn but can thrive in a planting area at least 7 to 10 feet wide. Large trees are a great choice for residential areas with wide frontage zones and for landscaped medians on roadways. Large trees include: Sycamore, Elm, Chestnut, Red Oak, and Beech.

PLANTINGS Native grasses and other plants can help to protect and restore soil conditions in urban environments. Native plants generally have longer root systems and can help process stormwater onsite. Native plantings can be a suitable alternative to traditional lawns. Groundcover choices can include: Bluegrass, Sedum, and Periwinkle.

ADDITIONAL PRINCIPLES FOR TREE SELECTION AND PLACEMENT:

Seek and reclaim space for trees. A surprising number of residual spaces suitable for planting can be found on streets between areas required for travel lanes and parking, such as traffic circles, medians, channelization islands and curb extensions.

Select the right tree for the space. In choosing a street tree, consider what canopy, form, and height will maximize benefits over the course of its life. Mature tree height should allow necessary clearances below overhead electrical transmission lines and prevent limbs from overhanging potentially sensitive structures, such as flat roofs. In commercial areas where the visibility of façade-mounted signs is a concern, choose species whose lowest branches are at least 12 to 14 feet above the ground. Select trees with non-aggressive root systems to avoid damaging paving and sidewalks.

Start with good nursery stock and train it well. When installing plant material, choose well-formed plants with complete single leaders and check that boxed trees are not root-bound. Proper watering and pruning every three to four years will allow trees to mature and thrive for many years of service.

Create optimum conditions for growth. Trees will require space for growing branches and for root extension underground. For optimal growth, a typical medium sized street tree requires a clear sidewalk furniture zone at least 6 to 7 feet wide, with uncompacted soil at least 3 feet deep.

Do not subject plants to concentrated levels of pollutants. Trees and other plants should be integrated within streetwater management practices wherever possible, but filtering pollutants from "first flush" rainfalls and street runoff will extend tree life and prevent toxic buildup of street pollutants in tree wells.

FIGURE 4.22B
TREE SPACING
Oak Park, IL



FIGURE 4.22C
PARKWAY
Oak Park, IL



TREE ROWS & PLANTINGS (CONTINUED) 4.22

TREE SPACING

Optimally, trees should be placed every 20 to 40 feet and intermingled with street lighting and utilities, but spacing between trees will vary with species and site conditions. In general, tree spacing should be 10% less than mature canopy spread; closer spacing of large trees is encouraged to create an interlaced canopy. Trees planted in groups and groves create a microclimate more favorable for growth, as isolated trees are exposed to heat and desiccation from all sides. On residential streets where lots are 40 or 50 feet wide, at least one tree should be planted on each lot between driveways. Where constraints prevent even spacing of trees, it is preferable to place a tree slightly off the desired rhythm than to leave a gap in the pattern. Trees should not be eliminated to create a uniform pattern.

PARKWAY OR TREE LAWN

In a parkway or tree lawn, (also known as a planting strip, boulevard, or terrace), the entire furniture zone is dedicated to trees and plantings, creating an optimal environment for a healthy tree row. Parkway are most suited to residential streets but also can be found in commercial areas in suburban settings.

TREES AND VEHICLES

Trees have been shown to reduce driving speeds on roadways because they enclose the space and reduce sight distances. Generally, street trees have a positive effect on roadway safety; however, special consideration should be given to sight lines and sight distances for trees placed near intersections and roadway curves, to avoid creating obstructions or blind spots.

TREE PLANTERS

Planters can be submerged into the sidewalk and used to create a tree row in urbanized settings where the entire length of the furniture zone cannot be dedicated to green infrastructure. Planters should be at least 6 feet by 6 feet to allow room for medium-sized trees to mature; larger planter boxes that extend 20 feet to 40 feet in length can support larger tree varieties. Although planters may be the best option to increase biomass and canopy cover in urbanized areas, they provide a confined, compromised environment for trees, so extra care must be taken to promote tree health. Tree grates and guards should be used along streets with heavy pedestrian traffic; in less urban areas with lighter foot traffic, mulch can be used instead of tree grates to protect tree bases.

LANDSCAPE MEDIANS

Landscape medians offer an opportunity to replace a non-functional paved area with green space and expand the green infrastructure in urbanized areas, increasing stormwater retention and CO₂ absorption on heavily trafficked corridors and mitigating some of the adverse environmental effects of motor vehicle travel. Many medians 10 to 14 feet wide are suitable for large trees. Other than trees, plantings should not exceed 2 to 3 feet high. Landscape medians should not disrupt pedestrian connectivity and must be designed to maintain pedestrian access to both sides of the street with minimal pedestrian crossing delay.



4.22D

FIGURE 4.22D
TREE PLANTERS
Oak Park, IL



4.22E

FIGURE 4.22E
TREE GRATE
Chicago, IL



4.22F

FIGURE 4.22F
LANDSCAPE MEDIAN
Chicago, IL

Going the Distance

This section presents practices for green infrastructure that go beyond the tools listed above. These represent only a few of the many examples of green infrastructure currently in use in urbanized settings to enhance walkability, manage streetwater, create and extend green spaces and promote placemaking. All of these tools can be used in special districts.

FIGURE 4.24
RAIN GARDENS
Cultural Trail
Indianapolis, IN
Credit: Casey Jo Ailes



BIO-SWALES 4.23

By filtering and harvesting streetwater, sustainable management practices such as bio-swales capture the benefits of stormwater and other streetwater instead of treating it as a liability. A bio-swale is a wide, shallow, relatively flat vegetated ditch that captures and filters rainfall and runoff from adjacent areas. As the captured water moves slowly through the swale, particulates settle out and contaminants are removed by vegetation. Swales can be located adjacent to roadways, sidewalks, or parking areas and should be designed to work in conjunction with the street slope to maximize slowing and filtration of stormwater. Swale systems can be integrated into traffic calming devices, such as chicanes and curb extensions, and also can be placed in landscape medians. Roadway runoff can be directed into swales through flush curbs or small, evenly spaced cuts in raised curbs. Vegetated swales can be landscaped with native plants.

URBAN RAIN GARDENS 4.24

Rain gardens are made of native plants and shrubs planted in highly absorbent soil, sited in depressions with flat bottoms and gently sloping sides. Unlike bio-swales, which slowly move water away from the street area, rain gardens reduce or eliminate runoff by holding water in place, filtering out pollutants and recharging the surrounding ground. Rain gardens may have a footprint of any shape. Rain gardens are not ponds or wetlands; runoff captured in a rain garden should drain into the ground within 48 hours. Rain gardens may include overflow systems using pipes or swales to carry away stormwater after very heavy rainfall.

URBAN AGRICULTURE & COMMUNITY GARDENING 4.25

Urban agriculture is the practice of farming for food production in an urbanized setting. Typically, this is a private endeavor, undertaken on private land; in some settings, however, property owners may be permitted to plant urban crops in planter beds in the sidewalk furniture zone. Raised planter beds should be placed on streets with adequate southern sun, to maximize the daily growing cycle. There should be adequate space around the planter bed to avoid encroachment into the pedestrian way. Raised planter boxes should be used to protect crops from urban wildlife. Planter beds should include inlets at 8- to 12-foot intervals, to allow access for crop care. Planter beds may include fruit trees if local caretakers take responsibility for harvesting the fruit; trees should be placed to avoid casting shade on nearby plants.



FIGURE 4.25A
PLANTER BEDS
Chicago, IL

FIGURE 4.25B
COMPOST
Chicago, IL

FIGURE 4.25C
GARDENS
Chicago, IL

FIGURE 4.25D
PLANTER BEDS
Chicago, IL

FIGURE 4.25E
GARDENERS
Chicago, IL

FIGURE 4.25F
GREENHOUSES
Chicago, IL

ON THE REVERSE >>

TABLE 4D GREEN INFRASTRUCTURE

	●	●	●	●
KEY	Encouraged	Permitted	Discouraged	Required

TABLE 4D GREEN INFRASTRUCTURE

TABLE 4D GREEN INFRASTRUCTURE					Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays for Planned Contexts										
Getting Started	Infrastructure		Dimensions	Spacing	Design Considerations	Commercial/Mixed Use	Residential	Single Use	Commercial	Residential	Village Mixed-Use	Single Use	Residential/Agricultural	Village Mixed-Use	Pedestrian Priority Areas	TOD	Entertainment and Cultural Districts	Green Streets	Schools Zones and Campuses	Park Zones	Home Zones/Social Zones			
	Getting Started	4.22 Tree Rows & Landscape Medians	Large Trees	Requires a 7 ft. to 10 ft. wide planting area. Can thrive in smaller width planting areas if they are long enough to provide enough stormwater capture. Low branches provide 12 ft. to 15 ft. clearance from ground.	20 to 40 ft., one per residential lot, or 10% less than the mature tree canopy. Integrate with street lighting spacing.	Large trees should be encouraged wherever possible because the full canopies provide substantially more stormwater absorption, shade and CO2 processing than smaller trees. In some contexts large trees may block sightlines, detract from architectural design features, or simply not fit; however, these trees are permitted in all cases at designers discretion.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Medium Trees			Requires a 5 ft. to 7 ft. wide planting area. Low branches provide 10 ft. to 12 ft. clearance from the ground. Can be planted 6 ft. square wells.	20 to 40 ft., one per residential lot, or 10% less than the mature tree canopy. Integrate with street lighting spacing.	Medium trees are a suitable substitute for large trees and can be accommodated in most urban environments. When medium trees are required they can be substituted for larger trees.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Small Trees			Requires a 4 ft. wide planting area. Low branches provide 3 ft. to 5 ft. clearance from the ground.	20 to 40 ft., one per residential lot, or 10% less than the mature tree canopy. Integrate with street lighting spacing.	Encouraged for aesthetic appeal, but they provide minimal shade or stormwater absorption benefits; however, they can live in minimal space and can be used to fill in areas where medium and large trees cannot be planted. When small trees are required they can be substituted for larger trees.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Plantings			Requires a 2 ft. wide planting area.	Continuous where applied	—	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Going the Distance	4.23 Bioswales		Same as landscape median or furniture zone	Continuous where applied	Should be considered for stormwater filtration on Green Streets. Swales are continuous along the roadway.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	4.24 Urban Raingardens		Same as curb extension or curb bulbout	At intersections or midblock curb extensions.	Should be considered for stormwater filtration on Green Streets. Raingardens are suitable when a continuous swale can not be achieved. They can be any shape and are typically combined with traffic calming infrastructure.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	4.25 Urban Agriculture		Raised planter boxes. 2 ft. to 3 ft. high, 8 ft. to 12 ft. long, 4 ft. to 6 ft. wide.	Continuous where applied	Require permits to use public space for food production.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

SIGNING

40



Getting Started

Streetscape/wayfinding signs provide direction, destination, and/or location information. Signage can range from standard roadway network signs to custom identity signing plans for neighborhoods and districts. Streetscape signs are most appropriate for downtown, commercial, or tourist-oriented locations, or around large institutions. Best practices for wayfinding signs include street signs (for motorists, pedestrians, and bicyclists) and transit signs.

FIGURE 4.25A
BICYCLE AND
PEDESTRIAN
CROSSING SIGNS
Chicago, IL

STREET SIGNS 4.25

Best practices for street signs are included in the MUTCD. When placing signs for multimodal transportation corridors, the following principles should be considered:

FIGURE 4.25B
BIKE SYSTEM SIGNS
Chicago, IL

FIGURE 4.25C
BIKE SYSTEM SIGNS
Chicago, IL

FIGURE 4.25D
PEDESTRIAN
CROSSING SIGN
Oak Park, IL

FIGURE 4.25E
BICYCLE ROUTE
TURNING SIGNS
Chicago, IL

Signs for motor vehicles should also be visible and usable by bicyclists and pedestrians, where appropriate; for example, street name signs should face both directions at intersections of one-way streets, for pedestrian use.

Pedestrian warning signs are important at unsignalized crossings, to caution drivers to look for people crossing the street.

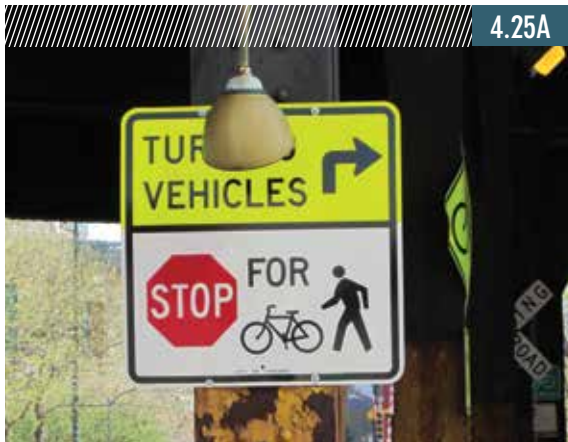
Bicycle signs can be used for wayfinding and regulatory purposes, and also help to raise motorists' awareness of bicyclists. Bicycle wayfinding signs should include the destination, distance, and direction. Regulatory signs inform bicyclists, pedestrians and motorists about rules and regulations for safe cycling and shared use. The MUTCD includes specifications for bicycle wayfinding, regulatory, and warning signs.



4.25C



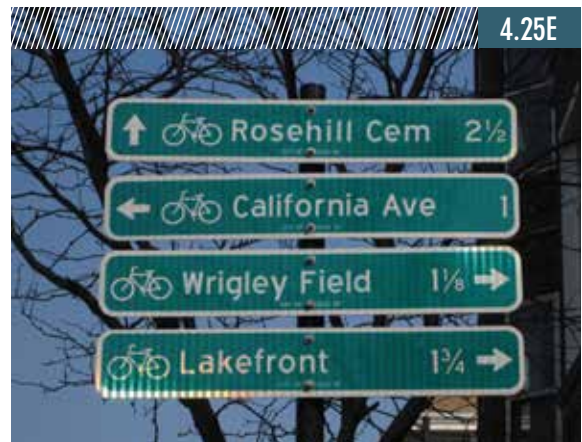
4.25D



4.25A



4.25B



4.25E

TRANSIT SIGNS 4.26

Transit system signs are needed to fully integrate transit into the roadway network and to connect bicyclists, pedestrians and drivers into the system. Signs are necessary to identify transfer points between service lines and other types of transportation. Transit signs generally fall into three categories: Station/Stop Identification, Service Information, and Wayfinding.

STATION/STOP IDENTIFICATION Transit stations and stops need to be clearly marked to show passengers where to wait for service. Pedestrian crossing signs should always be considered at transit stations and stops.

SERVICE INFORMATION Transit stops and stations should include signs and maps showing routes, schedules, and places served by the line. Newer technologies for transportation demand management (TDM) include “bus-tracker,” “next bus,” and “train-tracker” applications integrated into stations and bus shelters.

WAYFINDING Transit agencies should provide wayfinding signs inside the station, to ease connections, as well as within a half-mile of each station. Transit agencies can use wayfinding signs to increase connections to pedestrian and bicycle networks. Bicycle wayfinding signs should include major transit stations as prominent destinations.

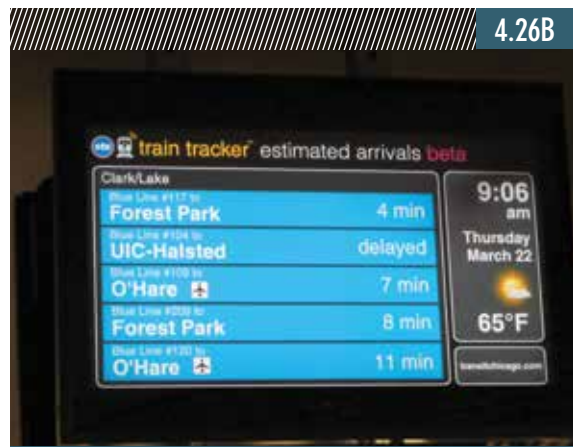


FIGURE 4.26A
STATION/STOP
IDENTIFICATION
Chicago, IL

FIGURE 4.26B
SERVICE INFORMATION
Chicago, IL

FIGURE 4.26C
WAYFINDING
Chicago, IL

FIGURE 4.26D
WAYFINDING
Chicago, IL



Going the Distance

This section presents practices for wayfinding that go beyond typical sign applications. Interpretive sign systems, such as those described here, can be incorporated into special districts for placemaking and district identity. Interpretive signing plans require research, custom design, and community engagement.

FIGURE 4.27A
BANNERS
Chicago, IL



INTERPRETIVE SIGNS 4.27

Interpretive signs are designed to promote interaction and engagement between people and streetscape environments. Interpretive signs can identify a district's name and gateways, announce important events, or display environmental or historical information. Some useful tools for interpretive signing include kiosks, sign stands, historical markers, installations, and banners.

Kiosks in public areas, often combined with gateway signs, can be attractive, useful street features. Kiosks can be used to display maps, bulletin boards, community announcements, and other important information.

Sign stands can be used for temporary purposes or in permanent installations, such as district maps and informative displays. Signs can be placed in vertical, poster-style stands or on floating tables.

Historical markers provide information about people, places, events, or resources of local or national significance. Historical markers are most often used in places listed on the National Register of Historic Places or local historic registries. Historical markers can be placed on freestanding signs, wall plaques, or even boulders.

Installations of public art can include creatively designed interpretive signs that can be informative elements of the streetscape.

Banners can be displayed on custom poles or can hang from existing lighting and utilities. Banners can be used as permanent district markers or rotated to note seasons or significant events.



4.27B



4.27D



4.27C



4.27E



4.27F



FIGURE 4.27B
BANNERS
New York, NY

FIGURE 4.27E
INFORMATIONAL KIOSK
Chicago, IL

FIGURE 4.27C
HISTORICAL MARKERS
Oak Park, IL

FIGURE 4.27F
INFORMATIONAL KIOSK
Chicago, IL

FIGURE 4.27D
NEIGHBORHOOD MURALS
Chicago, IL

ON THE REVERSE >>

TABLE 4E SIGNING

TABLE 4E SIGNING					Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays for Planned Contexts								
Getting Started	Signing Categories		Dimensions	Spacing	Design Considerations	Commercial/ Mixed Use	Residential	Single Use	Commercial	Residential	Village Mixed-Use	Single Use	Residential/ Agricultural	Village Mixed-Use	Pedestrian Priority Areas	TOD	Entertainment and Cultural Districts	Green Streets	Schools Zones and Campuses	Park Zones	Home Zones/ Social Zones	
	4.25 Street Signs	Vehicular	4 ft. to 6 ft. H	Varies	Place according to MUTCD.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pedestrian		4 ft. to 6 ft. H	—	Place according to MUTCD.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Bicycle		4 ft. to 6 ft. H	—	Place according to MUTCD.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4.26 Transit Signs		7 ft. H	Place at every bus stop.	Place according to Pace Development Guidelines.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Going the Distance	4.27 Interpretive Signs	Kiosks, signs, markers, installations, banners	Varies	Varies	Place to accentuate transportation systems: transit, pedestrian, and bicycle. Place at landmarks like parks, historic sites, or to highlight districts.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

KEY	●	●	●	●
	Encouraged	Permitted	Discouraged	Required

TEXTURES & MARKINGS



Getting Started

This section includes best practices for textures and markings, focusing on options for material selection beyond the typical use of concrete and asphalt.

4e

PAINT 4.28

Paints can be used creatively to define and repurpose spaces in underutilized areas of the roadway. Paint can be used to create colored bike lanes, to mark bike boulevards, or to block off whole areas and create new public gathering areas. Temporary, wash-away paint can be used in pilot projects to test their impacts on the roadway network. Some roadway paints are not suitable for cold-weather climates; care should be taken to select a product that will not create slipping hazards for bicyclists or pedestrians.

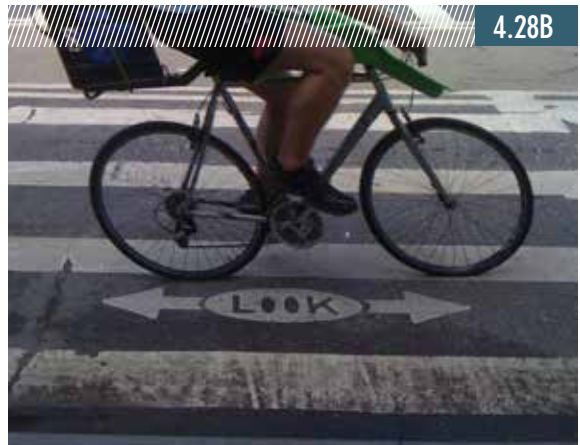


FIGURE 4.28A
PLAZA PAINT
New York, NY

FIGURE 4.28B
CROSSING PAINT
New York, NY

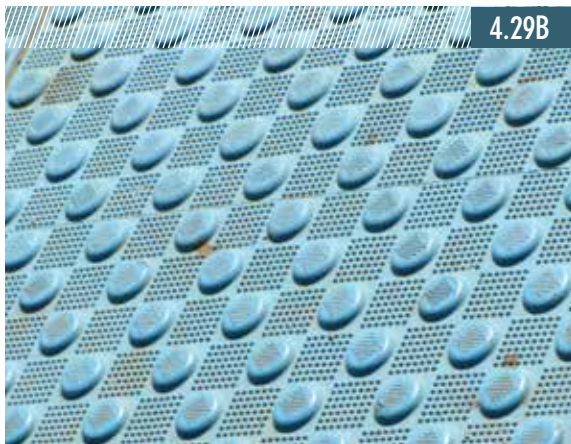
FIGURE 4.28C
CROSSING PAINT
Chicago, IL



FIGURE 4.29A
CROSSING TEXTURE
CHANGES
Lisbon, Portugal

FIGURE 4.29B
TRANSIT TACTILE
STRIPS
Chicago, IL

FIGURE 4.29C
BRICK TEXTURE
CHANGES
Oak Park, IL



TACTILE & TEXTURE CHANGES 4.29

Tactile and texture changes in the roadway or sidewalk can be used, often in conjunction with signage, to identify potential hazards or define special districts. Texture changes can be created in concrete finishes by using brooms, trowels or stamps; gravel, filler, and dies also can add texture to concrete surfaces. These techniques are frequently used to communicate nearby hazards to people with visual disabilities. Detectable warning strips – plastic surfaces with truncated domes – are required at pedestrian crossings and the edge of transit platforms to indicate transitions to people with impaired vision.



Going the Distance

This section describes design materials that go beyond common practice, and that are most appropriately used in special districts or transportation facilities of high design, such as cycle track and urban greenways.

FIGURE 4.30A
PAVER CROSSWALK
Chicago, IL

FIGURE 4.30B
PAVER CROSSWALK
Forest Park, IL

FIGURE 4.30C
CUSTOM COBBLE
SIDEWALK
Lisbon, Portugal

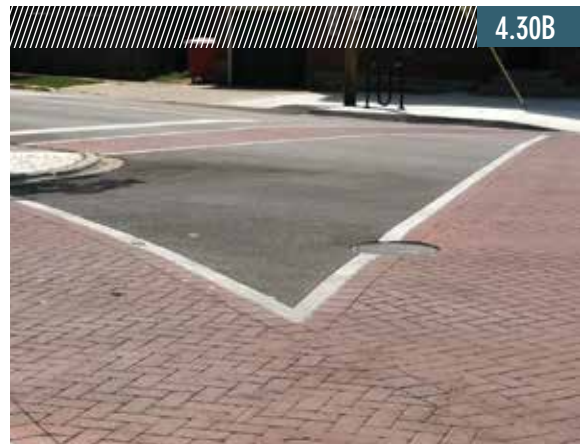
FIGURE 4.31
PERMEABLE PAVING
Green Bike Lane
Chicago, IL

BRICK & PAVERS 4.30

Historic brick and cobble streets convey a sense of place and identity that can add charm and interest to the environmental context. However, these surfaces are often uneven, making them potentially hazardous for bicyclists, people using wheelchairs, and pedestrians with mobility impairments. The needs of all users should be considered when using these materials; new brick and paver materials can be used to create attractive designs that are smooth and traversable.

PERMEABLE PAVING 4.31

Permeable paving reduces or eliminates direct runoff by absorbing rainfall and allowing it to infiltrate into the soil. By using permeable paving, municipalities can reduce water volumes in existing storm sewer systems and decrease the need for downstream filtration of streetwater. Permeable pavement can be clogged by sediment-laden runoff, so care should be taken to divert flows from landscaped areas away from paved sections. Permeable paving is not smooth, which makes it difficult for bicyclists and wheelchair users to traverse; this should be taken into account in the design. Permeable paving is usually appropriate in high-use parking lanes, which are not frequently used by cyclists and people in wheelchairs.



PLASTICS 4.32

Plastic products can be resilient, strong, and colorful, making them useful for creating placemaking designs in the streetscape. Thermoplastics, which use heat to bond plastics into asphalt and concrete, can be used to mark pavements, decorate crosswalks (along with required white lines) or to add stencils to roadways and sidewalks. Long-lasting colored plastics are commonly used instead of paints to create colored bike lanes, bike boxes, or bike through-lanes. Recycled plastic (or rubber) sidewalks can be used instead of concrete, allowing for easy replacement of single segments and easy access for maintenance issues, such as tree route trimming and drainage pipe repair. As plastics become more commonly used materials in roadway construction, there will be new opportunities to test various applications.



4.32A



4.32B

FIGURE 4.32A
THERMOPLASTIC
BIKE LANE
Chicago, IL

FIGURE 4.32B
THERMOPLASTIC
PLASTIC CROSSING
Indianapolis, IN
Credit: Storrow
Kinsella Associates
storrowkinsella.com

KEY	Encouraged	Permitted	Discouraged	Required
	○	○	○	○

TABLE 4F TEXTURES AND MARKINGS			Urban Contexts			Suburban Contexts				Rural Contexts		Places: Overlays for Planned Contexts						
Getting Started	Design Considerations		Commercial/ Mixed Use	Residential	Single Use	Commercial	Residential	Village Mixed-Use	Single Use	Residential/ Agricultural	Village Mixed-Use	Pedestrian Priority Areas	TOD	Entertainment and Cultural Districts	Green Streets	Schools Zones and Campuses	Park Zones	Home Zones/ Social Zones
	4.28 Paint	Cost effective tool. Can be used for pilot projects and simple improvements like crosswalks, and bike lanes and markings.		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.29 Tactile Pads & Textures	Non-verbal environmental cues can be as effective as signing. Detectable warning strips are required for ADA compliance.		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Going the Distance	4.30 Bricks & Pavers	Can be used to enhance aesthetics of districts. Can be used on bus routes and emergency routes	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	4.31 Permeable Paving	Can improve stormwater infiltrations. Requires maintenance to retain effective absorption. Can be used on bus routes and emergency routes. Can be difficult for bicyclists.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	4.32 Plastics	Cost effective if used in combination with resurfacing. Provides an enhanced design aesthetic in districts. Can be used on bus routes and emergency routes.	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

