Streetscape Functional Requirements

The repetition of standard elements provides the foundation of the streetscape and defines its overall feel. However, successfully accommodating existing and special conditions is also an important part of streetscape design. Dealing with these conditions provides the challenge and opportunity to create solutions that not only harmonize with the overall fabric of the streetscape, but also increase its safety, accessibility, and overall functionality.

Sidewalk width sets the stage for the streetscape, as it is the location in which most of the elements reside. Narrow spaces have greater limitations on the scale and size of elements that can be placed within the streetscape, while wider sidewalks offer more options. The City of Milwaukee would like to see creative use of the public realm as space permits. There are a variety of sidewalk widths on the streets of Milwaukee, each with unique design challenges and opportunities.

The following categories have been developed to illustrate the extent of streetscape improvements various sidewalk widths may accommodate:
- Less than 9’ wide
- 9’-12’ wide
- Greater than 12’ wide

Once the sidewalk category has been established, the design process can begin.
Sidewalks Less than 9 feet Wide

Sidewalks in this category are the most challenging due to limited space available for pedestrians and the installation of streetscape elements. The shy zones at the building and curb can create net pedestrian zones of 5 feet or narrower. There is very little space for making improvements. When designing streetscapes in sidewalks this narrow, it is important to note that a minimum clear sidewalk width of 5 feet should be maintained. A minimum 3 feet clear sidewalk width is required per the Americans with Disabilities Act Accessibility Guidelines.

Streetscapes can still be very successful in this narrow condition and can include:
- Enhanced sidewalk pavement treatments
- Vertical elements such as banners

In this situation, plantings may be added to the streetscape by alternative means, such as:
- Hanging baskets on light poles
- Private planter boxes along buildings in the shy zone or hanging from adjacent buildings
- At intersections, side street curb extensions or “push-outs” with large planters
- Decorative or wayfinding street signs and kiosks

Issues of particular note for streetscape elements placed in narrow sidewalks are: the need to maintain adequate doorsweeps (space next to curb to allow car door swing); turning radii for school buses and large vehicles at corners; placement of traffic signals and large planters to maintain a clear line of sight at corners with push-outs.

Curb push-outs can mitigate the limiting effects of a narrow sidewalk by offering extra space for benches, trees or planters. The trade-off is loss of the curb parking area necessary to create the push-out and the turning radii for large vehicles on either side. Note: The vertical line of sight between 2.5’ to 6’ must still remain clear for streetscape elements and plantings placed on curb push-outs. Curb push-outs are typically not placed at signalized intersections because this eliminates the pull over area for bus stops and for automobiles, the right turn on red.

A cost factor in all of these solutions is the level of maintenance the community can perform. The maintenance of hanging baskets and planter pots is costly and requires a significant commitment by the community. A community commitment to maintenance is critical if such improvements are to be included in the streetscape.

Figure 3-4: Shy Zones in sidewalks less than 9 feet wide
Figure 3-5: Planter pots in the shy zone along a storefront
Figure 3-6: Opportunities for vertical landscape elements
Sidewalks 9 to 12 feet Wide

Where adjacent land uses include parking lots or other open spaces, considerations should be given to share the landscapes that may be possible on the private side of the property line. Where possible, shade trees should be incorporated into those private property frontages so these narrow streetscapes can benefit from the shade created by the off-streetscape plantings.

Sidewalks that are 9’ - 12’ wide offer more flexibility. This width range allows for an ADA accessible route as well as a tree element planted in tree pits that are either open, covered with crushed gravel, mulch or tree grates. Heavily trafficked areas should use a walkable surface. Care should be taken that plantings do not obstruct a 5’ - 7’ clear walking path for pedestrians, wheelchairs and strollers.

For 8’-10’ wide sidewalks, longer, rectangular tree pits are recommended. A tree pit of 3’ x 6’ aligned parallel to the curb would leave a 5’ - 7’ clear zone for pedestrian flow.

For sidewalks in the 10’-12’ wide range, even wider tree pits are recommended. 4’ x 6’ or 5’ x 5’ tree pits are recommended.

Sidewalks in this category can also accommodate short benches (depending on the orientation), small kiosks, and small community identifiers. Placement must be carefully considered to not interfere with pedestrian movements.
**Sidewalks Greater than 12 feet Wide**

This sidewalk width range offers the most flexibility. However, even with extra space, care must be taken to preserve pedestrian flow and accommodate various levels of service.

Larger greenspace areas are possible because of the available width. Planters should be as long and continuous as possible while still providing sufficient business and pedestrian access from the parking zone. These planters can be raised, curbed planters which offer a better way to protect landscape plantings from salt intrusion and damage due to pedestrian traffic.

Pedestrians and delivery persons must have access from parking spaces and loading zones. Utilities and other elements in the streetscape will also determine the location and frequency of breaks between planters. It is also important to maintain clear sight lines when installing planters, especially at intersections.

Once again, the level of maintenance the BID or community group is willing to perform should be considered when determining the quantity and size of the planters and the landscape treatments to be installed in each planter.

In addition to more green space, wide sidewalks can usually accommodate more street furniture and amenity elements, including benches, bicycle racks, vertical elements, bus patron shelters, and public art. The City also encourages uses such as outdoor cafes, sidewalk artists, and street vendors.
Parking

One of the key objectives of the City streetscape program is to promote neighborhood commercial, economic, and social development. To successfully promote commercial districts, parking is an essential component. Most city streets have parking on at least one side of the street, although there are several cases where on-street parking is partially or completely restricted. These include:

- High traffic streets
- Snow routes, on snow days
- Fire hydrants
- Public transportation stops and stations
- Loading zones
- Rush hour restrictions

The City’s commercial areas typically have parallel parking. A limited amount of angled parking occurs, and may be appropriate on side streets adjacent to commercial areas. Angled stalls present a significant safety challenge by requiring the driver to back out into oncoming traffic. Larger vehicles may obstruct the view of adjacent vehicles, making a backing maneuver even more difficult. They may also project into the adjacent travel lane, creating a traffic hazard.

Specific guidelines have been developed to determine the feasibility of angled parking. These requirements are different for one-way and two-way streets. In addition, the existence of mature trees, driveways, loading zones, and low-height residential windows must also be examined.

In many areas of the city, parallel parking spaces are not striped into separate stalls but combined into a parallel parking zone and drivers are free to use the parallel parking lane as needed. Because the length of spaces is not delineated, car spaces will vary. This can create challenges for streetscape design given the interrelationship between parking and sidewalk zone elements like trees and lights.

The dimensions of metered parking stalls is an important design consideration. Metered parallel parking stalls are a delineated space that corresponds to a payment area. Dimensions may vary, but only slightly: an 8’ wide by 24’ long parking space provides good room for maneuvering. Parking stalls that are at the ends of the block can be down-sized to 8’ wide by 17’-20’ long. Parking stalls at the end of the block are also useful for rear or side-lift van accessible parking, where additional space is often beneficial.
Parking Meters and Kiosks

Metered parking stall dimensions can be used to help create the streetscape module that integrates the locations of trees, planters, lights, parking and other elements.

Currently, the City uses both single-head and double-head parking meters. Double-head meters have an advantage in the streetscape as they reduce the number of elements, which may be helpful aesthetically and functionally.

Parking Space Posts

In recent years, the City has been implementing parking kiosks which allow consumers to use cash or credit cards in areas where parking rates are relatively high, e.g., downtown. The kiosks eliminate the need to carry change. For example, two hours of downtown parking would require twelve quarters or thirty dimes at the old meters. The kiosk allows a $3.00 charge on a credit card for the two hours of street parking.

The parking spaces are numbered by a new small sign head attached to the top of the post that indicates the parking space number. Both the parking kiosks and parking stall number posts are streetscape elements that need to be accommodated in the overall design of the element line.

Door Sweeps

Parking stalls also affect the overall streetscape due to the influence of passenger doors opening into the sidewalk and roadway zones. Passenger doors of legally parked vehicles open outward over the curb and into the adjacent sidewalk zone. Door sweeps (minimum 24") need to be accommodated in the placement and arrangement of streetscape elements along the pedestrian zone. Placing elements within sweep zones can prohibit or limit opening passenger doors, causing damage to both the doors and to the streetscape elements and can severely restrict accessibility.
Corner Treatments

More streetscape elements are concentrated at corners than anywhere else in the streetscape. Corner treatments are a design challenge or opportunity for streetscape elements to overlap:

- Light poles and control boxes
- Traffic signal poles, lights and control boxes
- Pedestrian signal poles
- Regulatory signage
- Wayfinding
- Curb ramps
- Newspaper vending racks
- Trash receptacles
- Bus shelters / transit stops

In the middle of this potential clutter, pedestrians gather to make decisions on direction. Pedestrians waiting to cross in one direction must make way for pedestrians entering the corner from the other direction. In high pedestrian volume areas, this can be a challenging space to navigate.

To highlight the importance of these areas, streetscape treatments may be upgraded at corners, including the use of special pavements, seating, lighting, and other street furniture elements. These elements need to be carefully integrated with the other elements—lighting, traffic control devices, and regulatory signage—in order to not add to the visual and physical clutter.

During the design process, the streetscape designer should consider how to wrap the corners of the streetscape and to what point the streetscape extends down side streets.

In many cases, City of Milwaukee streetscape projects include a half block “return” on cross streets, or a continuation of basic infrastructure upgrades from the main street to the alley on the cross street (where alleys are present) or approximately half a block where alleys are not present.

Streetscape treatments can extend to building corners, window corners, other logical building breaks, or alleys. The goal is to end the streetscape in a way that blends within the context of the neighborhood and immediate surroundings.
Curb Push-Outs or Bump-Outs

As a variation on standard corner treatments, bump-outs create additional pedestrian space in place of vehicular surfaces. When allowed, bump-outs can be used at intersections on side streets or at the middle of the block. A typical bump-out is 7' wide by 20'-30' long. A bump-out can provide the following advantages:

- It shortens the distance that a pedestrian must travel to cross a street. Pedestrians will feel safer in these expanded pedestrian zones.
- It increases the sight distance between motorist and pedestrians crossing the street.
- It creates additional pedestrian space that can be used for amenities, bus shelters, and landscape treatments.

Careful traffic and parking analyses must be performed to determine the location of bump-outs and whether or not they are appropriate for a specific streetscape.

In addition, bump-outs need to be carefully coordinated with the various City departments especially those departments responsible for maintenance and snow removal. A few slight design changes can make maintenance, such as street sweeping or snow-removal, easier and more effective.

Note: As with all streetscape plantings and most larger opaque elements, a clear sightline from 2.5' to 6' should be maintained so pedestrians and storefront windows are visible from the street.

Curb push-outs or bump-outs are generally not used at bus stops. The push-out forces the bus to stop in a travel lane next to the curb push-out, which causes a traffic hazard. Curb push-outs are also generally not used at signalized intersections because they prevent right-on-red turns from the parking lane.

Bump-outs should have green spaces included where possible. These greenspaces should be enclosed with curbing and possibly low metal railings that protect the plantings from pedestrian damage and increase a snow plow driver’s awareness of the location of bump-outs. These raised planting curbs should be set back from the street curb to allow for snow storage.

Figure 3-22: Bump-out with room for street furniture
Figure 3-23: Bump-outs can accommodate many different elements
Figure 3-24: Bump-out with raised planting area
Crosswalks

Crosswalks are where pedestrians are legally allowed to cross city streets. The Manual on Uniform Traffic Control Devices provides guidelines for marked crosswalks, as well as standards and guidelines for crossing improvements. This document should be used in combination with professional judgment and specific traffic engineering analysis on a case-by-case basis when designing crosswalks. Pedestrians have the right to cross the street in the safest way possible, and crosswalks should be designed accordingly (Source: “Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO Draft August 17, 2001).

At intersections, crosswalks are defined as the extension of a designated walkway or pedestrian pathway across an intersection, whether marked or not. (Source: “Guide for the Planning, Design and Operation of Pedestrian Facilities”, AADAG, 2001). Wisconsin Statutes, Chapter 340, defines a “marked crosswalk” as any portion of the roadway indicated for pedestrian crossing by signs, lines or other markings on the surface.

Marked crosswalks generally consist of two white parallel lines perpendicular to the direction of traffic. Crosswalks vary in width and should align with the edge of the right-of-way (usually the property line) and a line extended from 2’ back of the curb face. Typically they are 6’-10’ wide and should merge at the corners of the intersection, where there is a double or single curb cut that aligns with the crosswalk. In special situations where it is common to have crowds, the crosswalk sizes can be increased to accommodate large numbers of pedestrians.

Crosswalks can become an important element in the streetscape environment by physically and visually linking opposite sides of the street. This continuation of the pedestrian zone through the parking and vehicular zones can be accomplished not only by striping, but by using various materials and patterns that may already occur in the streetscape.

A number of materials have been used to create special crosswalk surfaces in the city including pavers, standard asphalt and concrete, and stamped concrete and asphalt. These materials have been used with varying degrees of success. Unit pavers are rarely used due to both aesthetic and maintenance issues, such as chipping and heaving of pavers that result in uneven surfaces.

Maintenance must be considered when making material selections for crosswalks. The City’s preference, from high to low, is:
- Concrete (may be colored) with a scored pattern
- Specialty treatment asphalt such as Duratherm
- Unit pavers (sandset or traffic resilient setting)

Regardless of material used, it is typical to outline the crosswalk with parallel white demarcation lines on either side.
**Mid-Block Crossings**

In rare cases it may be acceptable to install a crosswalk at the middle of the block where this is a logical crossing point. Since vehicles may not expect a crossing in an area where they generally are not required to stop, these areas must be carefully studied and well marked with high visibility pavement markings.

International crosswalks, a series of ladder-style parallel bars running in the direction of traffic, are typically used in combination with traffic calming devices, such as warning signs, increased lighting, crossing islands, and curb push-outs.

Typically, a minimum amount of parking (100’) must be removed in advance of the crosswalk for visibility of pedestrians by motorists. The presence of curb push-outs will improve visibility, thereby reducing the amount of parking that must be removed in advance of the crosswalk.

**Driveways and Alleyways**

Driveways into parking lots, garages, and other properties often create a challenge for the streetscape designer. Driveways may create a breach in the fabric of the streetscape where the module elements may need to be adjusted or deleted to accommodate the driveway function.

Driveways and alley aprons need to be treated as a pedestrian surface; the pedestrian surface should appear to be unbroken (driveways are flared with no curb returns or grade separations) as the pedestrian travels through the streetscape and across the driveway. This includes continuation of the sidewalk pattern and treatments across the width of the driveway or alley. Driveways and alley aprons must be constructed according to City design standards and using heavy-duty pavement to withstand heavy wheel loads created by refuse trucks, fire trucks, and similar vehicles.

**Figure 3-28: Mid-block crossing connecting two segments of riverwalk**

**Figure 3-29: Driveway treatments should put pedestrians first**

**Figure 3-30: Alley crossing pedestrian zone**

**Figure 3-31: Mid-block driveway with minimal curb returns and grade separation**
Hollow (Vaulted) Sidewalks

Hollow, or vaulted, sidewalks are a building remnant from the past that creates special challenges in the development of streetscape projects in the city. According to City of Milwaukee ordinance, hollow walks are the responsibility of the property owner.

Some of the city’s vaulted sidewalks date from the middle of the 19th Century and were used for a number of purposes; mostly coal storage and utility connections to buildings. Over the years, some have been abandoned and filled in. However, many are extensions of building basements and still in use for storage or other purposes.

As with any building system, hollow sidewalks need maintenance, repair and eventual replacement or removal. In the interest of long term savings on maintenance, the City has sought to fill and seal these vaults as a safety measure for both pedestrians and building owners alike.

When a hollow sidewalk is noted within a streetscape project, special, more expensive, procedures are used for sidewalk reconstruction. First, a wall is built at the property line. Existing private utilities are moved, at the owner’s expense, to the interior of the new wall. Hollow sidewalks require a socket or base for street lighting and ductwork for electrical connections as needed (street light foundation by the private utility at owner’s expense).

The hollow area between the property line wall and the curb line wall is then filled with granular material, compacted, and sealed with a concrete sidewalk. The sidewalk and vaulted sidewalk roof are removed and a new vault roof is constructed. Waterproofing is applied to the vault roof prior to a new sidewalk surface being installed. The new sidewalk can be any of the surfaces the City uses now including concrete sidewalk pavements and unit pavements.
The Milwaukee County Transit System (MCTS) provides public transit services for the City of Milwaukee. Bus stops are treated as utilitarian not streetscape elements, with markers that simply note the stop and the route number. Bus stops in commercial areas may or may not have a shelter and may be no more than a posted sign. As described earlier, bus stops can create challenges for the overall design of the streetscape if not properly configured. Bus stop locations must accommodate the berthing of the bus, patron queuing and the minimum 5’- 7” passage of non-transit oriented pedestrians along the streetscape. The streetscape designer must be knowledgeable in transit operations to accommodate the front and rear patron doors in the MCTS buses so streetscape elements are not placed where interference is caused.

Clear Channel Outdoors, a media company that currently provides outdoor advertising, may select and purchase enhanced shelters, seating and trash receptacles for bus patron use. When selecting bus patron amenities, special consideration must be given to their heavy use, durability, maintenance and resistance to vandalism.

A clear walking path in front of or behind a bus shelter is critical to pedestrian safety and comfort.

The City has been installing a thick, concrete pad in the right lane at the most heavily used bus stop locations because of the heavy wheel loads and braking action of the buses used by the MCTS. This is to discourage premature deformation of the asphalt pavement at locations where buses make repeated stops on a daily basis.
Medians

The City of Milwaukee takes great pride in the median and award winning boulevards it has created over the course of a century. The City’s long history of boulevards began in the 1920’s with the first landscaped and irrigated boulevard. Currently, Milwaukee has over 120 miles of boulevards.

Recently, care and planting of the boulevards has taken a shift toward design and construction techniques that will reduce the amount of maintenance needed to keep the boulevards in good condition.

As part of the Milwaukee Strategic Boulevard Plan, a number of guidelines were developed to guide construction and future maintenance of the boulevards.

- A combination of annuals and perennials (but no evergreens) will be planted in the signature beds
- All beds will contain combinations of ornamental trees, shrubs, perennials and annuals
- All annual bed areas will be located at the borders or at the most highly visible focal point of the bed
- All bed grades will be raised for visual aesthetics
- All beds will contain some raised natural stone visual elements (primarily borders)
- All bed sizes will be dictated by the site location and follow the shape of the median where possible
- All beds will be a minimum of 800 SF, maximum of 2,000 SF
- All beds will be mass planted with closely spaced plantings
- All plant species will be selected for high salt tolerance, ease of maintenance, four-season color, flowering and texture characteristics
- Bulb plantings will be included in the shrub and perennial areas to add drama and color
- Species of annuals, perennials, grasses and shrubs to be limited to two species of each per bed
- All bed installations will be coordinated with irrigation contractors for proper head layout for cost savings and maintenance efficiencies
- Visual clear zones (between 2.5’ and 6’ above street grade) will be maintained near corners and median openings

Figure 3-38: Median planting can be highly varied
Figure 3-39: Median tree plantings add color and interest to streetscapes
Figure 3-40: Dramatic median through the Marquette campus
In an effort to promote transportation alternatives, recreation, better air quality, and environmental awareness, the City of Milwaukee is in the process of implementing a Citywide Bicycle Plan. This plan includes provisions for adding bike lanes on arterial streets in order to promote greater bicycle ridership among citizens and ultimately decrease auto dependency.

The following are some of the minimum desirable dimensions and requirements for bike lanes:

- Typical bike lane width is 5’. Placement of the bike lane is directly adjacent to the parking lane. For a standard 66’ right-of-way, this allows for a 48’ pavement width, giving a 11’ travel lane width in two directions, and a parking lane width of 8’.

- At approaches to channelized intersections, bike lanes are not distinguished. Delineation striping stops 125’ prior to the intersection. Bicycles share the road with cars in the right turn lanes and through lanes.

Bike lanes achieve a shared streetscape experience between the sidewalk, parking lane, and travel lanes. The impact of a bike lane on a neighborhood may be to encourage further bike-oriented travel, which helps reduce traffic congestion and pollution. This is especially true for short trips of five miles or less.

DPW typically determines locations for, and installs, bike lanes. When existing bike lanes are present in an area slated for streetscape improvements, they must be carefully incorporated into the design of the streetscape.
Special Security Issues

As a result of increasing homeland security concerns, the need for specially designed security barriers in the public way at selected sensitive buildings has become a new streetscape design issue. In these situations, it is important to retain a pedestrian-friendly environment. This includes maintaining a clear pedestrian path throughout and incorporating plantings and street trees whenever possible.

The General Services Administration (GSA) has developed a set of guidelines for developing secure perimeters around federal buildings under its jurisdiction. GSA guidelines need to be consulted during the development of streetscapes around federal facilities.

While some of the techniques for hardening the perimeter of these sensitive buildings can seem harsh, with proper planning these elements can provide multiple functions in the streetscape. Many perimeter security installations are combining bollards with hardened raised planters that create visual and pedestrian amenities while functioning as barriers. The presence of security cameras may also impact tree placement and/or pruning, but not eliminate trees from the streetscape.
Sustainable Streetscape Design

Streetscapes have long been participating in sustainable design with the need to recycle concrete and bituminous pavements to keep those materials out of landfills. Recently, new techniques and technologies have evolved to bring a higher level of sustainability to the design and engineering of streetscapes.

**Lighting:** As solar powered lighting elements continue to improve in appearance and function, there is the possibility that their use could help decrease the City’s total power consumption in the future. Currently, there are functional problems with snow cover and aesthetic issues with the industrial look of solar lights. However, the City’s DPW will continue to monitor improvements.

**Light pollution:** Light pollution can have negative effects on human health, disrupt ecosystems and be disorienting to the migratory patterns of birds. There is also the energy waste and cost of misdirected light, but not always enough to warrant retrofitting older light fixtures with cutoffs to reduce glare or light trespass. Dark sky design is gaining popularity in many cities as residents express a preference for a dark night sky over the ambient haze or glare (light pollution) given off by older model light fixtures. However, residents of Milwaukee have not expressed a strong preference for dark sky design or an opposition to light pollution. Therefore, it is unlikely that the city will undertake an expensive retrofit to reduce light pollution at any point in the near future.

**Permeable Pavements:** Decreasing the flow of surface water into the storm sewer system has become a high priority in the City of Milwaukee. Permeable pavements are an effective method for putting surface water into the subgrade where it can naturally percolate into groundwater. This can have several benefits as the water can be cleaned during this process of percolation. Solids are often left behind in the percolation process through a permeable pavement system and some biologic cleaning can also occur. Permeable pavements can be created in concrete, asphalt or unit pavers. While research is still on-going, permeable pavement systems appear to be the most long-lasting and easiest to install and maintain.

**Bioswales:** As with permeable pavements, bioswales are useful for getting the water back into the ground rather than directing it to storm sewer systems. Bioswales consist of water-tolerant plantings that are planted in a free draining media that helps to filter the water as the water percolates through the system. To be effective, bioswales must be properly sized to create effective infiltration areas. Medians and boulevards are ideal locations as are larger bump-out areas in streetscapes. Bioswales require regular maintenance as the water flow will tend to bring debris into the area. The fluctuating and irregular water levels require careful considerations to choose planting materials that can tolerate these conditions. Designers must also be aware of foundations for street lights, cable, and traffic control elements. Bioswales should not be located in areas near utility cabinets and light fixtures.
The Future

As modes of transportation change, streetscapes will need to evolve to meet the needs of transit patrons, pedestrians, motorists, and bicyclists. The City of Milwaukee is considering a street car system to augment its mass transit system. As this streetcar system is being developed, special attention will need to be taken to accommodate those new transit vehicles in both existing and new streetscapes, and most likely, in a shared right of way.

These transit technologies will continue to evolve in the future and will not only affect the transit vehicles, but the shelters, vehicle boarding areas, street lights and support elements (catenaries, rails, etc.). Future designers and engineers will need to incorporate these new transit-oriented features into Milwaukee's streetscape.