

STREETSCAPE STANDARDS

Bethesda Downtown Plan



THE MARYLAND - NATIONAL CAPITAL PARK AND PLANNING COMMISSION



Approved October 2020

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The Maryland-National Capital Park and Planning Commission
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Bethesda

Downtown Plan Streetscape Standards

Prepared by the Montgomery County Planning Department

MontgomeryPlanning.org

APPROVED OCTOBER 2020

MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION



Table of Contents

Chapter 1: Introduction	2		
1.1 2020 Streetscape Standards	2	4.2.1 Continuous Planter	38
1.2 Goals and Objectives	3	4.2.2 Tree Well	39
Chapter 2: Streetscape Elements	4	4.3 Covered Soil	40
2.1 Sidewalk Zones	4	4.3.1 Tree Space with Covered Soil	40
2.2 Streetscape by Street Type	6	4.3.2 Methods for Covered Soil	41
2.2.1 Urban Boulevard	8	4.3.3 Structural Soils	42
2.2.2 Downtown Mixed Use & Neighborhood Main		4.3.4 Structural Cells	43
Street	10		
2.2.3 Shared Streets	12	4.4 Tree Wells and Planting Strips	44
2.2.4 Neighborhood Connector	14	4.4.1 Tree Well With Structural Soil	44
2.2.5 Neighborhood Local Street	16	4.4.2 Tree Well With Structural Cells	45
2.2.6 Neighborhood Residential Street	18	4.4.3 Typical Tree Planting	46
2.3 Bikeways	20	4.4.4 Planting Strip: Vegetated Stormwater Collector	47
2.4 Streetscape Utilities	22	Chapter 5: Detail Standards	48
2.4.1 General Guidelines for Utility Location	22	5.1 Sidewalk Paving	48
		5.1.1 Brick Sidewalk Details	48
		5.1.2 Accent Paving	51
Chapter 3: Streetscape Best Management		5.2 Curb Ramps	52
Practices	24	5.2.1 OVERVIEW: Curb Ramp Design and Accessibility	
3.1 Introduction	24	requirements	52
3.1.1 BMP Types	24	5.2.2 Curb Ramp Typical Details	54
3.2 Environmental Site Design Goals and Objectives	25	5.2.3 Curb Ramp Materials	55
3.2.1 Bioretention Cell	26	5.2.4 TYPE I: Perpendicular, Narrow Radius Curb Ramps	
3.2.2 Vegetated Planter Box	27	56
3.2.3 Dry Swale	28	5.2.5 TYPE II: Perpendicular, Wide Radius Curb Ramp	57
3.2.4 Wet Swale	29	5.3 Furnishings	58
Chapter 4: Planting Design	30	5.3.1 Street Light	58
4.1 Introduction	30	5.3.2 Benches	59
4.1.1 Street Trees	30	5.3.3 Bike Racks	60
4.1.2 Soil Volume	32	5.3.4 Moveable Planting Containers	62
4.1.3 Understory Planting	32	5.3.5 Receptacles	63
4.1.4 Container Plantings	33		
4.1.5 Bioretention Plantings	33	Chapter 6: Specifications	64
4.2 Tree Space Typologies	38	6.1 Standard Brick Paving	64
		6.2 Streetscape Planting	68
		6.3 Streetscape Furnishings	70

List of Figures and Tables

Figures

Figure 2.01: Design Guidelines - street types	7
Figure 2.02: Bikeways per street	21
Figure 4.01: Tree canopy corridors.....	31
Figure 4.02: Street trees per street	34

Tables

Table 4.01: Recommended trees	35
Table 4.02: Trees - understory	36
Table 4.03: Groundcovers	36
Table 4.04: Bioretention	37
Table 5.01: Planting container	62
Table 5.02: Planting container	62
Table 5.03: Planting container	62

Chapter 1: Introduction

1.1 2020 Streetscape Standards

The 2020 *Bethesda Streetscape Standards* seek to extend the legacy of the existing standards while updating and expanding those standards to reflect best practices of multi-modal streetscape design. The updated streetscape standards have been carefully developed to reinforce the planning objectives of the Bethesda Downtown Sector Plan (BDSP) and Bethesda Downtown Plan (BDP) Design Guidelines. As a detailed extension of these resources, the 2020 Streetscape Standards should be understood as a complementary reference source.

These standards have been organized into four principal sections, plus a supplementary appendix at the end:

Streetscape Elements--begins with an overview of streetscape components, placing them within the context of the street types established by the BDSP and BDP Design Guidelines. This overview of

concepts is intended to promote a comprehensive approach for designing projects within the downtown Bethesda public realm and includes sidewalk zones, street types, bikeways and utilities.

Streetscape Best Management Practices--addresses the importance of coordinating the wide range of streetscape elements for any given development project, including BMP types and environmental site design.

Streetscape Planting Design--provides both street tree planting standards along with standards for understory and freestanding container plantings.

Streetscape Detail Standards--provides the requisite construction details required for implementing a downtown Bethesda streetscape project, including paving, curb ramps, and furnishings.



Habitat + Health

Improve community health and environmental quality through increased public green spaces and landscapes designed to enhance habitat connectivity.



Community Identity

Reflect and enhance the distinct character of Bethesda's existing neighborhoods and centers of activity, while providing opportunities for innovation.



Equity

Create an inviting public realm and provide a mix of inclusive housing options to improve quality of life for residents of all incomes, ages and abilities.

1.2 Goals and Objectives

This document contains detailed guidelines and standards for downtown Bethesda that respond to the vision set forth in the Sector Plan and parameters defined in the Design Guidelines.

The streetscape standards contained herein will contribute to fostering design excellence and a high-quality public realm of pedestrian-oriented streets. The goals of the Bethesda Downtown Plan Streetscape Standards are as follows:

BUILD UPON BETHESDA'S CHARACTER & COMMUNITY IDENTITY

This document builds upon the distinct character of Bethesda's downtown and other centers of activity by including strategic additions and enhancements to the existing streetscape palette by considering a holistic approach to materials and layout at multiple scales. For example, this document makes recommendations on the layout and spacing of streetscape elements based on the street types identified in the Sector Plan. These street types, when fully realized, will contribute toward a strong pedestrian character throughout downtown Bethesda.

IMPROVE ACCESS + MOBILITY

This document, along with the Design Guidelines, will contribute to a network of streets and sidewalks that are integrated and easily accessible to users of all abilities. Streetscape layouts prioritize a clear, unobstructed pedestrian zone while also encouraging a healthy street tree canopy, which makes for a more comfortable and compelling streetscape experience.

FOSTER ENVIRONMENTALLY SUSTAINABLE DESIGN

Extensive street tree plantings, horticultural diversity, and the inclusion of substantial green space within public plazas cultivates a garden-like atmosphere across the city. Bethesda's early adoption of advanced urban forestry practices has contributed to a rich canopy of healthy and mature street trees. These standards build on this legacy by incorporating additional best practices in the areas of urban forestry, environmental site design and stormwater management.

access + mobility



Access + Mobility

Develop a well-connected network of walkable and bikeable streets, trails and open spaces accessible to all users.

water



Water

Incorporate water conservation and stormwater treatment measures throughout the design of the public and private realm.

energy



Energy

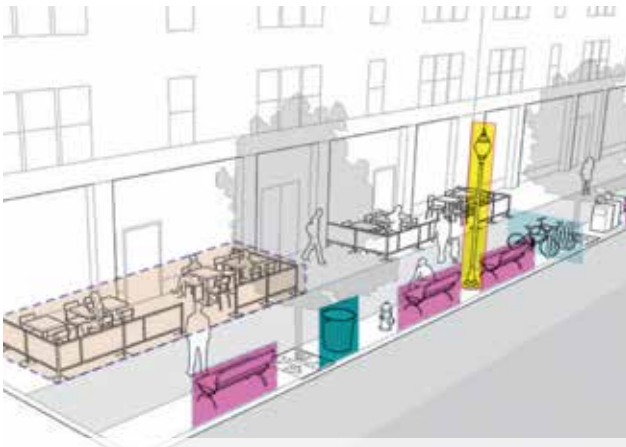
Integrate energy-efficient design to address climate change and create healthier living and working environments.

Chapter 2: Streetscape Elements

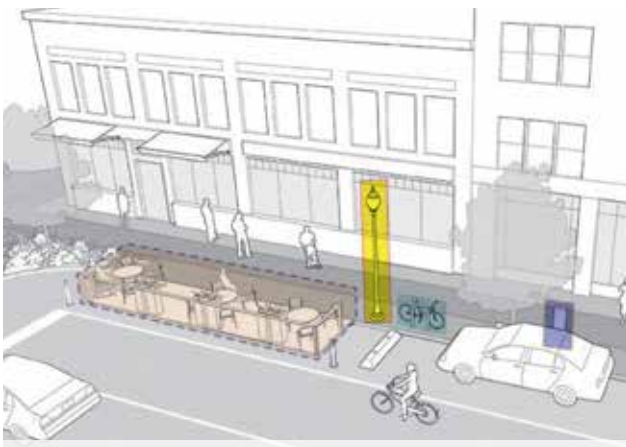
2.1 Sidewalk Zones



STREETSCAPE CONCEPTS: SIDEWALK AREA ZONES



STREETSCAPE CONCEPTS: ELEMENTS OF THE STREETSCAPE



STREETSCAPE CONCEPTS: ELEMENTS OF THE STREETSCAPE

Well-designed, successful sidewalks are essential contributors to the quality of life in downtown Bethesda. Sidewalks should be designed to balance the needs of pedestrians, be accessible for people of all abilities, promote an expanded and healthy tree canopy cover, and capture stormwater runoff. Designers must constantly balance these competing needs to provide a complete and unified streetscape design.

The *Planting/Furnishing Zone* is the buffer from vehicular traffic. It contains street lighting, street trees and planting strips, a curbside pedestrian loading area, street furnishings and occasionally outdoor dining on some street types. Though adequate Pedestrian Through Zone width should always be prioritized, streets should be lined with healthy, well-maintained trees to increase pedestrian comfort and canopy cover.

The *Pedestrian Through Zone* should always maintain the most unencumbered layout possible. Vertical obstructions should be avoided at all costs. Paving disruptions, such as manholes and vaults should be kept to an absolute minimum.













Typically, the *Frontage Zone* provides opportunities for commercial-retail seating while the *Planting/Furnishing Zone* is expected to accommodate a more intense inventory of programs, including street trees and understory plantings, public benches, bike racks, planting containers, and trash receptacles. Bus shelters and signage elements can also be found in this zone. The furnishing zone is also the preferred location for utility components including traffic signals, light poles, electrical vaults, gas and water meters.

Accessibility & Pedestrian Activity:

Providing safe and accessible sidewalks for people of all abilities is the highest priority for any new design of Bethesda's sidewalks. Accessible sidewalks shall be designed to:

- Utilize the best practices of universal design to provide a clear and unobstructed pedestrian through zone appropriate for users of all abilities, including those with visual or mobility impairments
- Promote safe pedestrian access for the widest range of users, including children, seniors and persons with disabilities
- Contribute to a continuous and integrated street grid that connects users to destinations in downtown Bethesda, including public transit, activity centers, and civic green spaces.

Elements of the Streetscape Key:

	Tree Planting
	Furnishing / Utility Pad
	Curb Extension
	Bus Shelter
	Bike Rack / Bike Share
	Lighting / Traffic Signal
	Curb Ramp / Crosswalk
	Planting Container
	Trash Receptacle
	Bench
	Signage
	Outdoor Cafe
	Bikeway



2.2 Streetscape by Street Type

In the Design Guidelines, Bethesda's functional roadway classifications (which pertain to the Master Plan of Highways and Chapter 49 of the Montgomery County Code) will remain the same but a supplemental set of street types has been developed to provide a more refined approach to establishing street character. These street types seek to balance existing conditions with the Sector Plan vision for the public realm, with its emphasis on design excellence, improved user experience, and the continued greening of Bethesda. These street type designations include:

Urban Boulevards are the major thoroughfares of downtown Bethesda and as such are of a grander scale and width. Facilitating significant loads of pedestrian, transit, and vehicular circulation within the context of taller, higher density development, these streets need to ensure efficient pedestrian flow and comfort while providing something of a ceremonial experience for visitors and residents alike.

Downtown Mixed-Use Streets are the bustling side streets that connect to Urban Boulevards, offering increased commercial / retail activities and pedestrian destinations. As such, they experience increased levels of parking, loading, and service access. Similar to Urban Boulevards, they are associated with neighborhoods of moderate density with a mix of mid-to high-rise buildings.

Neighborhood Main Streets are similar to Downtown Mixed-Use Streets in their commercial / retail character, but are located in neighborhoods with an increased residential character and reduced density with a mix of low-to mid-rise buildings. From a streetscape perspective, the commercial / retail character is a primary factor and these streets have been developed in unison with the Downtown Mixed-Use Street type.

Shared Streets have been introduced in areas where the level of pedestrian activity is far greater than the actual or desired level of vehicular activity. Shared Streets are designed and detailed to diminish or eliminate the traditional separation of sidewalk and roadway. They provide flexibility of use, as well as a placemaking strategy for transforming streets into urban

destinations and are often used for larger street events. Within this context, access is maintained for delivery vehicles and the slowing of or restricting vehicular traffic is enforced as measures for slowing traffic.

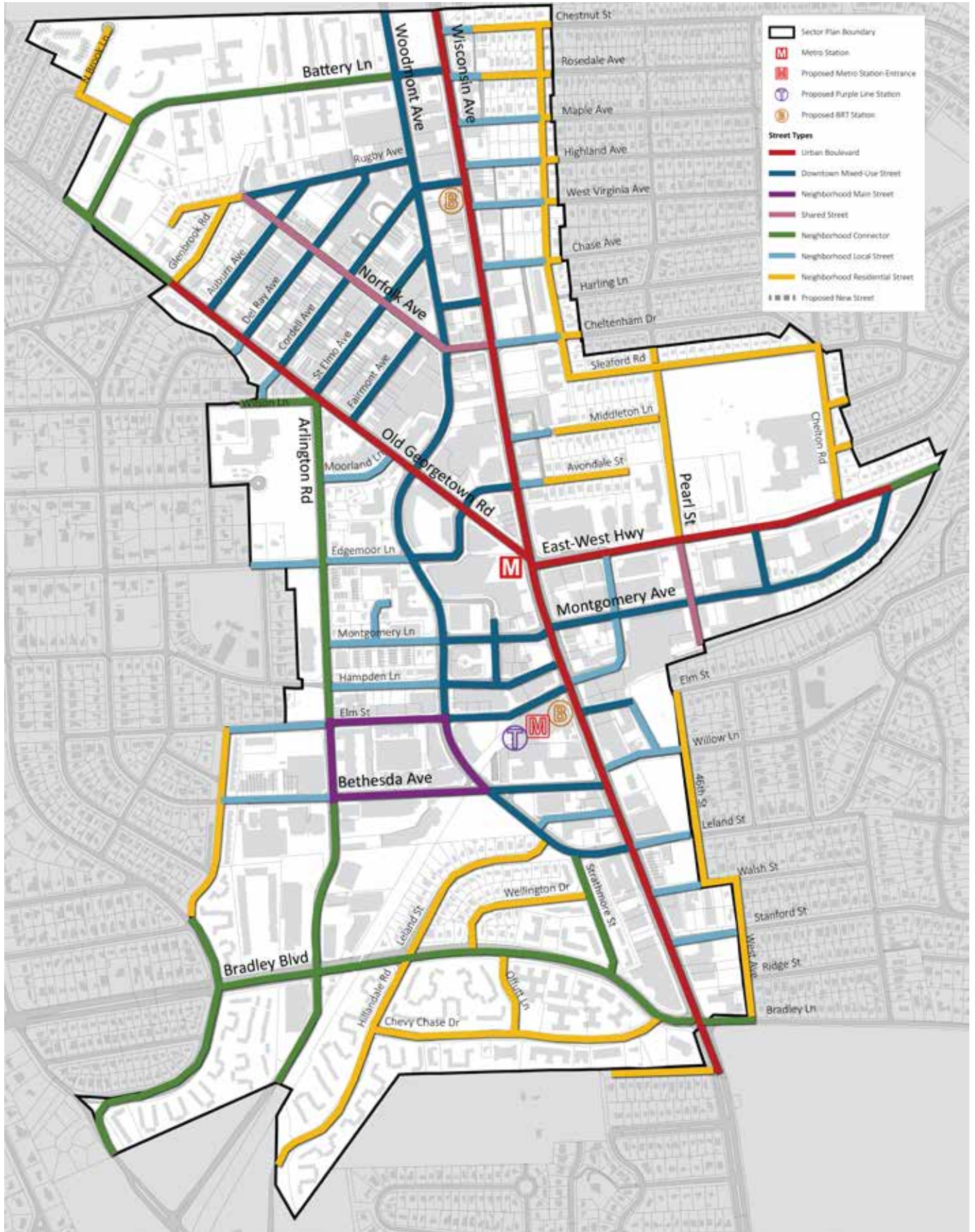
Neighborhood Connectors function more as arterial or pass-through streets for residents. As such, these streets tend to have a greater concentration of multi-unit homes and a range of building sizes. Neighborhood Connectors experience a higher level of vehicular traffic than Downtown Mixed-Use or Neighborhood Main streets and require a greater number of driveway curb cuts. These streets should provide sufficient traffic buffering and safe circulation transitions for pedestrians.

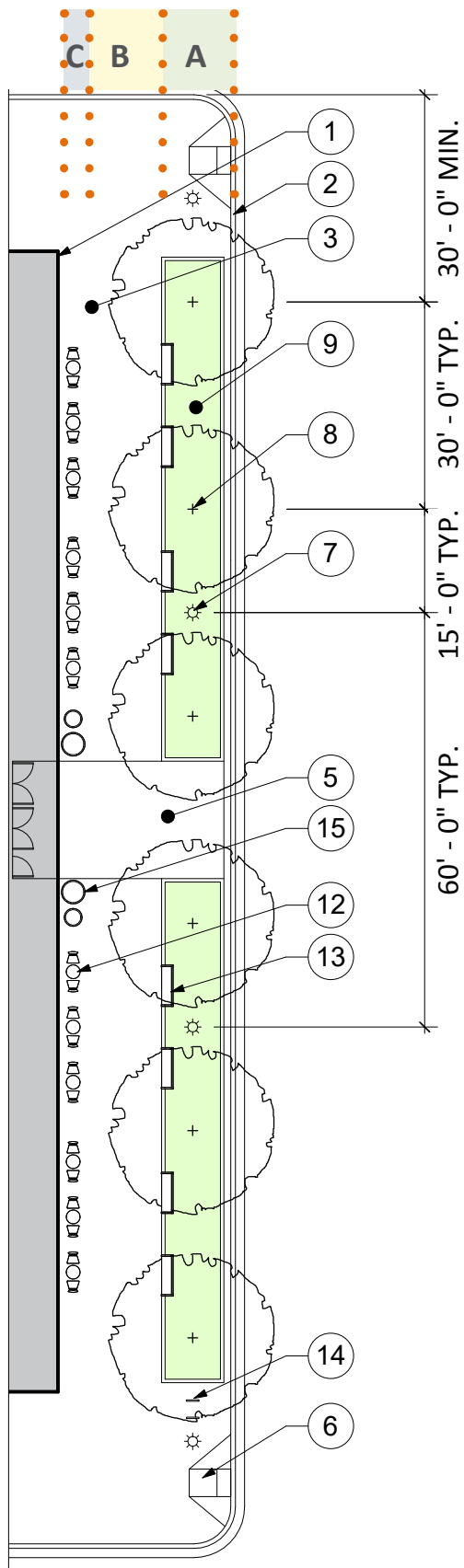
Neighborhood Local Streets are side streets providing a transition from the urban core to adjacent residential neighborhoods with lower scale buildings and detached homes. These streets are typically narrower and accommodate lower levels of traffic for local neighborhood residents. These streets need to balance vehicular access, bicycle access, and parking requirements.

Neighborhood Residential Streets are side streets with a strong residential character typically located along the outer edges of the downtown area. They are narrow streets with low-volumes of vehicular traffic and on street parking. With additional opportunities for greenspace along the frontage zone, these streets should create a casual walking experience within a garden-like environment.

The content that follows includes a variety of sample sidewalk layout and design standards for each of the street type designations, identifying the full range of streetscape elements and how they should be incorporated according to street type. Subsequent chapters address the integration of site utilities, stormwater management, furnishings / other streetscape elements, and the standard details and requirements pertaining to each condition.

FIGURE 2.01: DESIGN GUIDELINES - STREET TYPES





2.2.1 Urban Boulevard

The streetscape design for urban boulevards will provide a high-quality street level experience with a wide *pedestrian through zone* and a generous *planting zone* that will provide a sense of safety and comfort to pedestrians. Special attention is required for the planting recommendations in order to create consistent canopy coverage.

LOCATING ELEMENTS	A	B	C
	Planting + Furnishing	Pedestrian Through Zone	Building Frontage
	[6-10 FT.]	[10-20 FT.]	[0-10 FT.]
SITE FURNISHINGS			
Benches	□	×	×
Bike Racks	□	×	×
Café / Dining Tables & Chairs	×	×	□
Parking Meters	□	×	×
Planting Containers	■	×	□
Receptacles	■	×	×
Traffic + Parking Signs	■	×	×
DRY UTILITIES			
Water - Valves, Meters	◇	■	×
Gas - Valves	◇	■	×
Utility Laterals	□	□	□
Utility Conduits	◇	■	×
Street Lights	■	×	×
Utility Vaults	◇	■	×
KEY: ■ Most desirable ◇ Least desirable* □ Acceptable × Not Recommended <small>*Only employ if Most Desirable/Acceptable locations are not feasible</small>			

KEY LEGEND

- 1 Building Face
- 2 MCDOT Concrete Curbing, Typ.
- 3 Standard Brick Paving
- 4 Understory Tree, Typ.
- 5 Accent Paving (Subject to Approval)
- 6 ADA Curb Ramp
- 7 Street Light, Typ.
- 8 Street Tree, Typ.
- 9 Continuous Planting Strip
- 10 Tree Well
- 11 Planting Area
- 12 Café / Dining Seating
- 13 Bench, Typ.
- 14 Bike Rack, Typ.
- 15 Free Standing Planting Container
- 16 Hydrant or other Utility Fixture
- 17 Receptacles

Design Considerations:

Planting / Furnishing Zone:

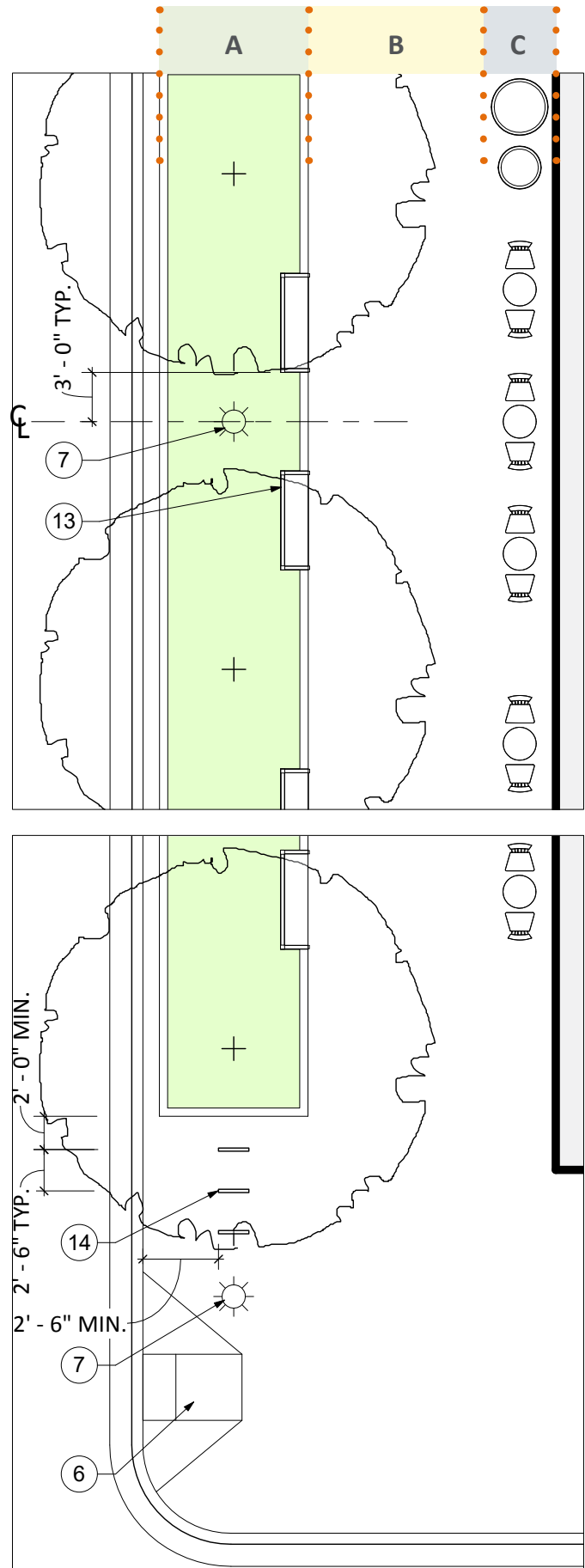
- Provide continuous planting strips wherever possible to encourage healthy urban tree canopy coverage.
- Place design emphasis on the Planting / Furnishing zone, providing a buffer to minimize noise from vehicular traffic of the Urban Boulevard.
- In order of priority, site furniture and amenities shall be secondary to planting and landscape elements.
- Minimize the placement of utilities in this zone, where possible (except for street lighting), to encourage a generous planting zone and continuous planting strip.
- Incorporate benches, spaced evenly along the street (where possible) and oriented parallel to the curb, facing the building.
- Locate bike racks at the beginning or end of continuous planting strips, near block corners.

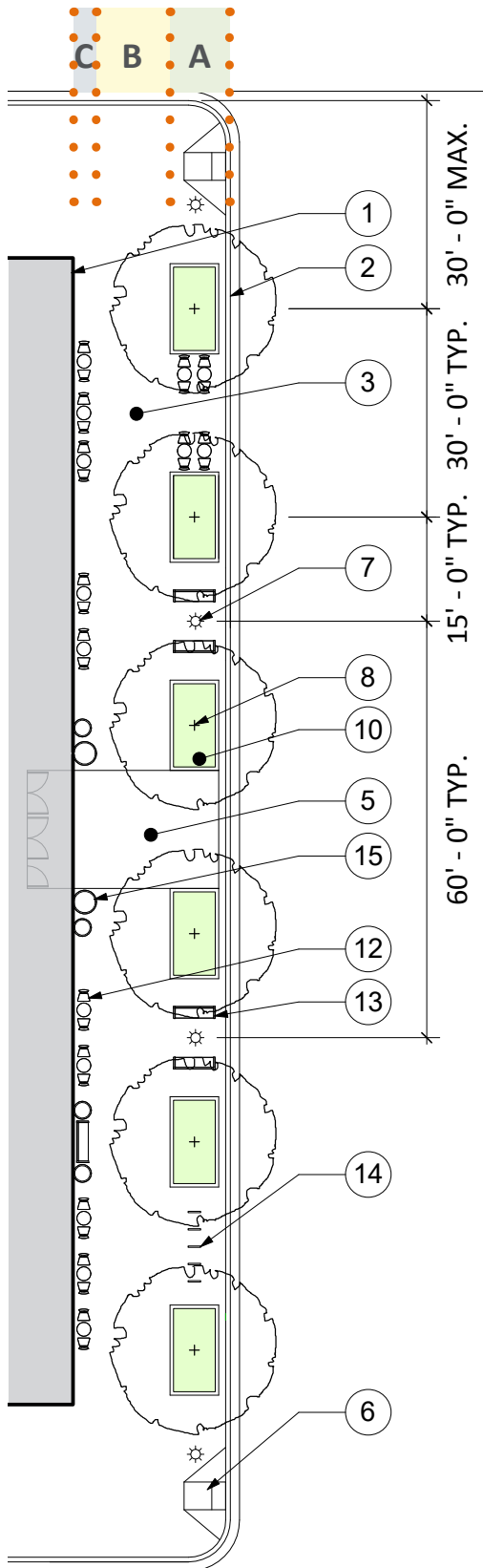
Pedestrian Through Zone:

- Design emphasis shall be placed on establishing an accessible, identifiable, and unobstructed walking surface.
- When utility vaults must be located in this zone, provide vault covers that accommodate brick pavers.
- Small utility vaults (gas valves, water meters, etc.) should be located in this zone when required, and aligned inboard of the sidewalk edge adjacent to the Planting / Furnishing zone.

Frontage Zone:

- Café / Dining seating may be provided if space allows; the preferred width to incorporate this space is 6 ft -10 ft.; or 3 ft., minimum.
- Where frontage zones are greater than 3 ft., planting containers may be included near building entries, which will soften the scale of large buildings.
- Any pedestrian amenity elements that cannot be accommodated for in the Planting / Furnishing zone can be incorporated into the Frontage Zone in effort to maintain a clear Pedestrian Through Zone.
- Accent paving can be provided at building entrances to enhance unique character and sense of place. All paving materials differing from the standard treatment are subject to review and approval.





2.2.2 Downtown Mixed Use & Neighborhood Main Street

Downtown Mixed Use & Neighborhood Main Streets should exhibit a high degree of design detail to maximize pedestrian activity and foster a vibrant street life.

A generous frontage zone provides ample space for outdoor dining and seating. The pedestrian through zone is less wide than the Urban Boulevard but allows for clear paths of travel. If tree wells are used in the planting/furnishing zone, seating, outdoor dining, public art, and vendors can occupy the area between tree wells.

LOCATING ELEMENTS	A	B	C
	Planting + Furnishing	Pedestrian Through Zone	Building Frontage
	[5-8FT.]	[8-12 FT.]	[0-7 FT.]
SITE FURNISHINGS			
Benches	■	×	×
Bike Racks	■	×	×
Café / Dining Tables & Chairs	□	×	■
Parking Meters	■	×	×
Planting Containers	■	×	□
Receptacles	■	×	×
Traffic + Parking Signs	■	×	×
DRY UTILITIES			
Water - Valves, Meters	■	◇	×
Gas - Valves	■	◇	×
Utility Laterals	□	◇	□
Utility Conduits	■	◇	×
Street Lights	■	×	×
Utility Vaults	◇	□	×
KEY:			
■	Most desirable	◇	Least desirable*
□	Acceptable	×	Not Recommended
*Only employ if Most Desirable/Acceptable locations are not feasible			

KEY LEGEND

- 1 Building Face
- 2 MCDOT Concrete Curbing, Typ.
- 3 Standard Brick Paving
- 4 Understory Tree, Typ.
- 5 Accent Paving (Subject to MCDOT Approval)
- 6 ADA Curb Ramp
- 7 Street Light, Typ.
- 8 Street Tree, Typ.
- 9 Continuous Planting Strip
- 10 Tree Well
- 11 Planting Area
- 12 Café / Dining Seating
- 13 Bench, Typ.
- 14 Bike Rack, Typ.
- 15 Free Standing Planting Container
- 16 Hydrant or other Utility Fixture
- 17 Receptacles

Design Considerations:

Planting / Furnishing Zone:

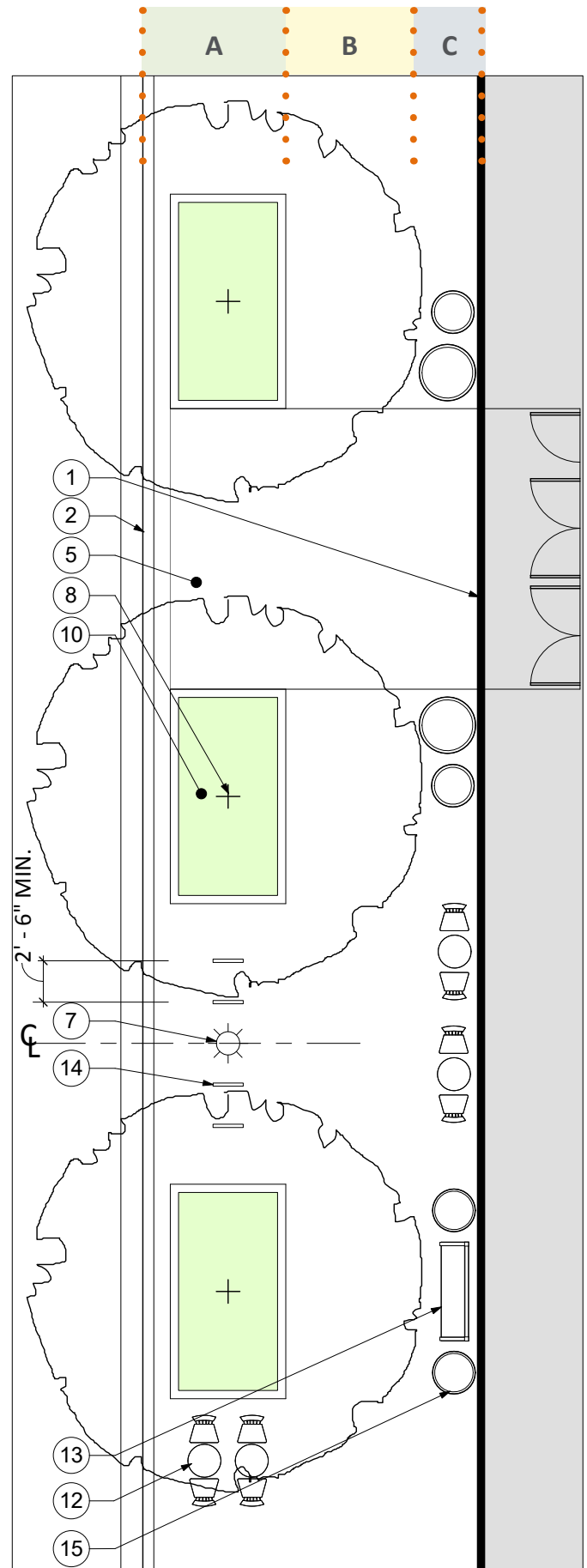
- Locate pedestrian amenities, such as seating, and space for vending or other pedestrian activities, where hardscape is provided between street trees.
- Incorporate benches, spaced evenly along the street where possible. Orient benches perpendicular to the curb in facing pairs and along the centerline of this zone.
- When using Street Tree Wells, provide additional soil volume to meet or exceed the minimum soil volume requirements (described in Chapter 3).
- Locate bike racks close to block corners or near building entries, when applicable.

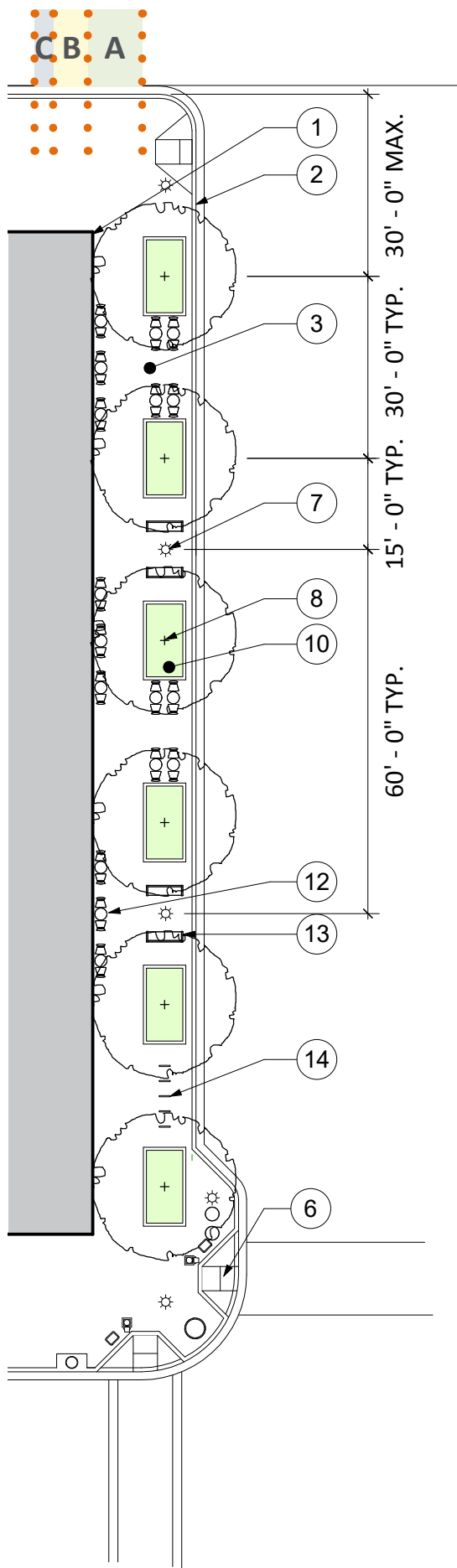
Pedestrian Through Zone:

- Design emphasis shall be placed on establishing an accessible, identifiable, and unobstructed walking surface.
- Maximize the width of the Through Zone to accommodate high levels of pedestrian activity.
- If utility vaults must be located in this zone, provide vault covers that accommodate pavers.
- Small utilities (gas valves, water meters, etc.) should be located and aligned within the Planting / Furnishing Zone- provided they do not directly interfere with soil volume requirements.

Frontage Zone:

- Maximize the space provided for café / dining seating, plazas, and other activities that contribute to a lively street scene, but not at the expense of reducing the Pedestrian Through Zone below its minimum width.
- Where frontage zones are greater than 3 ft., include planting containers near building entries to enhance the sense of welcoming.
- Accent paving can be provided at building entrances to enhance unique character and sense of place. All paving materials differing from the standard treatment are subject to review and approval.





2.2.3 Shared Streets

Shared Streets diminish the traditional separation between sidewalk and street. The ideal scenario is a curb-less condition with separation provided by bollards, built-in seating, or some other more seamless transition. This can occur across the full length of a Shared Street or can be incremental--as in the case of a Shared Intersection. Curb extensions both at intersections and/or mid-block locations are recommended for placing an emphasis on pedestrian priority in areas where an entirely flush condition is not feasible.

LOCATING ELEMENTS	A	B	C
	Planting + Furnishing	Pedestrian Through Zone	Building Frontage
	[FLEXIBLE]	[6-10 FT.]	[FLEXIBLE]
SITE FURNISHINGS			
Benches	■	×	×
Bike Racks	■	×	×
Café / Dining Tables & Chairs	□	×	■
Parking Meters	■	×	×
Planting Containers	■	×	□
Receptacles	■	×	×
Traffic + Parking Signs	■	×	×
DRY UTILITIES			
Water - Valves, Meters	■	◇	×
Gas - Valves	■	◇	×
Utility Laterals	□	◇	□
Utility Conduits	■	◇	×
Street Lights	■	×	×
Utility Vaults	◇	□	×
KEY:			
■	Most desirable	◇	Least desirable*
□	Acceptable	×	Not Recommended
*Only employ if Most Desirable/Acceptable locations are not feasible			

KEY LEGEND

- 1 Building Face
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- 8 Street Tree, Typ.
- 9 Continuous Planting Strip
- 10 Tree Well
- 11 Planting Area
- 12 Café / Dining Seating
- 13 Bench, Typ.
- 14 Bike Rack, Typ.
- 15 Free Standing Planting Container
- 16 Hydrant or other Utility Fixture
- 17 Receptacles

Design Considerations:

Planting / Furnishing Zone:

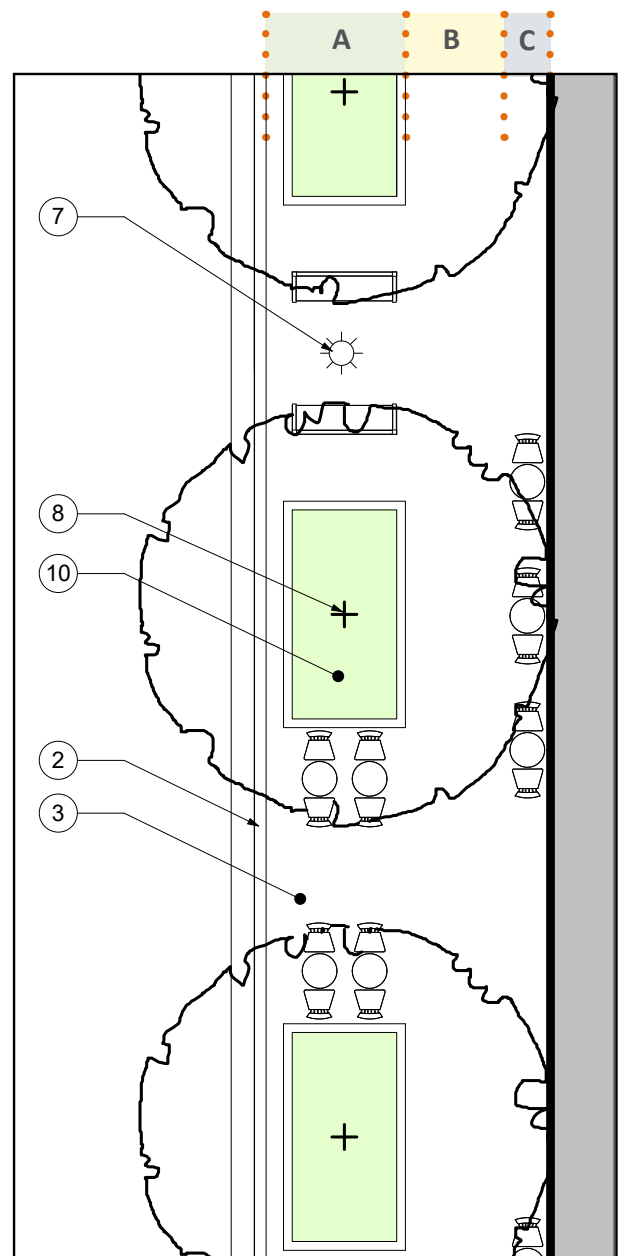
- Locate pedestrian amenities, such as seating, and space for vending or other pedestrian activities, where hardscape is provided between street trees, with the opportunity to spill into the road space when the shared street is closed to vehicular traffic.
- Incorporate bollards, with equal spacing along the hardscape space between street trees; removable bollards are preferred in order to maximize free pedestrian flows when applicable.
- Minimize the placement of utilities in this zone, where possible (except for street lighting), to eliminate obstructions during temporary street events and other pedestrian-oriented activities.
- Incorporate benches, spaced evenly along the street where possible. Orient benches perpendicular to the curb in facing pairs and along the centerline of this zone.
- Maximize the space provided for café / dining seating, plazas, and other activities that contribute to a lively street scene, but not at the expense of street tree canopy coverage or other street greenspace.
- When using Street Tree Wells, provide additional soil volume to meet or exceed the minimum soil volume requirements (described in Chapter 3).
- Locate bike racks close to block corners or near building entries, when applicable.

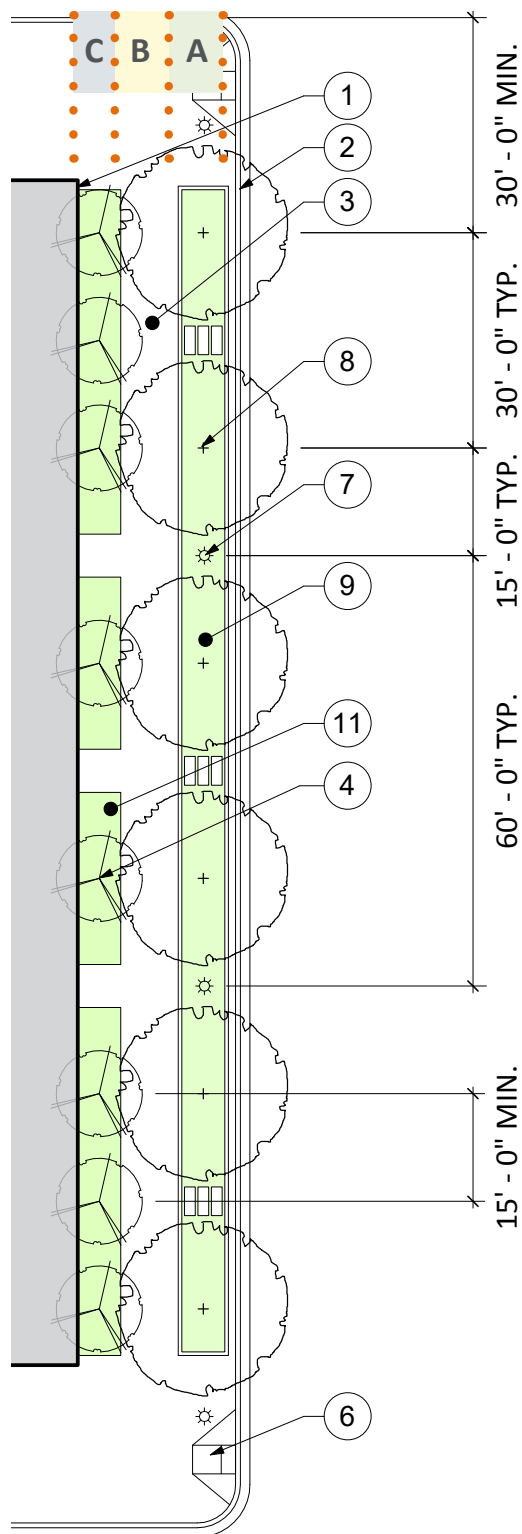
Pedestrian Through Zone:

- Design emphasis shall be placed on establishing an accessible and unobstructed walking surface, which can seamlessly transition into the adjacent Frontage and Planting/Furnishing zones, as well as the shared roadway.
- Accommodate high levels of pedestrian activity, and allow for flexibility between zones as shared streets are often unique to their specific area.
- If utility vaults must be located in this zone, provide vault covers that accommodate brick pavers.
- Small utility vaults (gas valves, water meters, etc.) should be located and aligned within the Planting / Furnishing Zone- provided they do not directly interfere with soil volume requirements.

Frontage Zone:

- Maintain a flexibility of usages; shared street are dynamic and can host a variety of events in addition to their daily uses.
- Where frontage zones are greater than 3 ft., include planting containers near building entries to enhance the sense of welcoming.
- Any pedestrian amenity elements that cannot be accommodated for in the Planting / Furnishing zone can be incorporated into the Frontage Zone in effort to maintain a clear Pedestrian Through Zone.
- Accent paving can be provided at building entrances to enhance unique character and sense of place. All paving materials differing from the standard treatment are subject to review and approval.





2.2.4 Neighborhood Connector

As the name might imply, Neighborhood Connectors are transportation conduits into which a variety of street types flow.

From a streetscape perspective their design and materiality has been conceived as having a transitional character.

Relative to configuration, the frontage zone has been developed to maximize additional green space--anticipating the traditional residential front yard--while providing additional opportunities for locating vaults and consolidating utilities.

LOCATING ELEMENTS	A	B	C
	Planting + Furnishing	Pedestrian Through Zone	Building Frontage
	[6-8 FT.]	[6-10 FT.]	[5-8 FT.]
SITE FURNISHINGS			
Benches	×	×	□
Bike Racks	■	×	×
Café / Dining Tables & Chairs	×	×	×
Parking Meters	■	×	×
Planting Containers	×	×	×
Receptacles	■	×	×
Traffic + Parking Signs	■	×	×
DRY UTILITIES			
Water - Valves, Meters	■	◇	×
Gas - Valves	■	◇	×
Utility Laterals	□	◇	□
Utility Conduits	■	◇	×
Street Lights	■	×	×
Utility Vaults	◇	□	×
KEY:			
■	Most desirable	◇	Least desirable*
□	Acceptable	×	Not Recommended
*Only employ if Most Desirable/Acceptable locations are not feasible			

KEY LEGEND

- 1 Building Face
- 2 MCDOT Concrete Curbing, Typ.
- 3 Standard Brick Paving
- 4 Understory Tree, Typ.
- 5 Accent Paving (Subject to Approval)
- 6 ADA Curb Ramp
- 7 Street Light, Typ.
- 8 Street Tree, Typ.
- 9 Continuous Planting Strip
- 10 Tree Well
- 11 Planting Area
- 12 Café / Dining Seating
- 13 Bench, Typ.
- 14 Bike Rack, Typ.
- 15 Free Standing Planting Container
- 16 Pedestrian Crossing Pavers
- 17 Receptacles

Design Considerations:

Planting / Furnishing Zone:

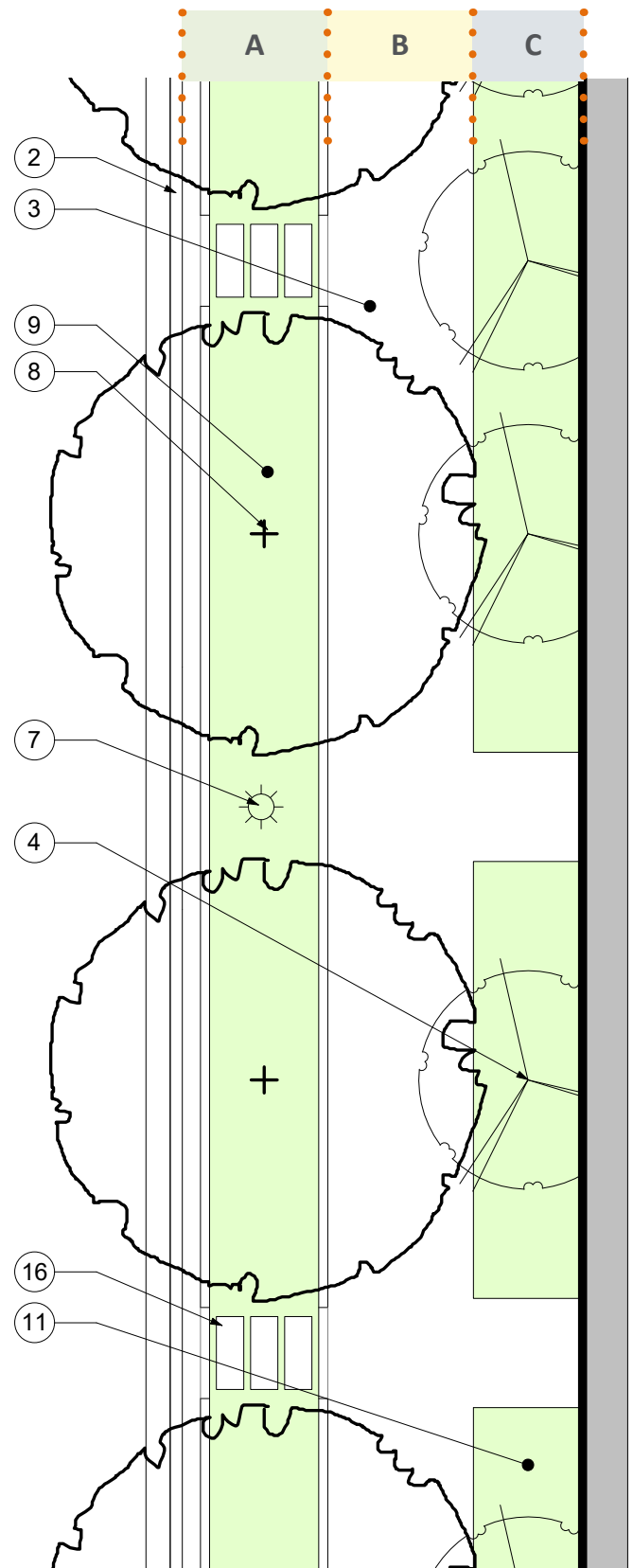
- Provide continuous planting strips wherever possible to encourage a healthy urban tree canopy.
- Place design emphasis on the Planting / Furnishing zone, providing a buffer to minimize noise from vehicular traffic.
- Where curbside parking is present, provide pedestrian crossing pavers at regular intervals (60 ft. o.c.) for connectivity between parking and the Pedestrian Through Zone.
- In order of priority, site furniture and amenities shall be secondary to planting and landscape elements on Neighborhood Connectors.
- Minimize the placement of utilities in this zone, where possible (except for street lighting), to encourage a generous planting zone and continuous planting strip.
- Locate bike racks close to block corners or near entries of residential buildings.

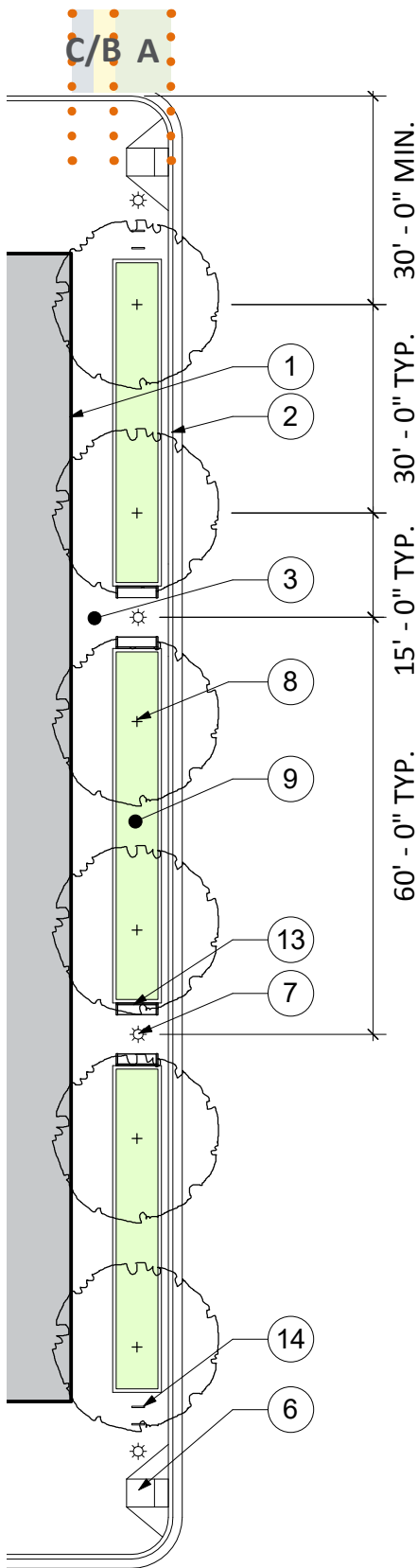
Pedestrian Through Zone:

- Design emphasis shall be placed on establishing an accessible, identifiable, and unobstructed walking surface.
- When utility vaults must be located in this zone, provide vault covers that accommodate brick pavers.
- Small utility vaults (gas valves, water meters, etc.) should be located in this zone when required, and aligned inboard of the sidewalk edge adjacent to the Planting / Furnishing zone.

Frontage Zone:

- Provide additional planting area where possible, in effort to maximize greenspace and soften the feel of building foundations.





2.2.5 Neighborhood Local Street

Taking cues from the Neighborhood Connector design, Neighborhood Local Streets are of a similarly transitional character mixing the Bethesda core district brick paving and the residential district concrete paving.

LOCATING ELEMENTS	A	B	C
	Planting + Furnishing	Pedestrian Through Zone	Building Frontage
	[5-8 FT.]	[6-10 FT.]	[0-4 FT.]
SITE FURNISHINGS			
Benches	x	x	□
Bike Racks	■	x	x
Café / Dining Tables & Chairs	x	x	x
Parking Meters	■	x	x
Planting Containers	x	x	x
Receptacles	■	x	x
Traffic + Parking Signs	■	x	x
DRY UTILITIES			
Water - Valves, Meters	■	◇	x
Gas - Valves	■	◇	x
Utility Laterals	□	◇	□
Utility Conduits	■	◇	x
Street Lights	■	x	x
Utility Vaults	◇	□	x
KEY:			
■	Most desirable	◇	Least desirable*
□	Acceptable	x	Not Recommended
*Only employ if Most Desirable/Acceptable locations are not feasible			

KEY LEGEND

- 1 Building Face
- 2 MCDOT Concrete Curbing, Typ.
- 3 Standard Brick Paving
- 4 Understory Tree, Typ.
- 5 Accent Paving (Subject to Approval)
- 6 ADA Curb Ramp
- 7 Street Light, Typ.
- 8 Street Tree, Typ.
- 9 Continuous Planting Strip
- 10 Tree Well
- 11 Planting Area
- 12 Café / Dining Seating
- 13 Bench, Typ.
- 14 Bike Rack, Typ.
- 15 Free Standing Planting Container
- 16 Pedestrian Crossing Pavers
- 17 Receptacles

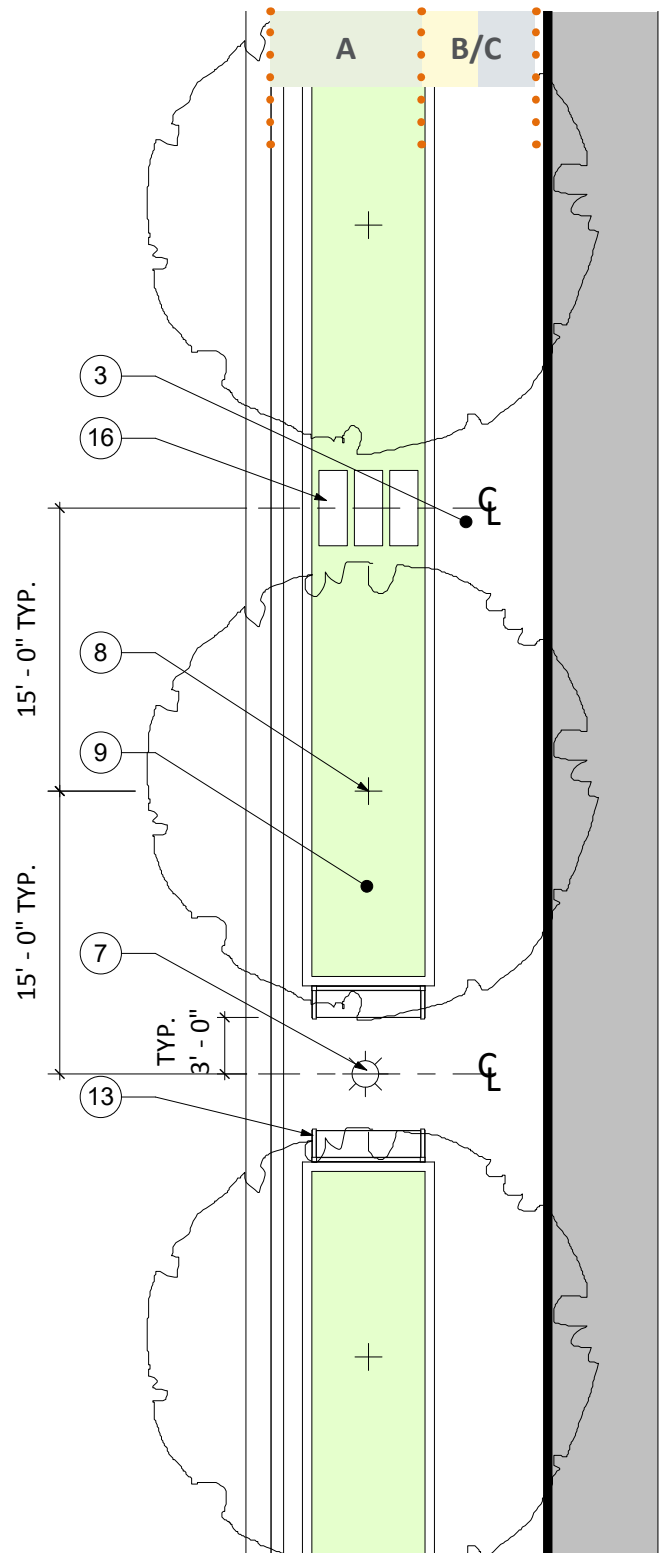
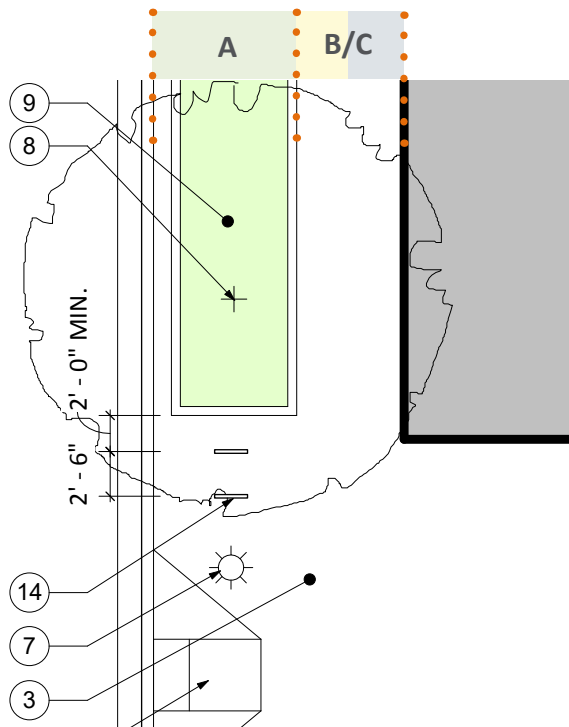
Design Considerations:

Planting / Furnishing Zone:

- Provide continuous planting strips wherever possible to encourage a healthy urban tree canopy.
- In order of priority, site furniture and amenities shall be secondary to planting and landscape elements
- Minimize the placement of utilities in this zone, where possible (except for street lighting), to encourage a generous planting zone and continuous planting strip.
- Incorporate benches, typically at block ends and oriented perpendicular to the curb in facing pairs, along the centerline of this zone.
- Locate bike racks close to block corners or near entries of residential buildings.

Pedestrian Through Zone:

- Design emphasis shall be placed on establishing an accessible, identifiable, and unobstructed walking surface.
- When utility vaults must be located in this zone, provide vault covers that accommodate paving which matches the surrounding paving field.
- Small utility vaults (gas valves, water meters, etc.) should be located in this zone when required, and aligned inboard of the sidewalk edge adjacent to the Planting / Furnishing zone.



Design Considerations:

Planting / Furnishing Zone:

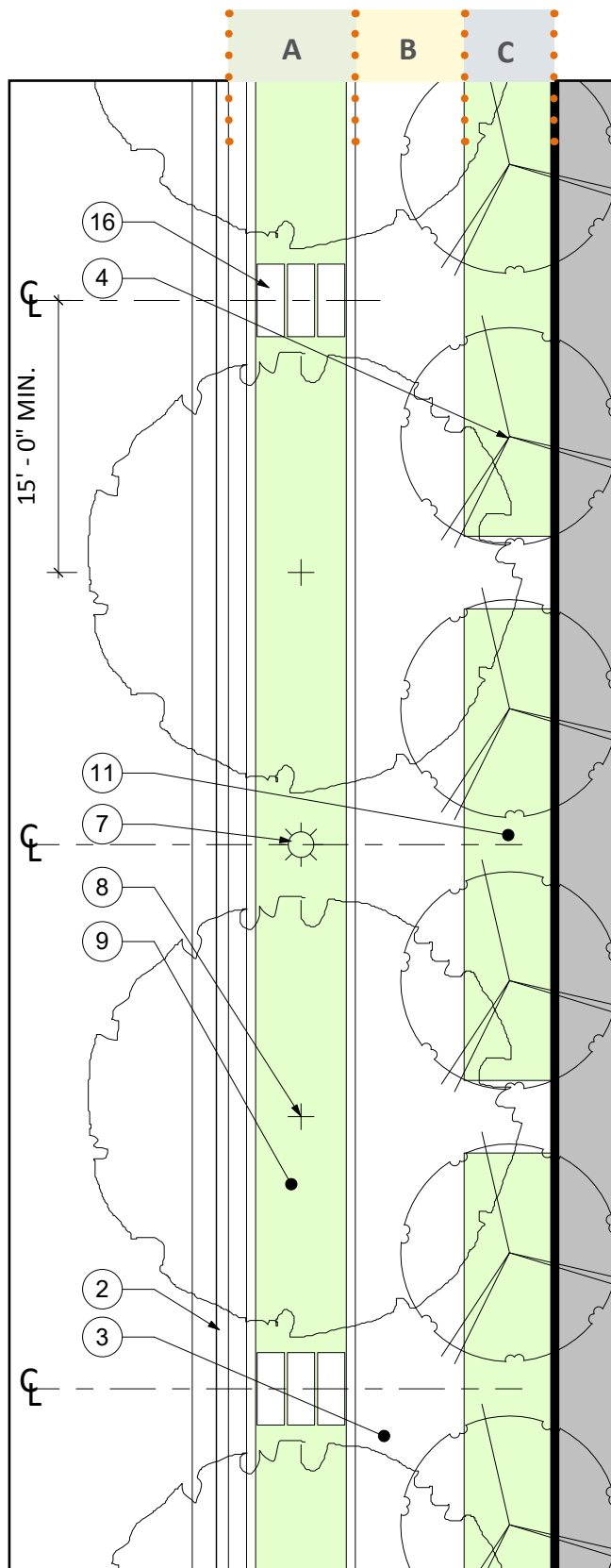
- Provide continuous planting strips wherever possible to encourage a healthy urban tree canopy
- Minimize the placement of utilities in this zone, where possible (except for street lighting), to encourage a generous planting zone and continuous planting strip.
- Place design emphasis on the landscape components of the Planting / Furnishing zone in order to foster a garden-like experience.
- Where curbside parking is present, provide pedestrian crossing pavers at regular intervals (60 ft. o.c.) for connectivity between parking and the Pedestrian Through Zone.

Pedestrian Through Zone:

- Design emphasis shall be placed on establishing an accessible, identifiable, and unobstructed walking surface.
- When utility vaults must be located in this zone, provide vault covers that accommodate paving which matches the surrounding paving field.
- Small utility vaults (gas valves, water meters, etc.) should be located in this zone when required, and aligned inboard of the sidewalk edge adjacent to the Planting / Furnishing zone.

Frontage Zone:

- Provide additional planting area where possible, in effort to maximize greenspace and soften the feel of building foundations.



2.3 Bikeways

The 2018 Bicycle Master Plan makes recommendations for a low-stress network of bikeways throughout Bethesda, to ensure that cyclists of all ages and abilities are comfortable and safe riding to transit stations, employment centers, shops, public facilities, and other destinations. While these standards address pavement and landscaping details, layout and design details of bike facilities should be consistent with the Bicycle Master Plan and the accompanying Bicycle Facility Design Toolkit.



Trails are paths that are located outside of the road right-of-way. They provide two-way travel designated for walking, bicycling, jogging and skating. Trails include off-street trails, stream valley park trails and neighborhood connectors.



Separated bikeways provide physical separation from traffic and include sidepaths and separated bike lanes. In general, separated bike lanes are recommended in higher activity areas. Sidepaths are recommended in lower activity areas.



Striped bikeways are designated spaces for bicycling that are distinguished from traffic lanes and shoulders by striping and pavement markings.



Shared roads are bikeways that share space with automobiles. They include neighborhood greenways in suburban areas, shared streets in urban areas and priority shared lane markings where there is insufficient space for a dedicated bikeway. Of course, all streets where bicycles share space with automobiles are de facto shared roads, but only some are master-planned.

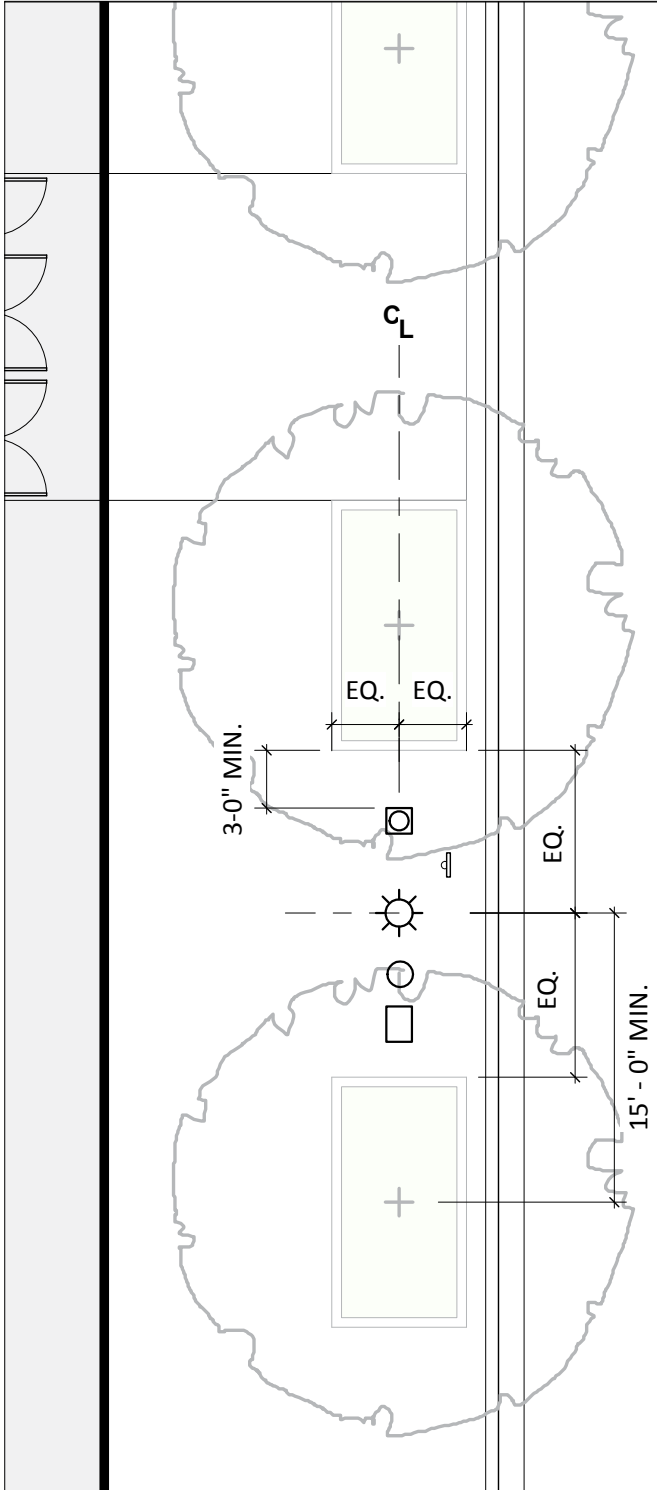
FIGURE 2.02: BIKEWAYS PER STREET



Note: White lines represent non-master planned bikeways

0 1000'

2.4



Utilities are an essential part of the urban environment. When well coordinated, they contribute to a cohesive, orderly, and more beautiful streetscape. Whether a project is a new development, a renovation, or repair job, utilities should be carefully considered and coordinated with other design elements early in the project.

Streetscape utilities typically include water valves and meters, gas valves, utility laterals & conduits (sewer, gas, water, telecommunications), and utility vaults. Above-ground utilities and furnishings, such as street lights, fire hydrants, signs, and parking meters, should also be considered in conjunction with below-grade utilities.

The benefits of thoughtful utility placement in the streetscape include:

- a safer environment for users of all abilities traveling through the pedestrian through zone
- increased soil volume for street trees as a result of minimizing conflict between utilities and street trees
- a more unified and orderly streetscape aesthetic
- ease of access to utilities and fewer long-term maintenance conflicts for utility providers.

However, significant challenges to utility coordination and placement remain, which include:

- utility providers that adhere to internal standards for utility placement in lieu of coordinating with the development team
- the high cost of relocating existing utilities might be financially unfeasible for both new developments with existing utilities on site and for retrofits.

2.4.1 General Guidelines for Utility Location

Undergrounding of Utilities

All new development projects in downtown Bethesda are expected to place utilities to and around their properties underground.

Timing and Coordination:

Utilities should be installed during full or partial sidewalk improvements, rather than a separate, utility-focused project whenever possible.

Utilities should be considered at the earliest possible stage of design. Utility plans should be submitted during initial development submittals so that utilities can be located and coordinated to minimize conflicts with other streetscape elements.

Utility Location and Consolidation:

Utility lines should be located to minimize disturbance of the existing streetscape elements. In no circumstance should utilities of any kind diminish the accessibility of the Pedestrian Through Zone.

Utilities that run parallel to the street should be located outside of the Planting / Furnishing Zone, where feasible.

Utilities that run perpendicular to the street should be grouped together to minimize conflict with street trees or other BMP/ESDs.

Dry utility conduits and laterals should be aligned, arranged or stacked to minimize the extent of utility zones.

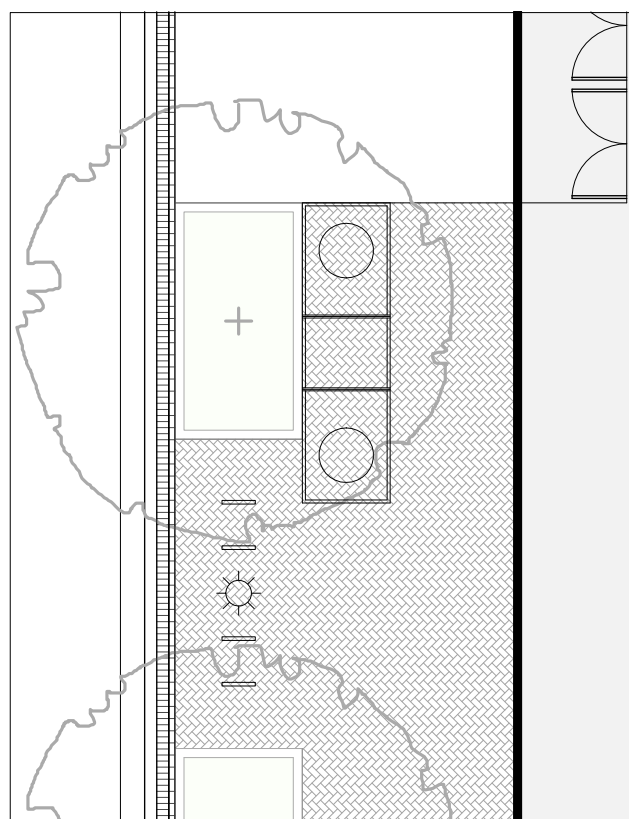
Above-ground streetscape utilities, such as street lights, fire hydrants, signs, and parking meters, should be located at the midpoint between street trees within the Planting / Furnishing Zone.

Above-ground streetscape utilities should be located to keep a minimum dimension of 3'-0" from the nearest curb face of a tree well or other BMP/ESD facility.

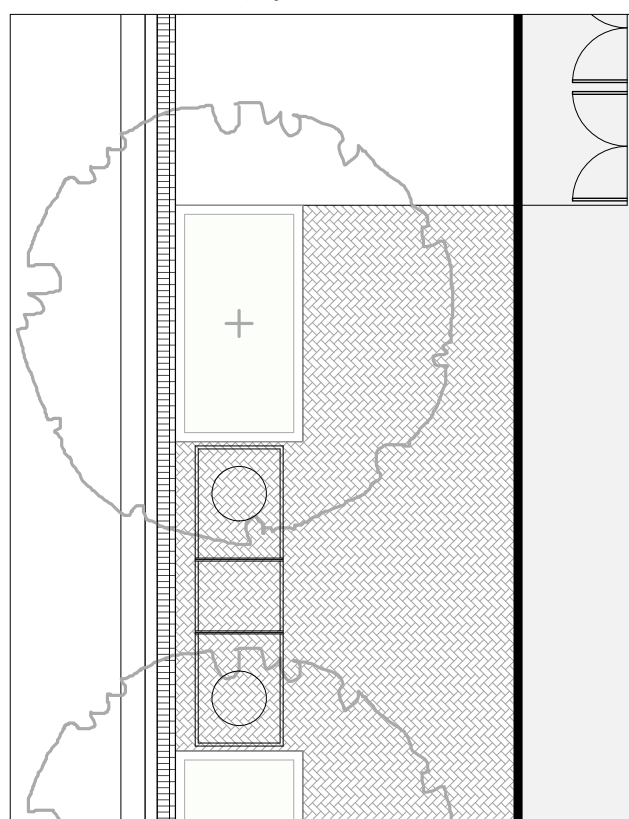
Utility Vaults:

Utility vaults should be located on private property where feasible. If a vault can only be placed in the public right-of-way, it is best located in the Pedestrian Through Zone so as to minimize conflicts with street trees or other ESDs in the Planting / Furnishing Zone. Vaults located in the Pedestrian Through Zone should have a solid cover flush with the adjacent sidewalk surface and should match the adjacent paving material. Vaults must be constructed in compliance with ADA standards for walking surfaces within an accessible route.

PREFERRED



ACCEPTABLE (if preferred is not feasible)



Chapter 3: Streetscape Best Management Practices

3.1 Introduction



Woodmont Avenue in Downtown Bethesda



BMP strategies for ESD

The Best Management Practices (BMPs) described in this chapter are centered around two primary goals:

1. enhancing the health of Bethesda's tree canopy by maximizing the soil volume available to street trees and
2. integrating Environmental Site Design (ESD) strategies that provide multiple performance area benefits for water quality, habitat, health and aesthetic improvement.

These BMPs were identified in both the Bethesda Downtown Sector Plan and the Bethesda Downtown Plan Design Guidelines as recommended steps for achieving a network of tree canopy corridors that will provide shade and comfort to encourage people to walk and bike through downtown Bethesda, without compromising bicycle and pedestrian accommodations and networks. Refer to MDE and DPS standards for ESD.

3.1.1 BMP Types

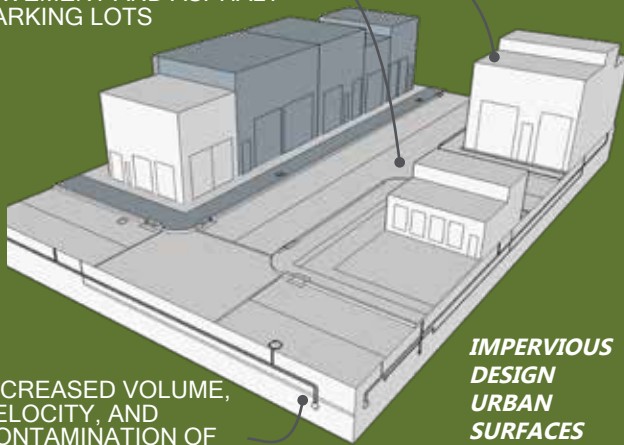
Tree Space & Sidewalk Design: These BMPs will enhance the health of Bethesda's tree canopy by maximizing the soil volume available to street trees while also providing accessible sidewalks that can accommodate high volumes of pedestrian traffic. Specific BMPs include the use of continuous planting strips (where feasible), structural soils, and structural cells.

Environmental Site Design: BMPs strategies for ESD can include bioretention cells, vegetated planter boxes, and swales (both dry and wet). When distributed throughout Bethesda's streetscape, these small-scale BMPs will help manage and treat stormwater runoff.

Streetscape Planting: Canopy trees, understory trees (where appropriate), and groundcover plantings are essential to the overall health of Bethesda's urban ecosystem. Streetscape planting is noted as a BMP here, but is covered in detail in Chapter 4.

3.2 Environmental Site Design Goals and Objectives

**HARD SURFACES:
IMPERVIOUS-- ROADS,
ROOFS, LARGE AREAS OF
PAVEMENT AND ASPHALT
PARKING LOTS**



**INCREASED VOLUME,
VELOCITY, AND
CONTAMINATION OF
STORMWATER RUNOFF**

**IMPERVIOUS
DESIGN
URBAN
SURFACES**

**SOFT SURFACES:
PERVIOUS/PERMEABLE
--GREEN ROOFS, RAIN
GARDENS, GRASS-
PAVER PARKING LOTS,
BIO-SWALES, AND MORE**



**INCREASED
GROUNDWATER
RECHARGE AND
WATER QUALITY
VALUES**

**PERVIOUS
DESIGN
URBAN
SURFACES**

In urban areas the percentage of paved, impervious surface area has steadily increased, contributing to record reductions in groundwater resources, poor water quality, and increased stress on municipal sewer systems- especially combined systems. This, in turn, has contributed to increased risk of and damage caused by erosion and flooding. Environmental Site Design of Stormwater Management (SWM) offers effective means for reducing the impact of untreated runoff. ESD achieves the following goals:

- Reduces Stormwater Volumes
- Reduces Stormwater Peak Runoff Discharges
- Improves Water Quality

A series of small-scale ESD practices is referred to as a 'treatment train' and is often connected via a drainage channel or pipe network. In an urban environment, a treatment train is connected to the larger municipal storm/sewer system. The benefit that comes with employing a train of small-scale facilities is the ability to achieve an overall greater level stormwater treatment and pollutant mitigation.

Current methods and types of ESD facilities include bioretention cells, vegetated planter boxes, wet and dry swales. As new technology is developed the ESD standards should be able to adapt to new practices.



BIORETENTION CELL



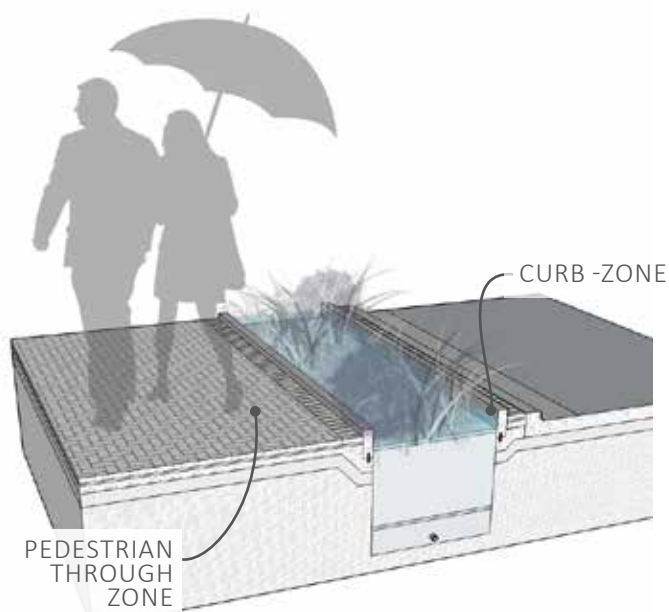
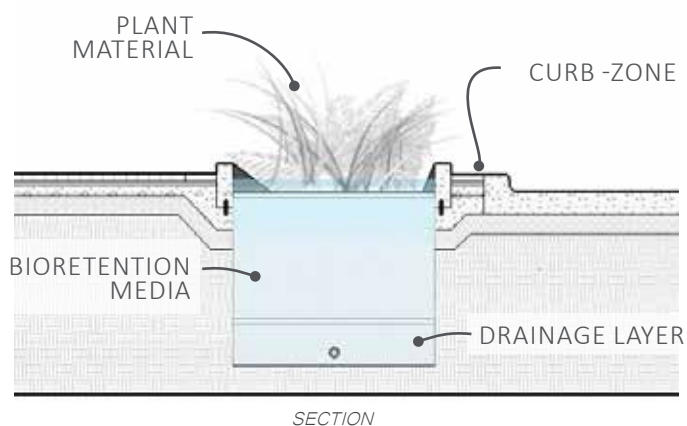
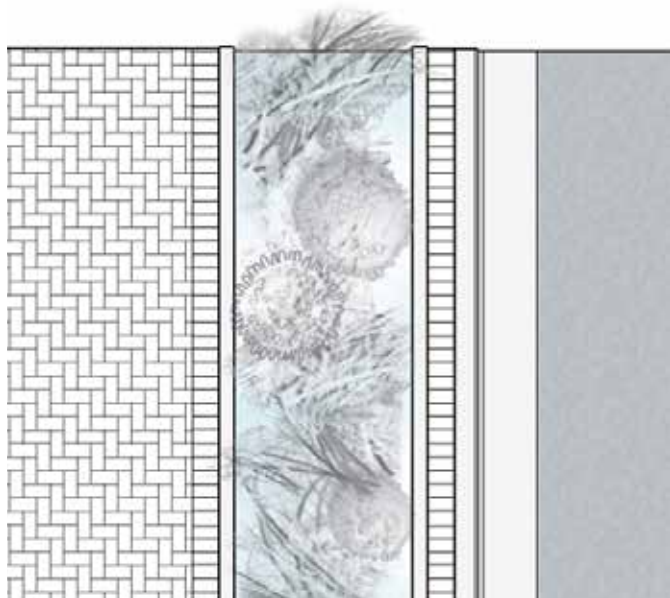
VEGETATED PLANTER BOX



DRY SWALE



WET SWALE



ENVIRONMENTAL SITE DESIGN

3.2.1 Bioretention Cell

Cells are landscaped depressions, functioning to capture and treat stormwater; in the urban environment bioretention cells are contained by curbing. The layers that comprise a bioretention cell include: plant material, mulch (if specified), planting soil / bioretention media, choker layer, and drainage layer (may or may not include drainage piping).

WHERE TO USE:

- Bioretention cells can be included in all street types, however they are particularly well suited for urban zones with high volumes of pedestrian traffic flow.
- Cells are flexible in configuration and thus can be employed in constrained locations.
- Cells shall be located in the planting/furnishing zone, sidewalk extensions, and medians
- Suitable for sites with less than 5% slope.

LIMITATIONS:

- Maintenance is required with all urban stormwater facilities; plant material shall be routinely maintained and all apertures shall be cleared of debris.

CONSIDERATION:

- The use of multiple, smaller bioretention cells is preferable to a single larger bioretention cell so that the total infiltration area is divided into smaller areas
- Bioretention cells should be designed to drain stormwater within 48 hours after a storm event
- Plant material should be both drought-resistant and tolerant of wet soils
- Landscape planting must ensure clear sight lines are maintained for pedestrian and vehicular safety
- An opportunity exists for pedestrian paths to bridge bioretention cells, offering a connection from curbside parking zones to the pedestrian through zone. Pedestrian bridges also foster connections between citizens and the ecosystem services performed by the bioretention facility, which can be elucidated through signage.

3.2.2 Vegetated Planter Box

Planter boxes are treatment facilities designed to aid in stormwater infiltration. Vegetated planter boxes are contained structures, which include a perforated drain connection to the municipal stormwater system. The layers of a planter box include: plant material, mulch (if specified), planting soil / infiltration media, choker layer, and drainage layer with perforated pipe.

WHERE TO USE:

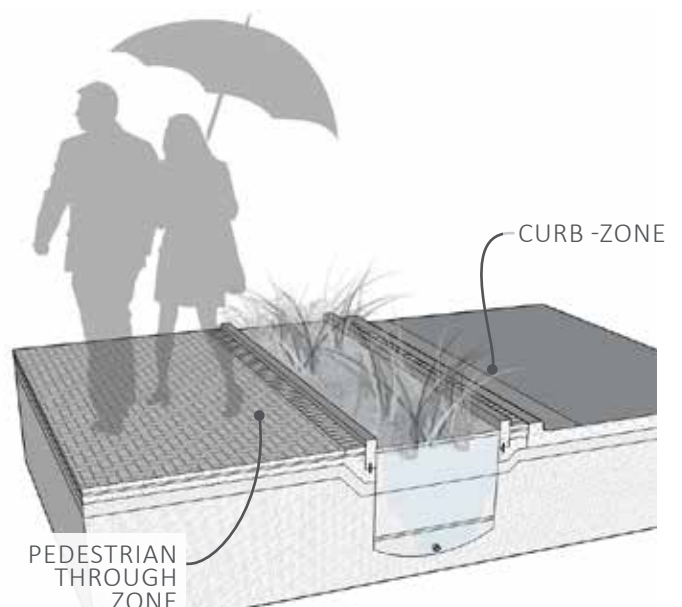
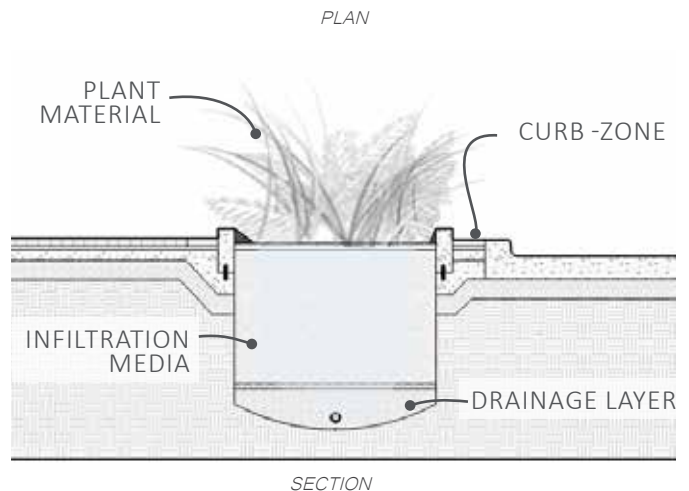
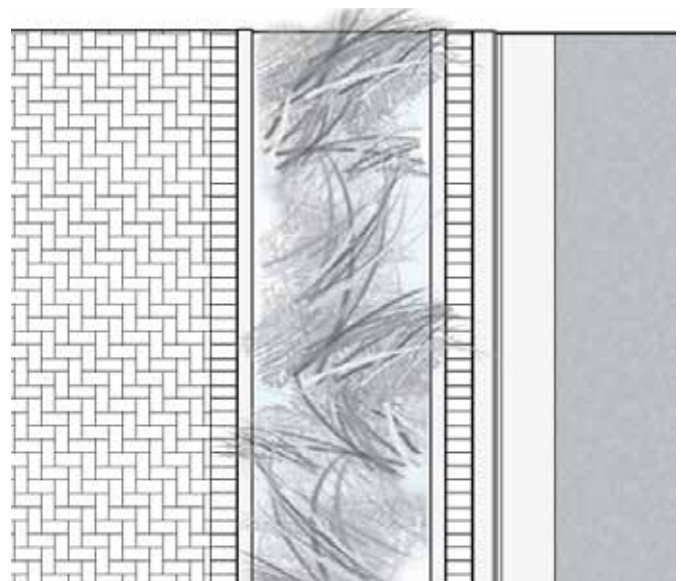
- Vegetated planter boxes can be included in all street types, however they are particularly well suited for urban zones with high volumes of pedestrian traffic flow.
- Boxes are flexible in configuration and thus can be employed in constrained locations.
- Boxes shall be located in the planting/furnishing zone.

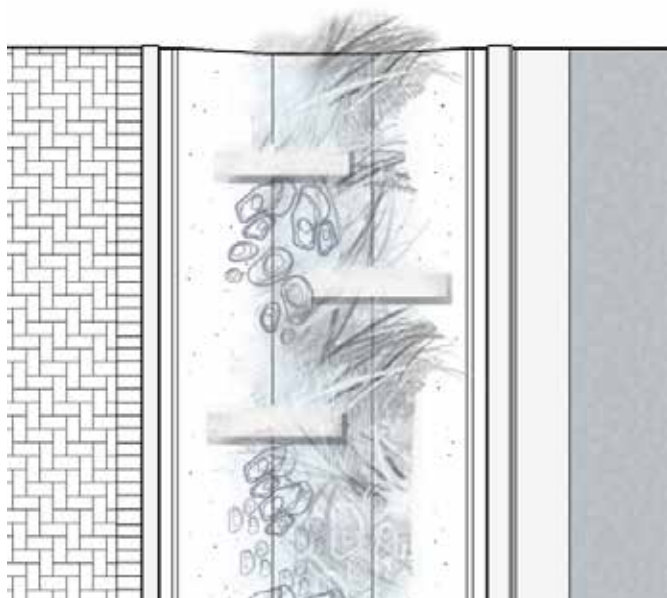
LIMITATIONS:

- Maintenance is required with all urban stormwater facilities; plant material shall be routinely maintained and all apertures shall be cleared of debris.

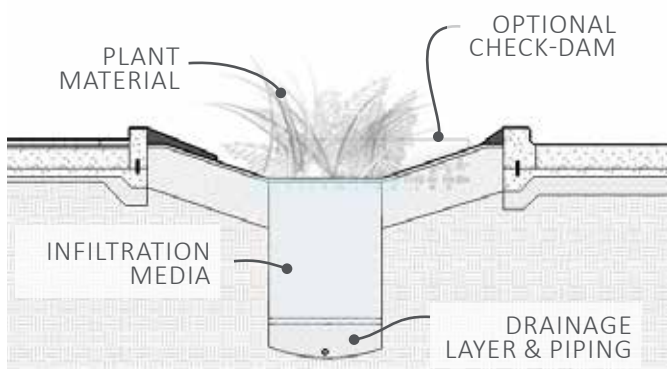
CONSIDERATION:

- An opportunity exists for pedestrian paths to bridge vegetated planter boxes, offering a connection from curbside parking zones to the pedestrian through zone. Pedestrian bridges also foster connections between citizens and the ecosystem services performed by the stormwater facility, which can be elucidated through signage.
- Planter boxes can be artfully configured and include the opportunity to incorporate a variety of textures, materials, and natural sounds.

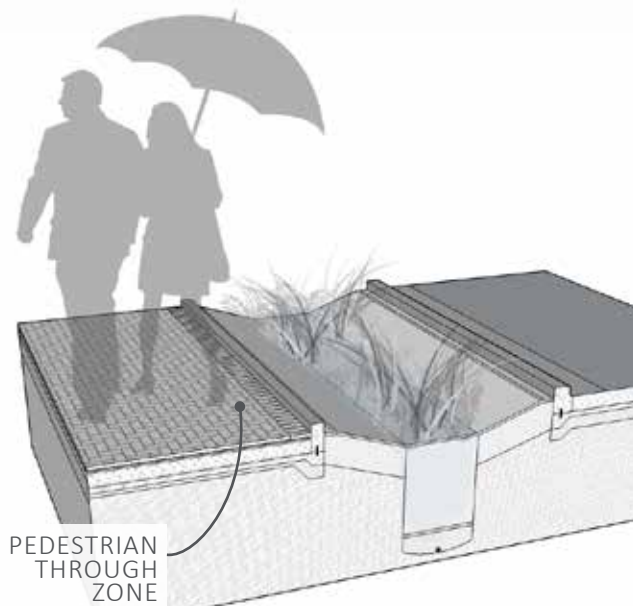




PLAN



SECTION



3.2.3 Dry Swale

Dry swales are vegetated, linear drainage paths, designed to convey stormwater at a low velocity, aid in the infiltration process, and to expeditiously drain runoff. Dry swales often include check dams, which can be constructed by a variety of materials – for example, check dams are often created out of natural stones, poured-in-place concrete, or gabion baskets. The sectional layers of a dry swale include: plant material, mulch (if specified), planting soil / infiltration media, choker layer, and drainage layer with perforated pipe.

WHERE TO USE:

- Swales are appropriate for lengthy, linear applications, such as along the following street types:
 - Urban boulevard
 - Neighborhood connector
 - Neighborhood local
 - Neighborhood residential

LIMITATIONS:

- Swales are not suitable for constrained areas or street types that require covered soil area.
- As with all stormwater facilities, maintenance is required; plant material shall be routinely maintained and all apertures or damming structures shall be cleared of debris.

CONSIDERATION:

- A pedestrian access route will need to be considered and accounted for if curbside parking is present.

3.2.4 Wet Swale

Wet swales are linear drainages paths, designed to slow stormwater runoff through a retention and infiltration process, which includes the ponding of water. Wet swales consist of water-loving vegetation, such as wetland or marshy plant species. Due to this intentional retention, wet swales are not usually applicable for the urban environment. Along steeper slopes, check dams may be incorporated to aid in decelerating runoff velocity. The sectional layers of a wet swale include: plant material, planting soil / infiltration media, choker layer, and drainage layer which may or may not include perforated pipe.

WHERE TO USE:

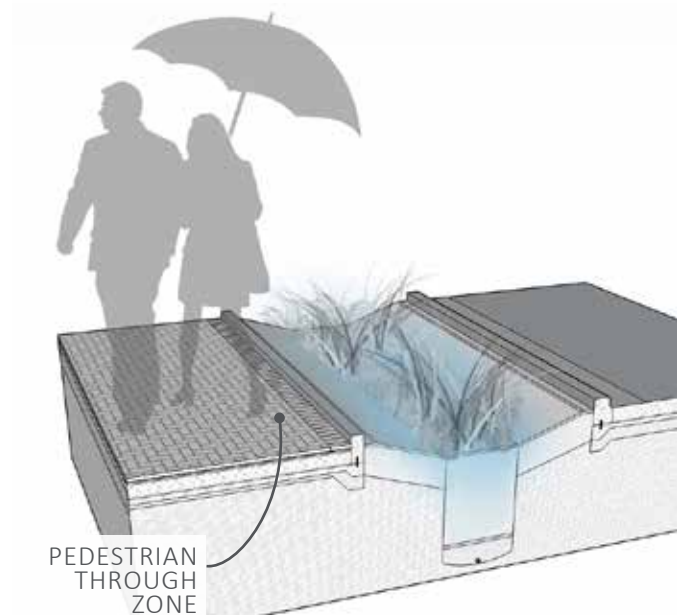
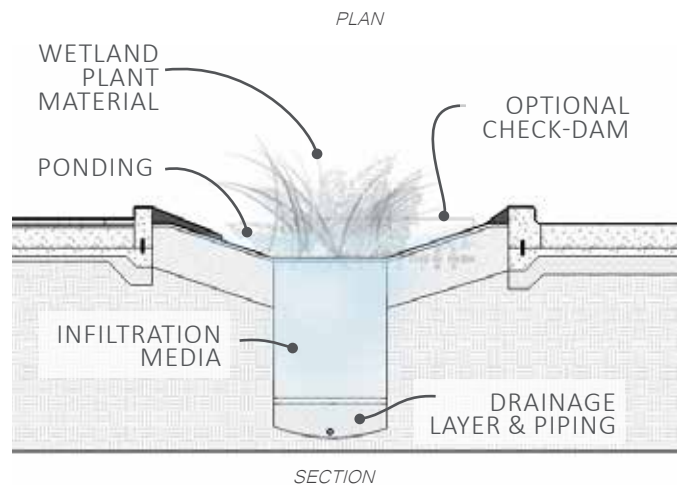
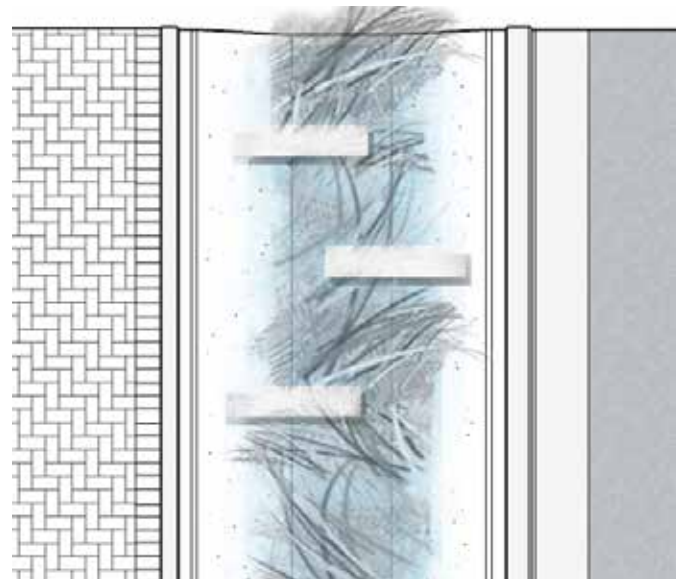
- Wet swales are only appropriate in areas with large swaths of space and consistent ventilation.
- Wet swales could be considered for use in the Battery Lane area, where the groundwater table is high - or incorporated in the stormwater management plan for the NIH campus.

LIMITATIONS:

- Swales are not suitable for constrained areas or street types that require covered soil area.
- As with all stormwater facilities, maintenance is required; plant material shall be routinely maintained and all apertures or damming structures shall be cleared of debris.

CONSIDERATION:

- Proximity to and volume of pedestrians must be considered when employing wet swales.
- All health & safety measures shall be incorporated in wet swale designs, as is typical of any facility with ponding or standing water.



Chapter 4: Planting Design

4.1 Introduction

Urban ecology is said to contribute more to the quality of experience than any other urban component. In this context, street trees and plantings may provide urban placemaking and an oasis among the urban fabric. To a lesser extent, the same may be said of understory plantings--the lower growth greenery that presents a more immediate effect in mediating the surrounding built environment hardscapes.

4.1.1 Street Trees

Thanks to the early planning efforts of the Montgomery Planning Department and the ongoing maintenance provided by Bethesda Urban Partnership, Bethesda has a well-established street tree canopy and a roster of approved tree species that has been vetted and revised over time. Virtually all of the approved street tree species in Bethesda should be classified as 'large' trees and follow suit with respect to soil volume and spacing criteria.

Tree spacing should be a minimum of 30'-0" and maintain as continuous of canopy coverage as possible. When and where possible, trees should be aligned to minimize potential interference with the full range of streetscape components.

Trees adjacent to intersections and curb cuts require careful placement consideration. While street trees adjacent to intersections can lessen the impact and intensity of street activity on pedestrians, they can also impact visibility for motorists and subsequently must adhere to the sight distance standards that dictate minimum tree placement offsets from the intersection. This is also true for driveway curb cuts. These offsets are established by the design speed of the roadway.

FIGURE 4.01: TREE CANOPY CORRIDORS



4.1.2 Soil Volume

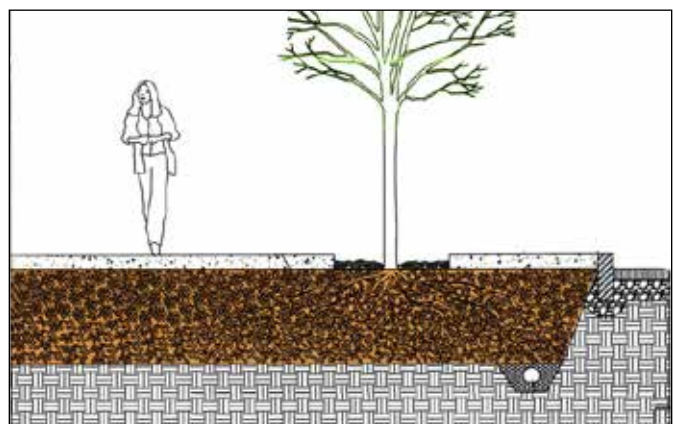
Tree space should be designed to meet and, wherever feasible, exceed minimum soil volume requirements for street trees without encroaching on the pedestrian through zone. There are several methods for providing soil volume, which include providing open soil areas in the form of tree wells or continuous planting strips, providing added soil volume underneath pavement that accommodates root growth while supporting the sidewalk above, or a combination of the two.

Open soil areas, in the form of continuous planting strips or tree wells, are generally encouraged when space allows. This method of providing soil volume maximizes the amount of stormwater that can be infiltrated and provides easy access to oxygen for street tree roots. However, it can be difficult to provide the minimum soil volume using only open soil areas.

When open soil areas will not provide the minimum 600 cubic feet required soil volume for street trees, covered soil in the form of structural soil or structural cells should be used. Covered soil are covered by pavement and have been designed to accommodate the growth of tree roots while also structurally supporting the pavement above. Covered soil should also be considered in areas where high pedestrian traffic is expected, including the Urban Boulevard and Downtown Mixed Use street types.



STRUCTURAL CELLS



STRUCTURAL SOIL

4.1.3 Understory Planting

There have been numerous trends over the past few decades that have led to major changes in the realm of urban planting design. These range from the increased use of native plantings to contend with local climate conditions and long-term maintenance practices to the expanding uses of planting related to green infrastructure. The emergence of enhanced approaches to urban planning such as multi-modal and low impact design are rapidly transforming American cities and landscape planting design has played an important role in this process.

Similar to trees, understory plantings can go a long way in contributing to and defining the aesthetic character of a neighborhood. Bethesda has a mixed history with

understory plantings. For many years, the tree planting standard included granite sets in the bed, limiting the possibility of understory plantings. This has slowly been changing--first with the deletion of the granite sets from the planting standard and later with the success of the Bethesda Row streetscape improvements.

Not unlike trees, there are a number of environmental factors that challenge the survival of low growing urban plantings including but not limited to soil health and volume, run-off, pestilence and disease, feasibility of maintenance and resource allocation, and animals, both domestic and wild. Climate, solar exposure, and the compatibility of planting mixes requires additional consideration and coordination--just to cite a few variables.

The material included in this particular section includes a range of plantings ‘approved’ for use within the right-of-way zones of the Bethesda Downtown Plan. These planting materials have been identified for a variety of characteristics including hardiness, water requirements, urban tolerance, and of course, aesthetic appeal. Size, sun / shade requirements, and suitability for use in SWM have been provided as well.

These plantings have been organized according to:

- Herbaceous Perennials
- Ornamental Grasses
- Ferns

EarthPlanter or approved alternatives shall be used in right-of-way zones.

4.1.4 Container Plantings

The Canterbury ‘Jardin’ planting container is an iconic streetscape element in Bethesda. Most intersections along Wisconsin Avenue prominently feature these containers. They can also be found along most major streets and many side streets throughout the downtown area. The use of planting containers has been steadily on the rise since the inauguration of Bethesda Row. In recent years several emerging centers of activity have made container plantings a signature element in their local placemaking efforts; one particular example would be the Woodmont Triangle Neighborhood.

To date, there have been no particular standards for container planting in Bethesda. To that end, the recommendations of this section have been provided as guidelines rather than strict standards.

In the past containers were most frequently utilized for seasonal display of annual plants. In recent years, however, more and more varieties of shrubs, grasses, and perennials have been the trend.

4.1.5 Bioretention Plantings

Plant lists identifying the most recommended trees, shrubs, perennials, ornamental grasses, ferns and annuals specific to the streetscape conditions are continued on the following pages.

FIGURE 4.02: STREET TREES PER STREET



TABLE 4.01: RECOMMENDED TREES

TREES - CANOPY

			Height	Spread	Type Tree	Tolerance	Native	SWM
●	Acer rubrum	Red Maple	40-60′	40-60′	Large		x	
●	Acer saccharum	Sugar Maple	40-80′	30-60′	Large		x	
●	Gleditsia tricanthos var. inermis	Honey Locust	60-80′	60-80′	Large	D, AP	x	x
●	Quercus Bicolor	Swamp White Oak	40-60′	50-60′	Large	D, S	x	
●	Quercus acutissima	Sawtooth Oak	40-60′	40-60′	Large	D	x	
●	Quercus palustris	Pin Oak	65-70′	25-40′	Large	D, AP	x	
●	Quercus phellos	Willow Oak	40-60′	30-40′	Large	AP, S	x	x
●	Quercus rubra	Red Oak	60-75′	60-75′	Large	D, AP, S	x	
●	Tilia cordata	Little Leaf Linden	60-80′	30-50′	Large	AP, S		
●	Ulmus parvifolia	Bosque Elm	40-50′	25-40′	Large	D, AP		x
●	Ulmus Americana	American Elm	60-90′	45-70′	Large	D, S, AP	x	
●	Cercis canadensis	Red Bud	20-30′	25-35′	Small	D, AP	x	

Tolerance

D- Drought

S- Salt

AP- Air Pollution

Wildlife Cover	●●●●●●●	Seasonal Food For Birds	●●●●●●●●
Food For Mammals	●●●●●●●	Food for Breeding Birds	●●●●●●●●
Food For Caterpillars	●●●●●●●●	Bird Nesting Site	●●●●●●●●
Carbon Sequestration	●●●●●●●●	Pollen or Nectar	●●●●●●●●●●

TABLE 4.02: TREES - UNDERSTORY

TREES - UNDERSTORY							
Scientific Name	Common Name	Height	Spread	Type Tree	Tolerance	Native	SWM
<i>Amelanchier canadensis</i>	Shadblow Serviceberry	6-20'	10-20'	Small	D, S	x	x
<i>Amelanchier x grandiflora</i>	Apple Serviceberry	25-30'	15-20'	Small	D, S	x	x
<i>Cercis canadensis</i>	Eastern Redbud	20-30'	25-35'	Small		x	
<i>Chionanthus virginicus</i>	Fringe Tree	12-20'	12-20'	Small	AP	x	
<i>Cornus florida</i>	Flowering Dogwood	15-30'	15-30'	Small		x	
<i>Cornus kousa</i>	Kousa Dogwood	15-30'	15-30'	Small			
<i>Crataegus viridis</i> 'Winter King'	Green Hawthorne 'Winter King'	25-35'	25-35'	Medium	D	x	x
<i>Magnolia stellata</i>	Star Magnolia	15'-20'	10'-15'	Small			
<i>Magnolia virginiana</i>	Sweet Bay Magnolia	10-35'	10-35'	Small	AP	x	
<i>Magnolia x soulangeana</i>	Saucer Magnolia	20-30'	20-30'	Medium			
<i>Lagerstroemia indica</i>	Crapemyrtle	15-25'	15-25'	Small	D, S, AP		x
<i>Syringa reticulata</i>	Japanese Tree Lilac	20-30'	15-20'	Small			x

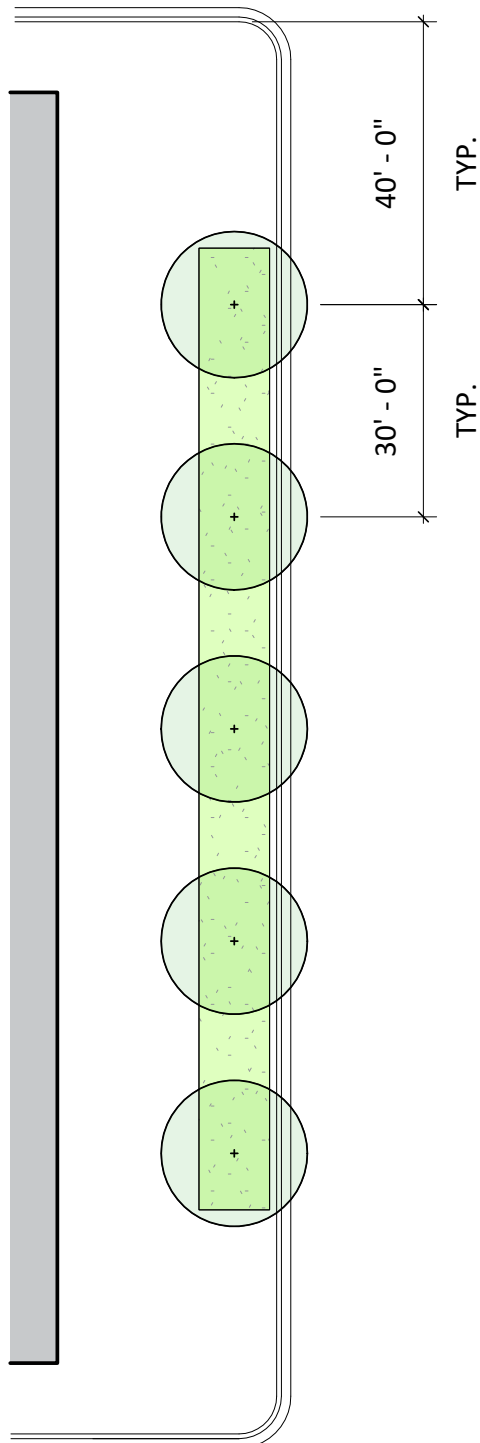
TABLE 4.03: GROUNDCOVERS

GROUNDCOVERS							
Scientific Name	Common Name	Type	<2 -ft (ht.)	>2-ft. (ht.)	Sun/Shade	Native	Tolerance
<i>Achillea millefolium</i>	Yarrow	Perennial	x		Sun	x	
<i>Asarum canadense</i>	Wild Ginger	Perennial	x		Partial/shade	x	
<i>Astilbe chinensis</i>	Chinese astilbe	Perennial		x	Partial/shade		
<i>Carex morrowii</i>	Japanese Grass Sedge	Perennial	x		Partial/shade		
<i>Chrysogonum virginianum</i>	Golden Knee / Goldenstar	Perennial	x		Partial/shade	x	
<i>Gaultheria procumbens</i>	Wintergreen	Perennial	x		Partial/shade	x	
<i>Heuchera americana</i>	Alumroot	Perennial	x		Sun/partial	x	D
<i>Hypericum calycinum</i>	St. John's wort	Shrub	x		Sun/partial		D
<i>Juniper horizontalis</i> 'Wiltonii'	Creeping Juniper	Evergreen	x		Sun	x	D, AP
<i>Liriope muscari</i>	Lily Turf	Perennial	x		Sun/partial		D, AP
<i>Pachysandra procumbens</i>	Alleghany Pachysandra	Perennial			Partial/shade	x	D
Nepeta racemosa 'Walkers Low'	Catmint	Perennial		x	Sun/partial		D, AP
<i>Phlox subulata</i>	Creeping Phlox	Perennial	x		Sun	x	D, AP
<i>Polystichum acrostichoides</i>	Christmas Fern	Perennial	x		Partial/shade	x	
<i>Stachys byzantina</i>	Lambs ear	Perennial	x		Sun		D, AP
<i>Tiarella cordifolia</i>	Foam Flower	Perennial	x		Partial/shade	x	

TABLE 4.04: BIORETENTION

BIORETENTION							
Scientific Name	Common Name	Type	<2 -ft (ht.)	>2-ft. (ht.)	Sun/Shade	Native	Tolerance
<i>Achillea millefolium</i>	Yarrow	Perennial	x		Sun	x	
<i>Adiantum pedatum</i>	Northern Maidenhair	Perennial		x	Sun/partial	x	
<i>Alchemilla mollis</i>	Lady's Mantle	Perennial	x		Sun / partial		
<i>Allium cernuum</i>	Nodding Onion	Perennial	x		Sun	x	
<i>Amsonia hubrichtii</i>	Blue Star	Perennial		x	Sun / partial		
<i>Amsonia tabernaemontana</i>	Eastern Blue Star	Perennial		x	Sun / partial		D
<i>Aronia melanocarpa</i>	Black Chokecherry	Shrub		x	Sun/partial	x	
<i>Asclepias incarnata</i>	Swamp Milkweed	Perennial	x		Sun/partial	x	
<i>Asclepias tuberosa</i>	Butterfly Weed	Perennial		x	Sun/partial	x	D
<i>Carex eburnea</i>	Bristle-leaf Sedge	Grass	x		Partial/Shade	x	
<i>Carex morrowii</i>	Japanese sedge	Grass	x		Partial/Shade		D
<i>Carex pensylvanica</i>	Pennsylvania Sedge	Grass	x		Partial/Shade	x	
<i>Carex stricta</i>	Tussock Sedge	Grass		x	Sun/partial	x	
<i>Chasmanthium latifolium</i>	Northern Sea Oats	Grass		x	Sun/partial	x	
<i>Clethra alnifolia</i>	Sweet Pepperbush	Shrub		x	Sun/partial	x	
<i>Cornus sericea</i>	Red Twig Dogwood	Shrub		x	Sun/partial	x	D, AP
<i>Dianthus gratianopolitanus</i> 'Cheddar Pink'	'Cheddar Pink' Dianthus	Perennial	x		Sun	x	
<i>Diplazium pycnocarpon</i>	Glade Fern	Perennial		x	Sun/partial	x	
<i>Echinacea purpurea</i>	Purple Coneflower	Perennial		x	Sun/partial	x	D
<i>Hackonechloa macra</i>	Japanese Forest Grass	Grass		x	Partial		AP
<i>Hypericum calycinum</i>	St. Johnswort	Shrub			Sun/partial		D
<i>Ilex glabra</i>	Inkberry Holly	Shrub		x	Sun/partial	x	AP
<i>Iris 'Caesars Brother'</i>	Siberian Iris	Perennial		x	Sun/partial		D
<i>Juncus inflexus</i>	European Meadow Rush	Grass		x	Sun	x	
<i>Juncus patens</i>	Grey Rush	Grass	x		Sun/partial		D
<i>Juniperus conferta</i>	Shore Juniper	Shrub	x		Sun		D, AP
<i>Juniperus horizontalis</i>	Creeping Juniper	Shrub	x		Sun	x	D, AP
<i>Liriope muscari</i>	Lily Turf	Perennial	x		Sun/partial		
<i>Lobelia cardinalis</i>	Cardinal Flower	Perennial		x	Sun/partial	x	
<i>Muhlenbergia capillaris</i>	Pink Muhlygrass	Grass		x	Sun/partial		D, AP
<i>Myrica pensylvanica</i>	Bayberry	Shrub		x	Sun/partial	x	D
<i>Nandina domestica</i>	Heavenly Bamboo 'Compacta'	Shrub		x	Sun/partial		D
<i>Panicum virgatum</i>	Switchgrass	Grass		x	Sun/partial	x	D, AP
<i>Pennisetum alopecuroides</i>	Fountain Grass	Grass		x	Sun/partial		D, AP
<i>Polystichum arostichoides</i>	Christmas Fern	Perennial			Sun/partial	x	D
<i>Sorghastrum nutans</i>	Indian Grass	Grass		x	Sun	x	D, AP
<i>Solidago sphacelata</i>	Goldenrod	Perennial	x		Sun	x	D
<i>Sporobolus heterolepis</i>	Prairie Dropseed	Grass		x	Sun	x	D, AP
<i>Viburnum dentatum</i>	Arrowwood Viburnum	Shrub		x	Sun/partial	x	D, AP

4.2 Tree Space Typologies



4.2.1 Continuous Planter

A continuous planter provides a sense of safety and comfort to pedestrians and maximizes the amount of open soil available to street trees. Continuous planters should be employed wherever possible, but especially along streets with lower volumes of pedestrian activity due to the relationship of a smaller pedestrian through zone that is typically associated with the open soil area of a continuous planter.

WHERE TO USE:

- Urban Boulevard
- Neighborhood Connector
- Neighborhood Local
- Neighborhood Residential

LIMITATIONS:

Continuous planters create a buffer between the roadbed and the pedestrian through zone or sidewalk area. While this can be a barrier that is advantageous for streets with high vehicular traffic, in areas with curbside parking the pedestrian route needs to be accounted for.

CONSIDERATION:

- Allocate curb-zone space to accommodate a pedestrian step-off area where curbside parking is present.
- Provide intermittent paved connections from the curb-zone to the pedestrian through zone (sidewalk) where curbside parking is present – typically spaced at 60' o.c.
- Avoid mulched tree beds; employ a variety of ground cover plantings. A variety of plant material is aesthetically pleasing and environmentally beneficial. Refer to Table 4.03.

4.2.2 Tree Well

Tree wells are individual planting areas that have a 5' - 0" minimum width and range in length from 8' - 0" to 12' - 0". While tree wells allow for streetscape activities and furnishings between street trees, they typically do not provide the minimum soil volume required and should not be used unless additional soil volume can be provided in the form of structural cells or amended soil panels.

WHERE TO USE:

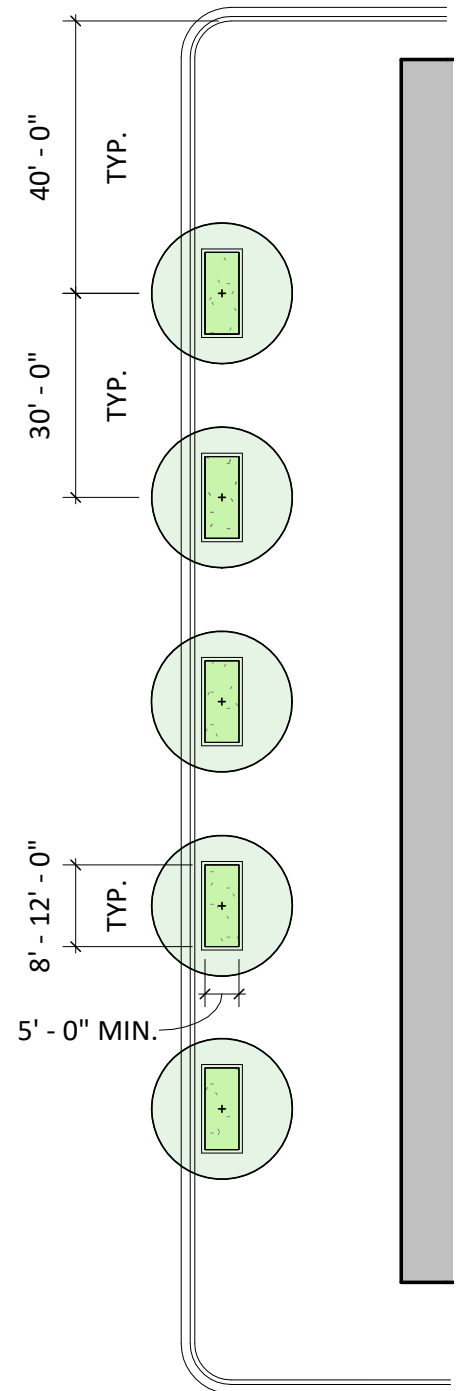
- Downtown Mixed Use & Neighborhood Main Street
- Shared Streets

LIMITATIONS:

- Achieving adequate soil volume for proper tree health is generally harder to accommodate with tree wells and will require a covered soil volume approach.

CONSIDERATION:

- Providing street tree pit guards clearly delineates the planting zone and protects the tree space/ planting bed from pedestrians and other various activities associated with urban life.



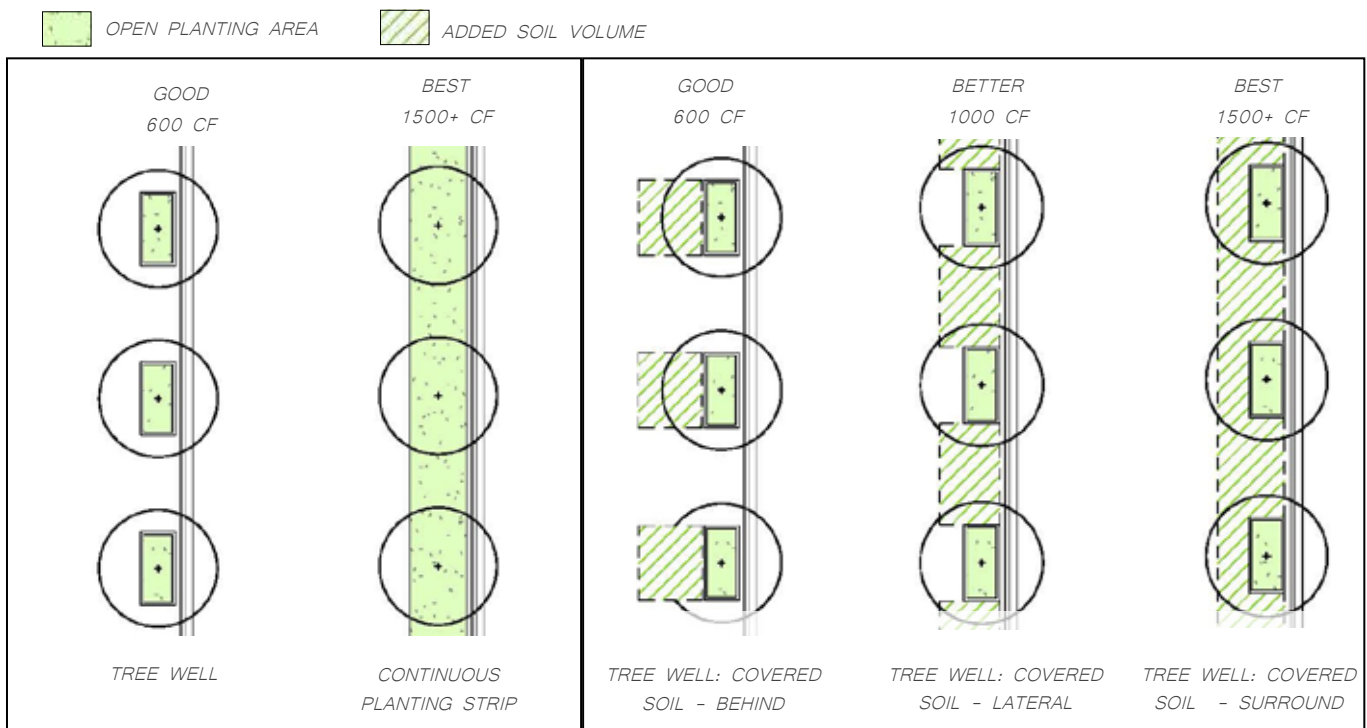
4.3 Covered Soil

4.3.1 Tree Space with Covered Soil

In order for a tree to grow and stay healthy, adequate rooting space is essential. In ideal conditions, with uncompacted soil, the roots of a mature tree can spread to more than twice the width of a tree's canopy. Tree roots gain nutrients from the soil, but roots also need the air and water that occupy the voids between soil particles. In uncompacted soil these voids are abundant.

In dense urban areas, where soils are often compacted and covered by pavement, urban trees rarely reach their full growth potential and lead shortened lives. Covered soil areas allow street trees to utilize additional uncompacted soil volume that would otherwise be unavailable while also supporting the sidewalk above, allowing for a healthier tree canopy and a more flexible sidewalk paving surface above.

SEE [SOIL VOLUME RECOMMENDATIONS FROM CASEY TREES](#)



4.3.2 Methods for Covered Soil

Methods:

There are two methods of providing covered soil area specified in this document:

- 1. Structural soils
- 2. Structural cells

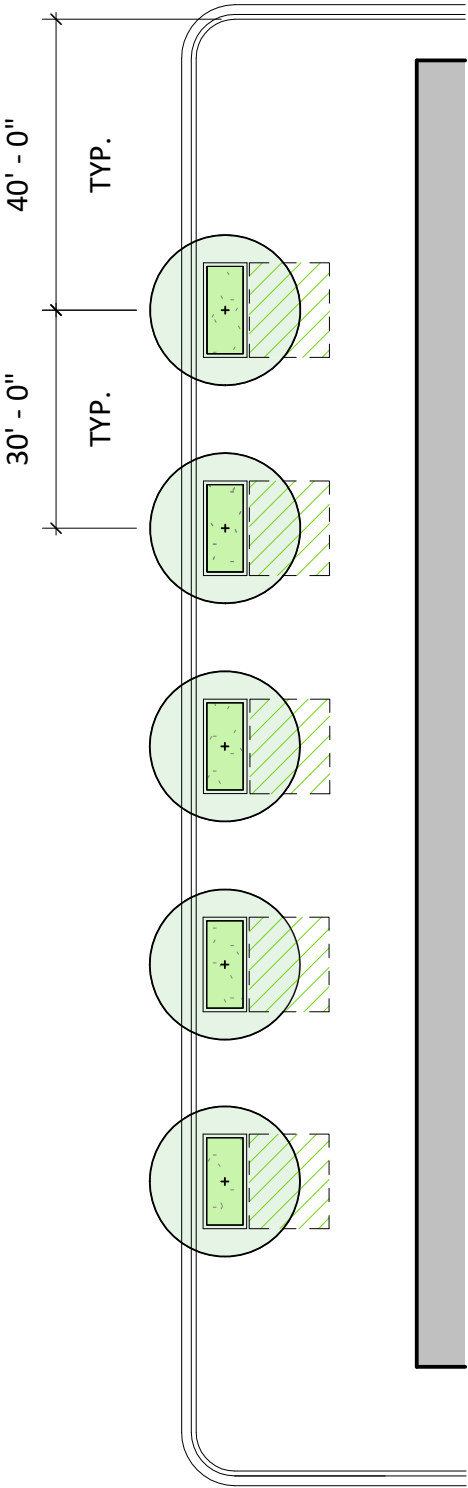
WHERE TO USE:

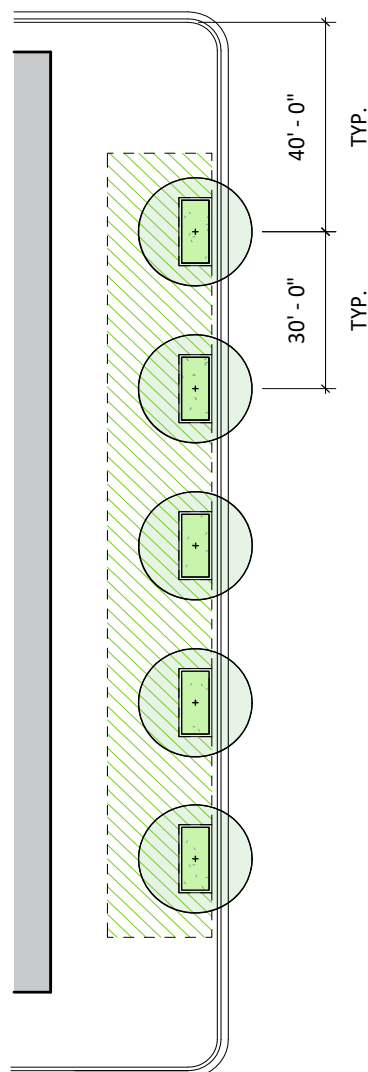
- Streets with high amounts of pedestrian activity and /or streets with constrained sidewalk widths. Street types include but are not limited to:
 - Urban Boulevard
 - Downtown Mixed Use & Neighborhood Main Street
 - Shared Street

RECOMMENDED VOLUMES:

- Minimum soil volume per tree = 600 cubic feet
- Greater amounts of soil volume per tree are encouraged; see table below for recommended soil volumes quantities per mature canopy size
- General Rule:
1 to 2 cu. ft. per each square foot of canopy spread

Recommendation	Soil Volume (cu. ft.)
Good	600
Better	1,000
Best	1,500+





4.3.3 Amended Soil Panels

A growing media composed of gap-graded gravel + organic matter that meets pavement design requirements, while also promoting healthy tree root growth. Amended soil panels act as a base course under pavements- made of crushed stone, soil or organic matter, clay loam or sand, and a hydrogel stabilizing agent- which supports pedestrian / vehicular loads while also creating sufficient porosity for healthy tree root growth.

WHERE TO USE:

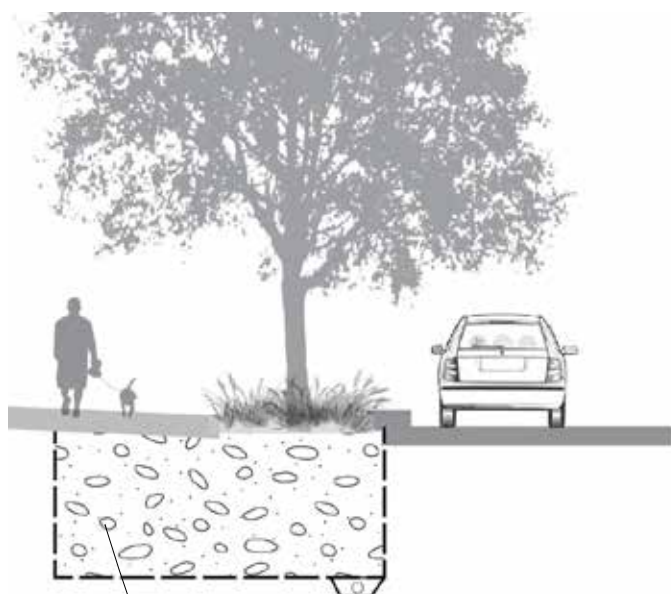
- Amended soil panels should be employed in areas where additional soil volume is needed to meet soil volume requirements.
- Amended soil panels are to be located beneath pavement, comprising the covered soil area.
- Street types include, but are not limited to:
 - Urban Boulevard
 - Downtown Mixed Use
 - Neighborhood Main Street
 - Shared Street

LIMITATIONS:

- When compared to uncompacted, open planting soil, larger volumes of amended soil panels are required to meet the same tree root health and stormwater metrics.
- Amended soil panels are not recommended for use in areas where soils are not required to be compacted.

CONSIDERATION:

- Amended soil panels are available in a variety of compositions- an understanding of the structural soil blend is required in order to promote proper nutrient balance and healthy plant habitat.



Amended Soil Panels (Structural Soils)

4.3.4 Structural Cells

A manufactured pavement support system, typically made of plastic or recycled materials, configured in a stacked, pillar-like arrangement. Soil between the pillars remains uncompacted in order to promote tree root growth and soil health. Structural cells are often selected in lieu of structural soils due to the greater volume of uncompacted soil space which is created by the cell system.

WHERE TO USE:

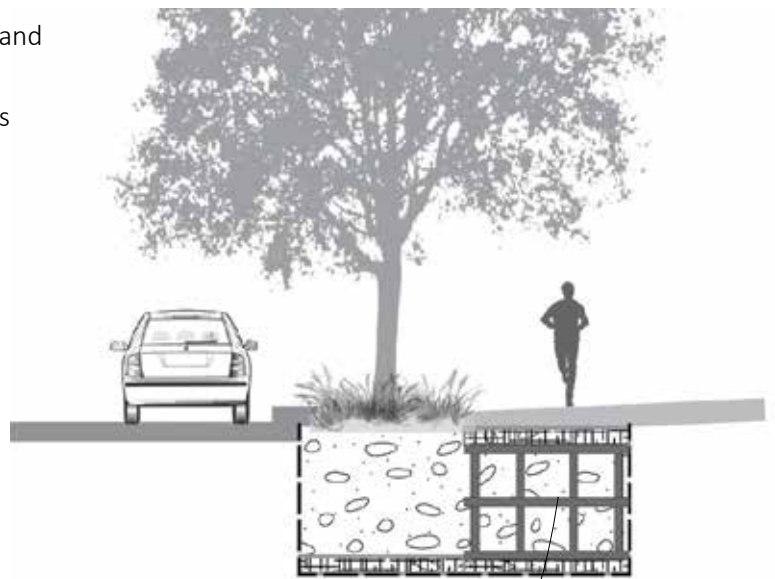
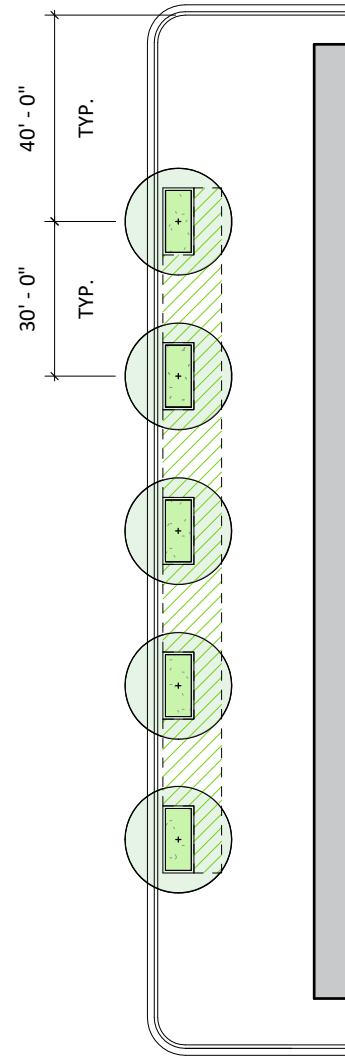
- Structural Cells should be employed in areas where additional soil volume is needed to meet soil volume requirements.
- Structural Cells are to be located beneath pavement, comprising the covered soil area.
- Street types include, but are not limited to:
 - Urban Boulevard
 - Downtown Mixed Use & Neighborhood Main Street
 - Shared Street

LIMITATIONS:

- Structural cells are considered to be cost prohibitive for some projects.

CONSIDERATION:

- Due to structural network of these cells; the location of any underground (sub-surface) utilities requires coordination for placement and grouping.
- It is advisable to protect underground utilities from root penetration (in the form of root barrier).

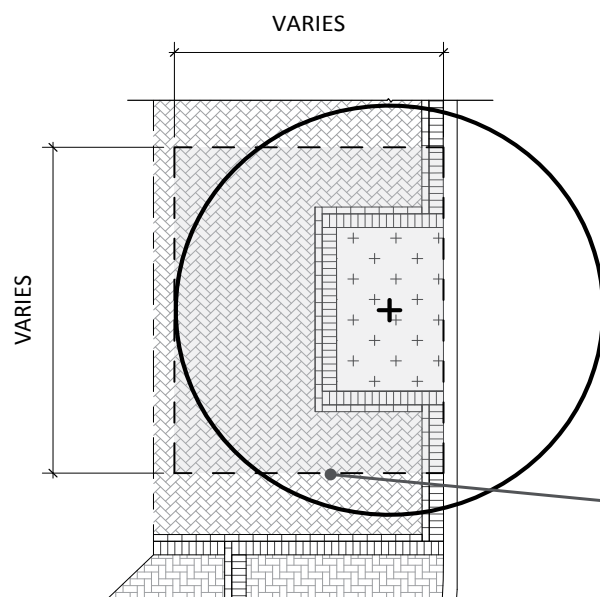


Structural Cells

4.4 Tree Wells and Planting Strips

Typical Tree Planting Details

REFER TO **CASEY TREES** FOR TREE PLANTING STANDARDS AND TYPES OF STRUCTURAL SOILS

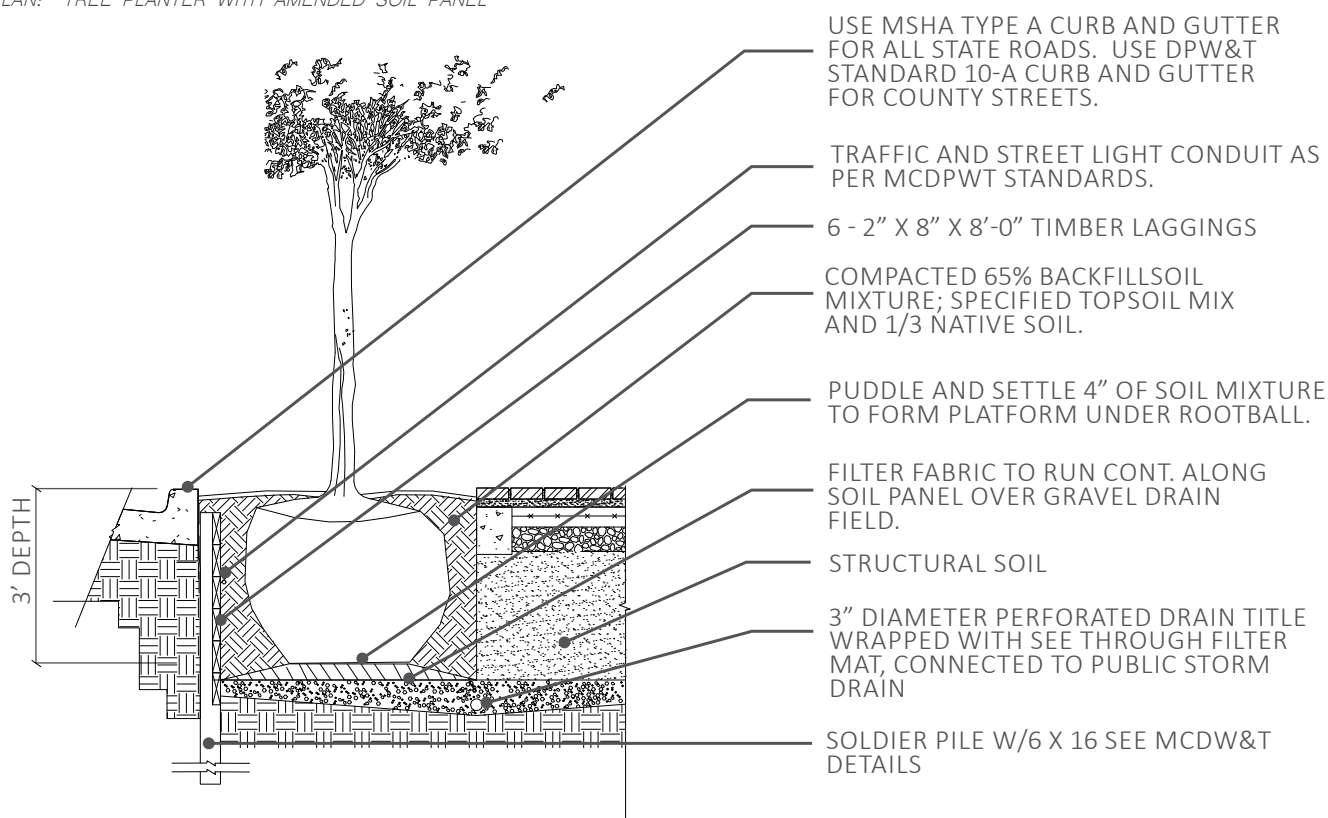


PLAN: TREE PLANTER WITH AMENDED SOIL PANEL

4.4.1 Tree Well With Amended Soil Panels

Amended soil panels are engineered media to provide the bearing capacity necessary to support sidewalks while also providing the volume and porosity required for root growth and water infiltration. Structural soils typically consist of about 70-80% angular gravel, 20-30% clay loam soil, and about 3% hydrogel to bind the elements together. Amended soil panels also have about 20-25% of void space to allow for root growth and stormwater infiltration.

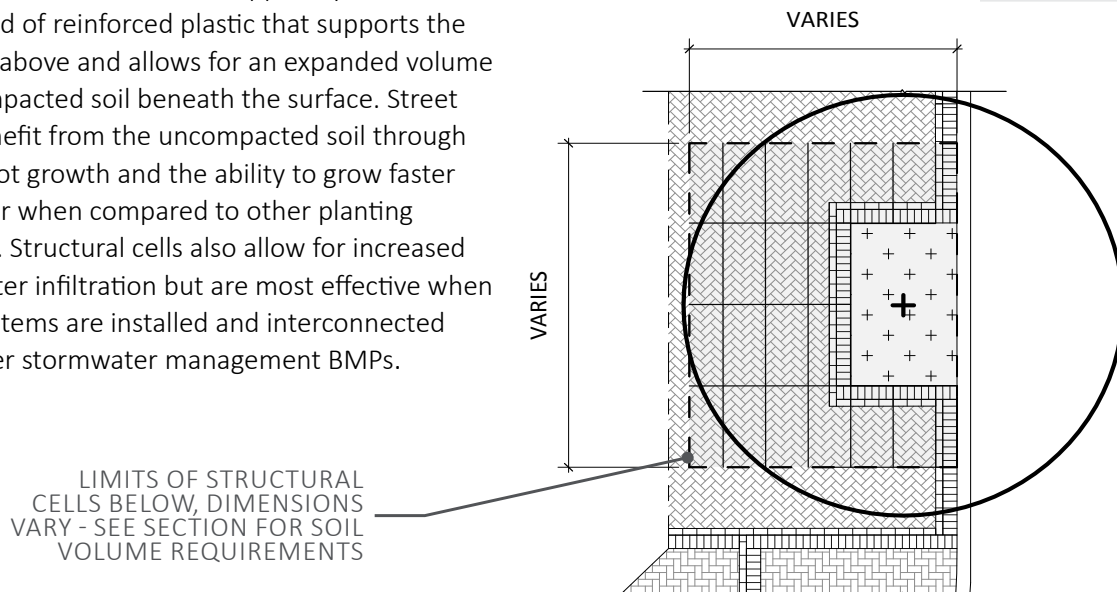
LIMITS OF STRUCTURAL SOIL BELOW, DIMENSIONS VARY. SEE CHAPTER 3 FOR SOIL VOLUME REQUIREMENTS.



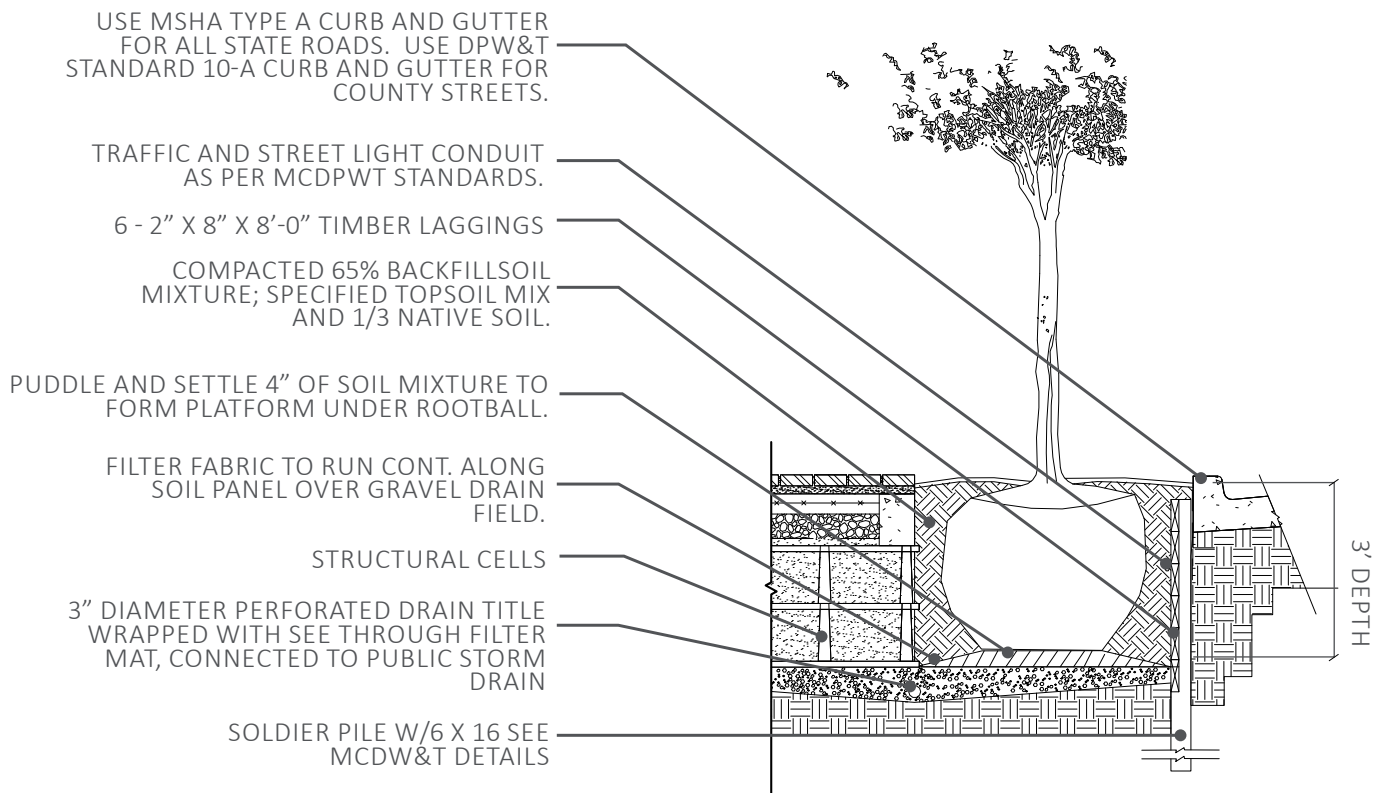
4.4.2 Tree Well With Structural Cells

Structural cells are modular support systems comprised of reinforced plastic that supports the sidewalk above and allows for an expanded volume of uncompacted soil beneath the surface. Street trees benefit from the uncompacted soil through better root growth and the ability to grow faster and larger when compared to other planting methods. Structural cells also allow for increased stormwater infiltration but are most effective when larger systems are installed and interconnected with other stormwater management BMPs.

STRUCTURAL CELL DIAGRAM
[GREEN BLUE URBAN, STRATA CELL]



PLAN: TREE PLANTER WITH STRUCTURAL CELLS

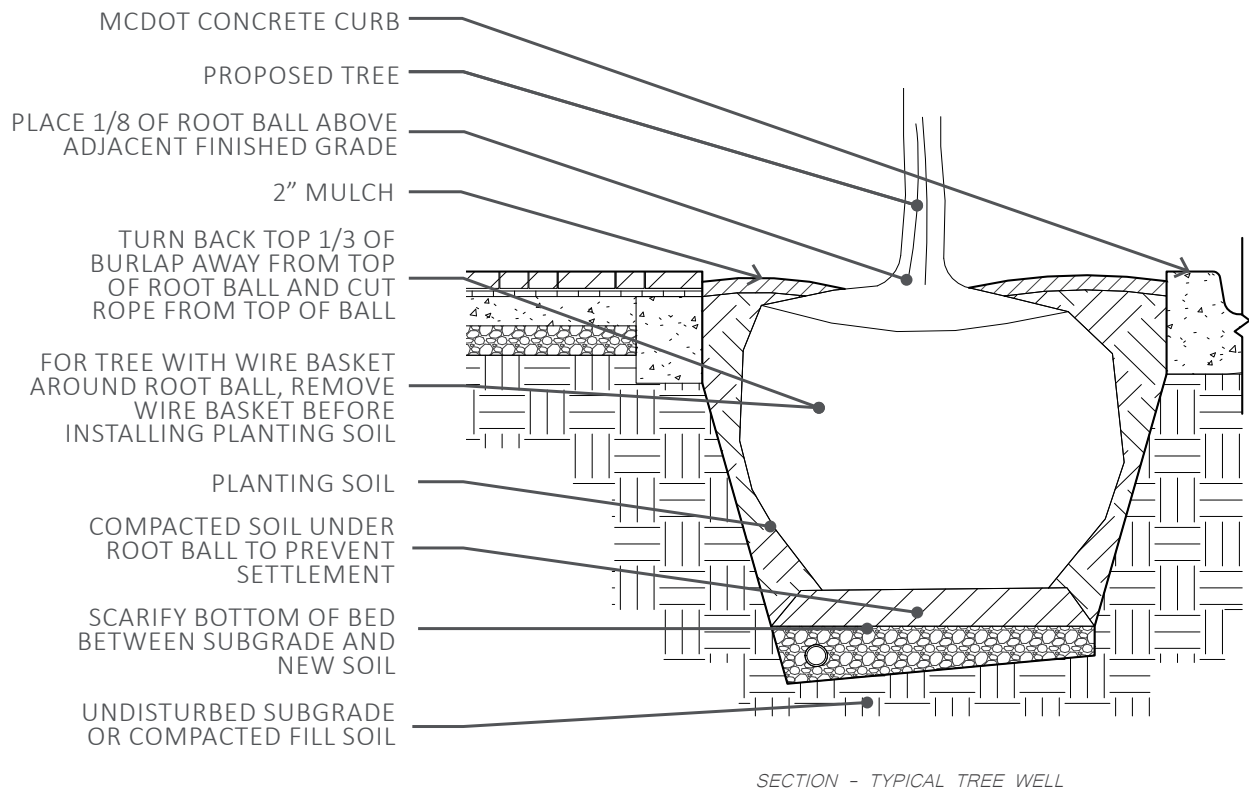


4.4.3 Traditional Tree Planting

The typical street tree planting detail consists of a 12 foot long tree well that accommodates a single street tree. The width of the tree well may vary depending on site-specific conditions, but the minimum width is 5 feet.

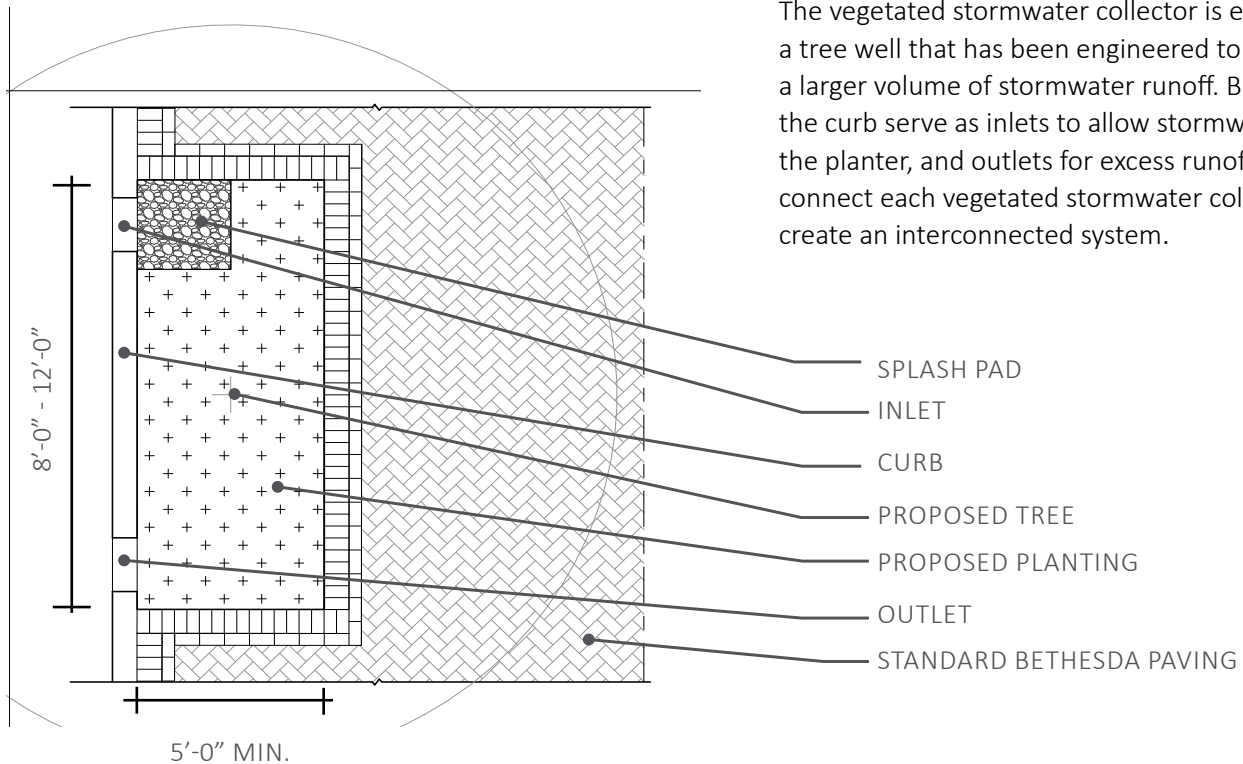
Soil Volume

This detail as shown will likely not meet Bethesda's soil volume requirement of a minimum 600 cubic feet per tree. Therefore, this planting method should not be used unless existing constraints (such as the presence of utility vaults and other large utilities) do not permit any of the tree planting methods that allow for expanded soil volumes. Such constraints may require approval from M-NCPPC to allow this detail to move forward in the approvals process.

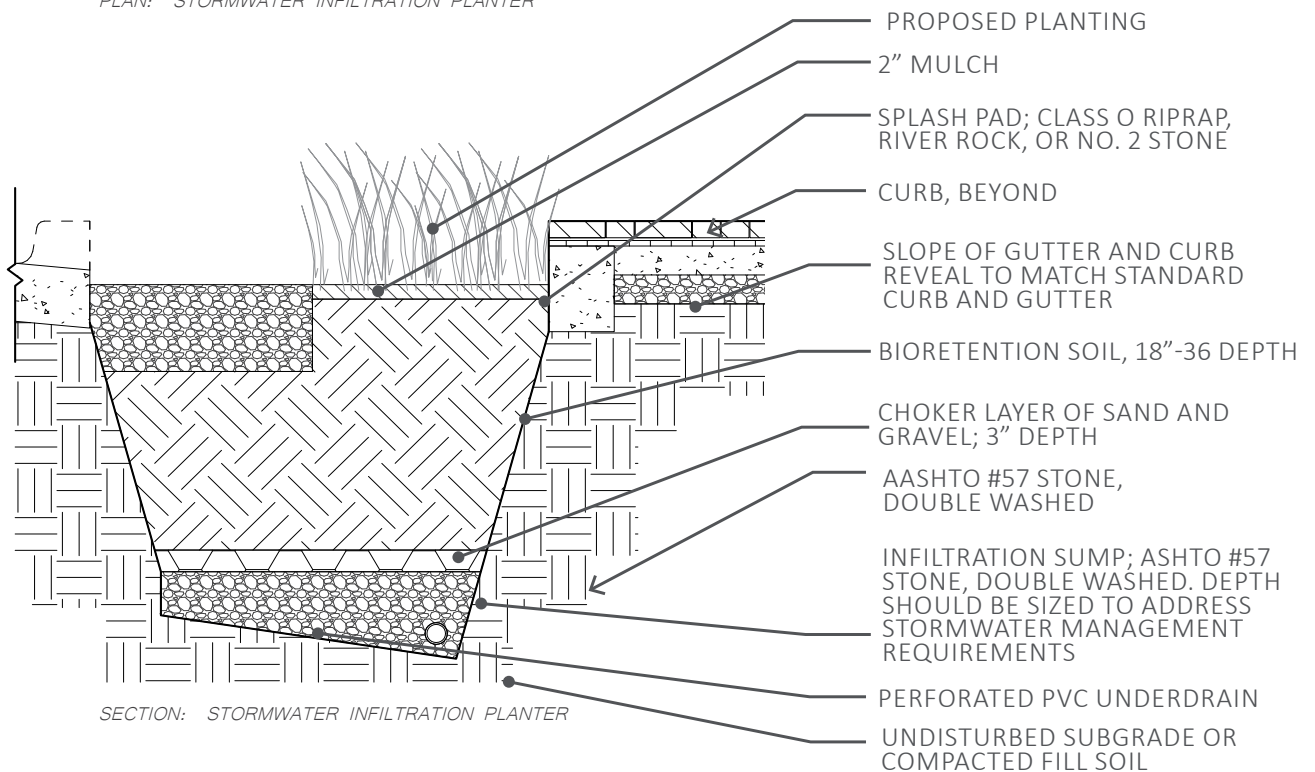


4.4.4 Planting Strip: Vegetated Stormwater Collector

The vegetated stormwater collector is essentially a tree well that has been engineered to absorb a larger volume of stormwater runoff. Breaks in the curb serve as inlets to allow stormwater into the planter, and outlets for excess runoff. Drains connect each vegetated stormwater collector to create an interconnected system.



PLAN: STORMWATER INFILTRATION PLANTER



SECTION: STORMWATER INFILTRATION PLANTER

Chapter 5: Detail Standards

5.1 Sidewalk Paving

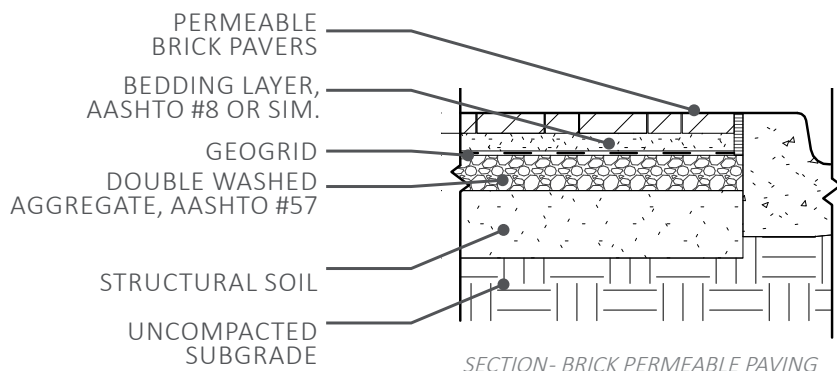
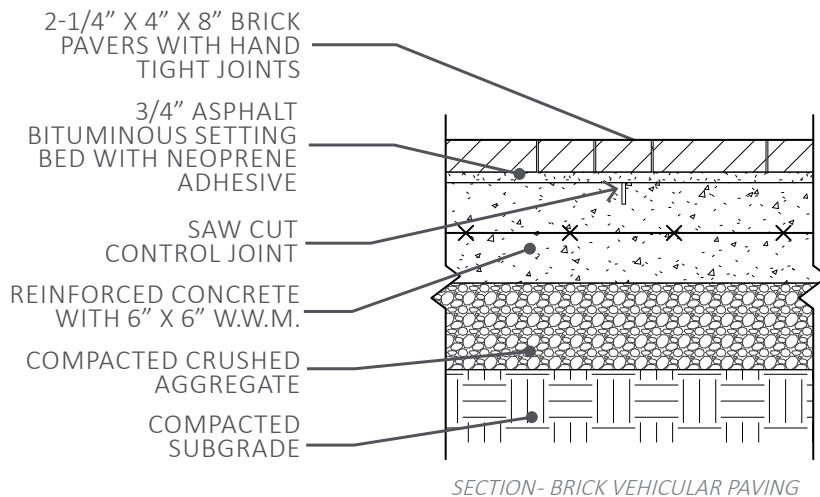
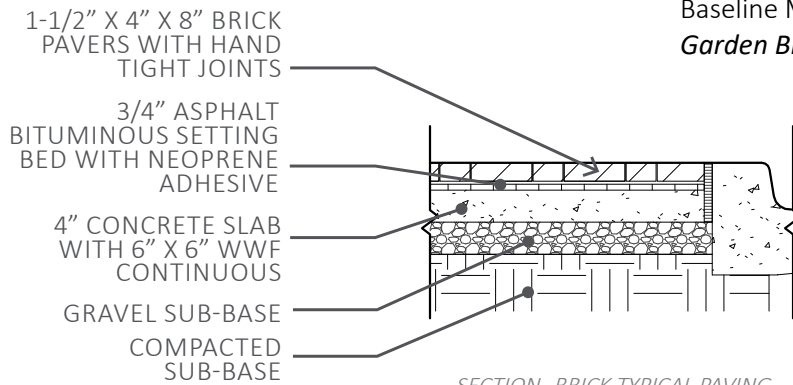
REFER TO [MCDOT DESIGN STANDARDS](#)
FOR ALL CURB, ROADWAY, AND SIDEWALK
CONSTRUCTION DETAILS

5.1.1 Brick Sidewalk Details

Applications

The typical Bethesda brick sidewalk applies to all street types.

Baseline Material: Watson town Brick Company
Garden Blend Brick Pavers



Typical Brick Paving - Plans

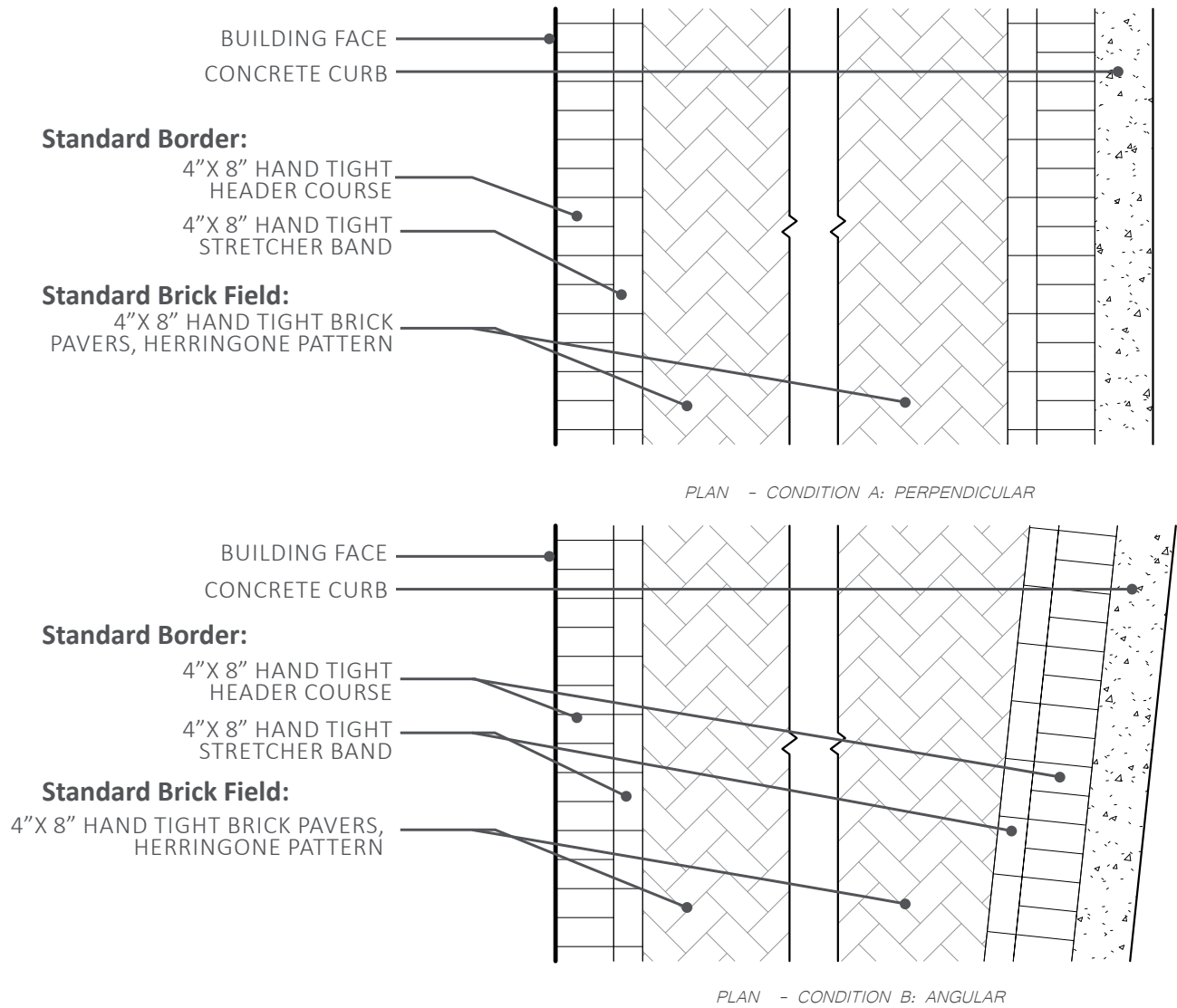
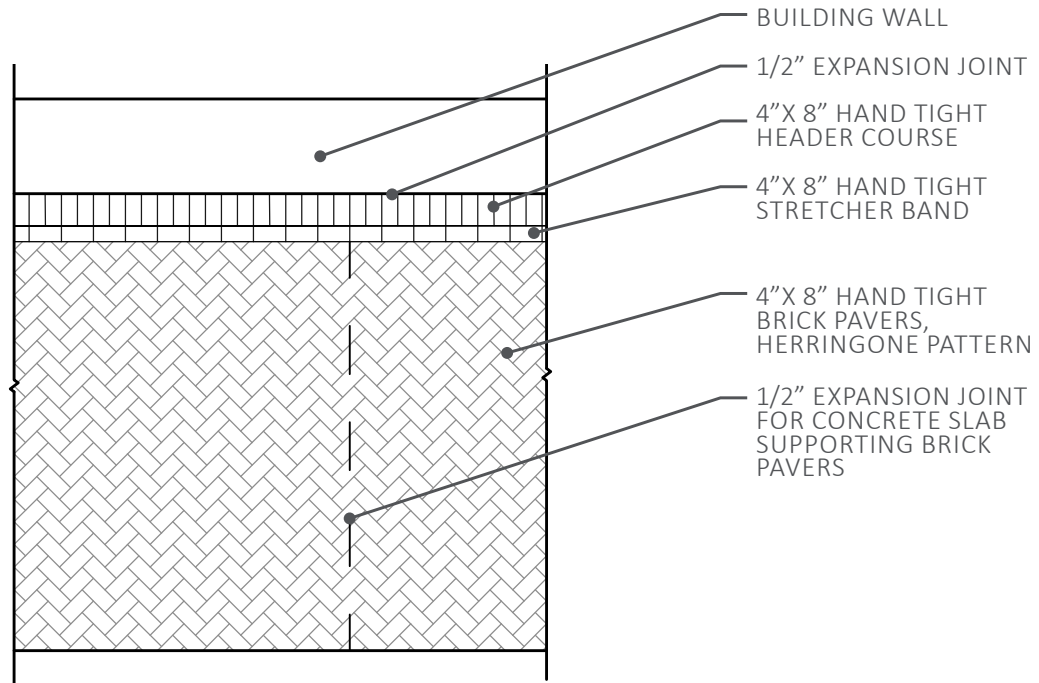


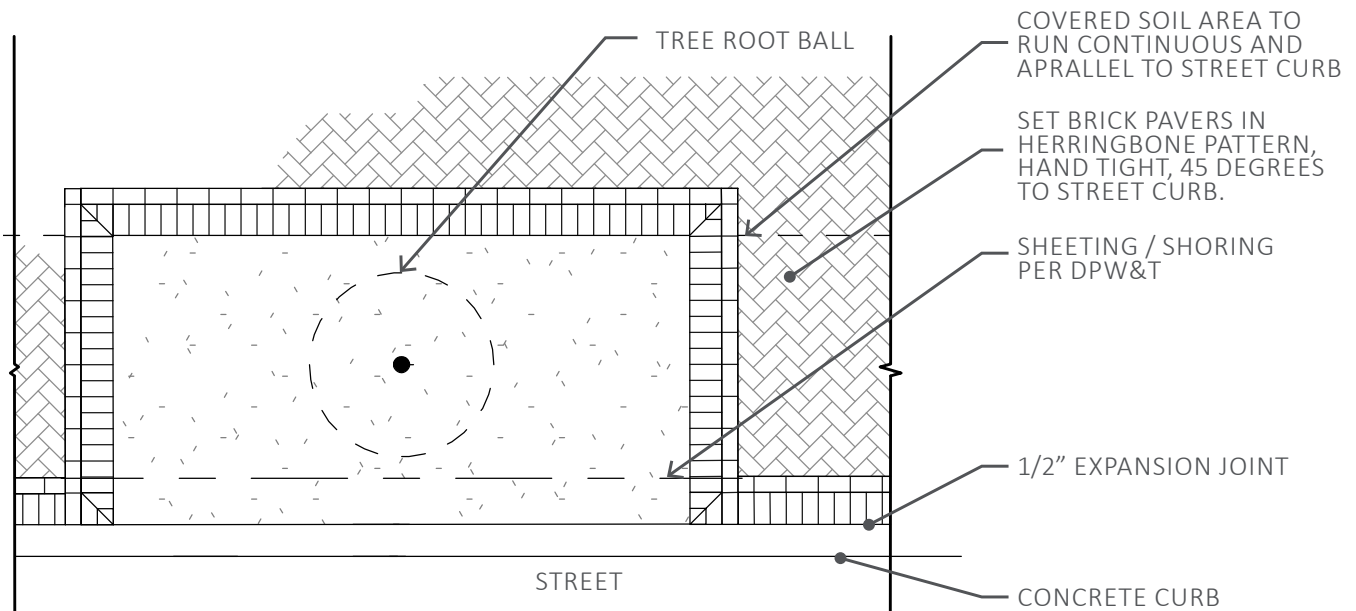
Fig. 5.7 - SIDEWALK DETAILS - BRICK STANDARD FIELDS & BORDER

Notes:

Brick border patterns are to remain perpendicular to the building face and curbing in both perpendicular (condition a) and irregular (condition b) situations.



Plan - Brick Border at Building Edge



Typical Brick Paving Pattern and Brick Border

Design Examples:

5.1.2 Accent Paving

OVERVIEW

Accent paving, also known as “special paving”, are design exceptions to the typical paving detail within the right-of-way.

All accent paving treatments are subject to review and approval.

MATERIALS

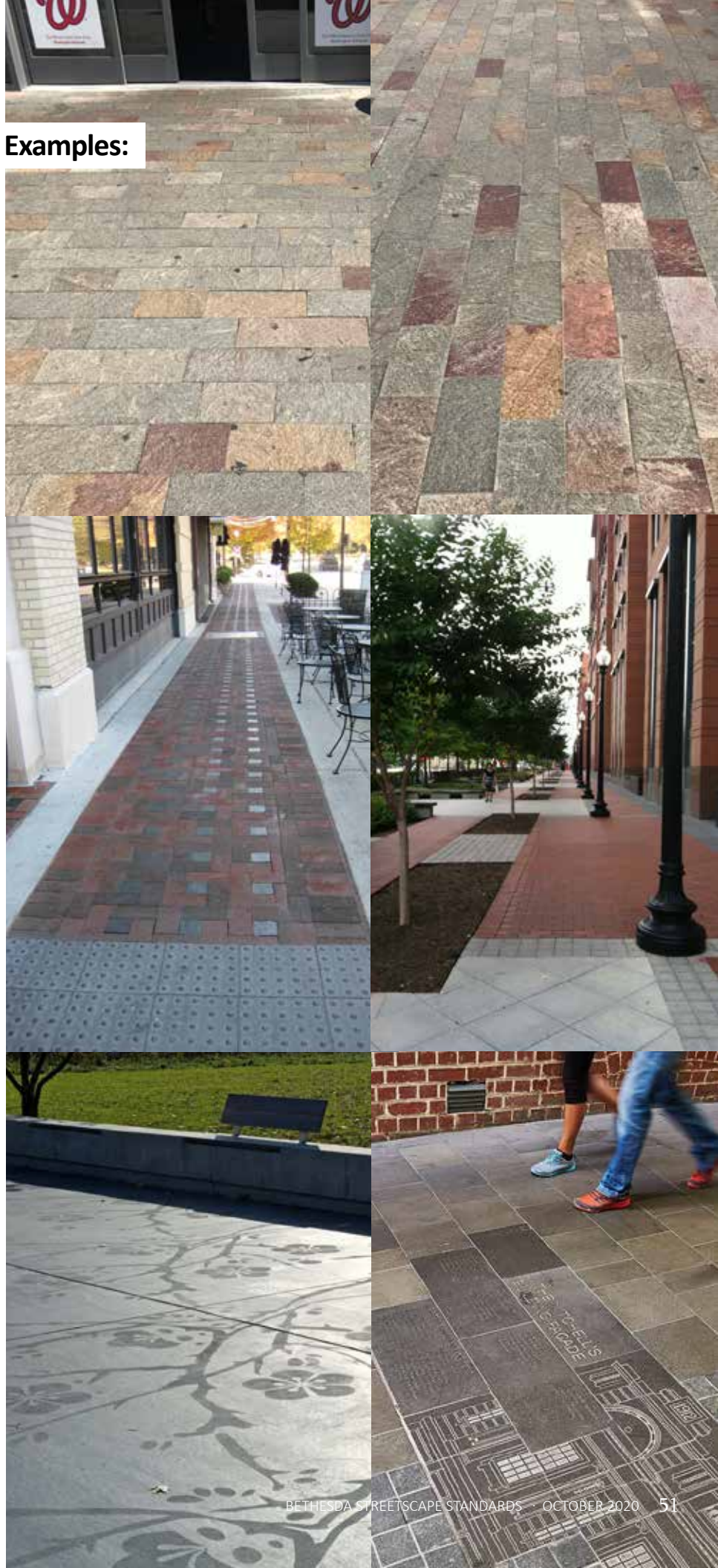
Accent paving may be chosen from the following materials. Any accent or special paving material must be suitable for pedestrian use.

- *Stone*, such as bluestone or granite
- *Brick*, typically with a lighter color
- *Concrete* with custom patterns

APPLICATION

Accent or special paving may be suitable to distinguish or draw attention to certain aspects of the streetscape experience, including:

- Building entries
- Sidewalk zones to define cafe seating areas or other special sidewalk uses
- Items or places of historical significance



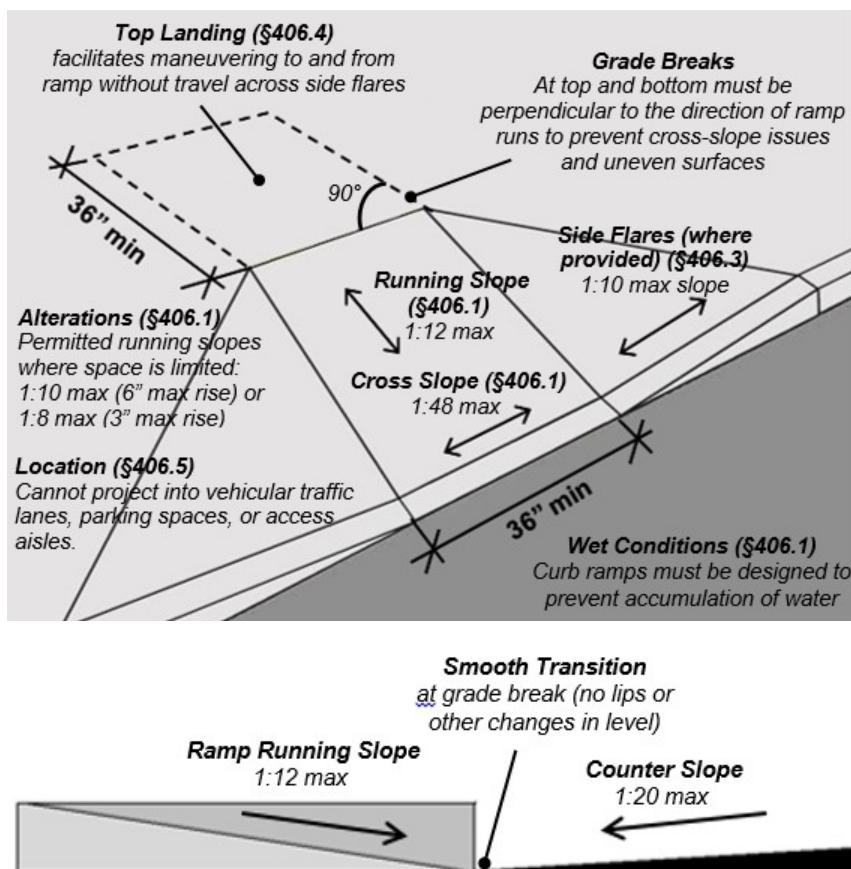
5.2 Curb Ramps

5.2.1 OVERVIEW: Curb Ramp Design and Accessibility requirements

Curb ramps are sloped surfaces that allow pedestrians to transition from the sidewalk to the street. Proper curb ramp design is critical for providing an accessible route through intersections for persons with disabilities. Curb ramps also benefit many other sidewalk users, including people pushing strollers, grocery carts, rolling suitcases, walkers, or bicycles.

GENERAL DESIGN CONSIDERATION

- Curb ramps must be designed per federal, state and local accessibility (ADA) standards.
- Curb ramps should be provided at every marked crosswalk that involves a change in grade.
- Curb ramps should be designed to prevent the accumulation of water, snow, and debris.
- Curb ramps should be located based on the desired pedestrian path of travel.
- Wherever possible, locate two perpendicular curb ramps at an intersection corner, rather than one diagonal curb ramp.
- Curb ramps must remain clear of obstacles. No new poles or utilities should be placed in curb ramps or the top landing area.
- ADA-compliant detectable warning strips are required on all curb ramps. They alert pedestrians with visual disabilities that they are about to enter the street.
- Curb ramp materials vary based on the street type. Please refer to the curb ramp materials diagrams in the following pages.

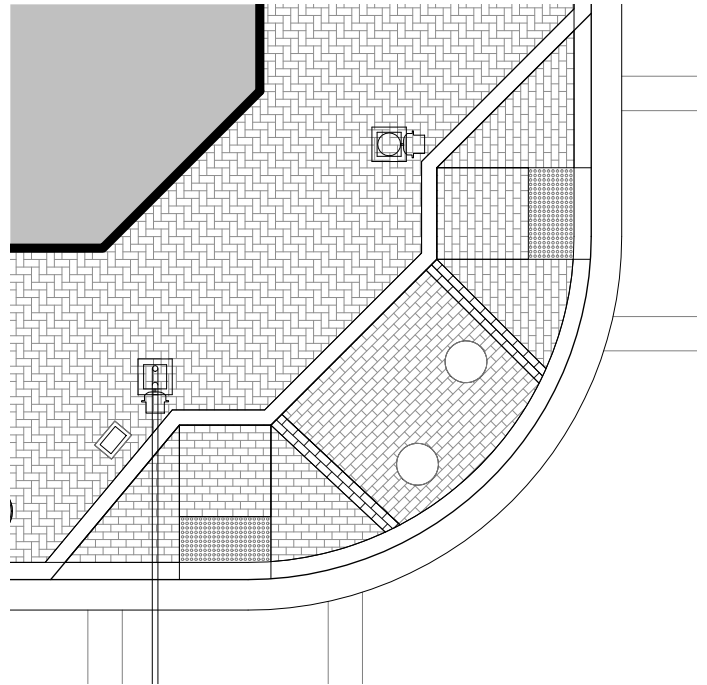


CURB RAMP TYPES

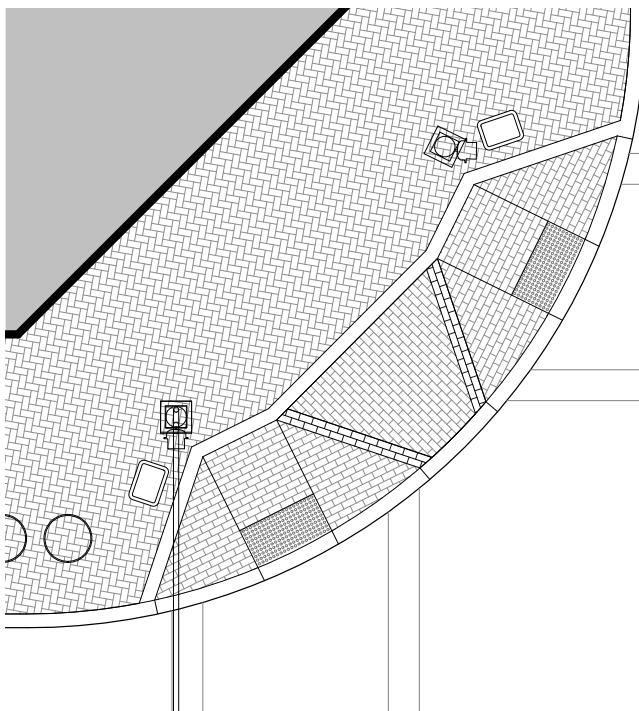
A number of different curb ramp types are available and should be selected based on site-specific constraints, such as the total sidewalk width, pedestrian crossing distances and desire lines, anticipated pedestrian volume, adjacent traffic volume, the gradient of the street, and drainage.

Generally, the most desirable curb ramp configuration is to place the ramps perpendicular to the curb so that both ramps are aligned with the pedestrian direction of travel. This allows visually impaired pedestrians to travel safely across the intersection. Furthermore, drivers can expect pedestrians to travel in predictable directions.

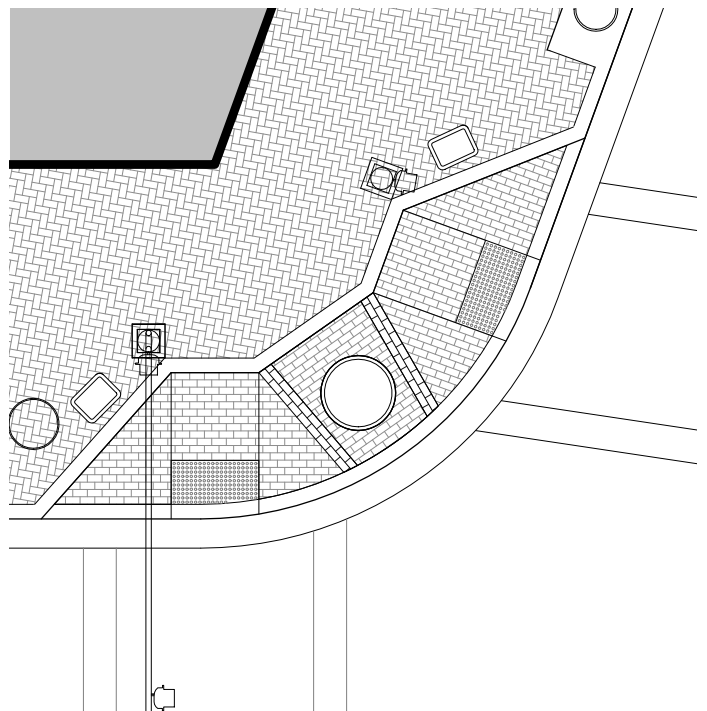
DESIRABLE - TYPE I



ACCEPTABLE - TYPE II



ACCEPTABLE - TYPE II (NON-90°)

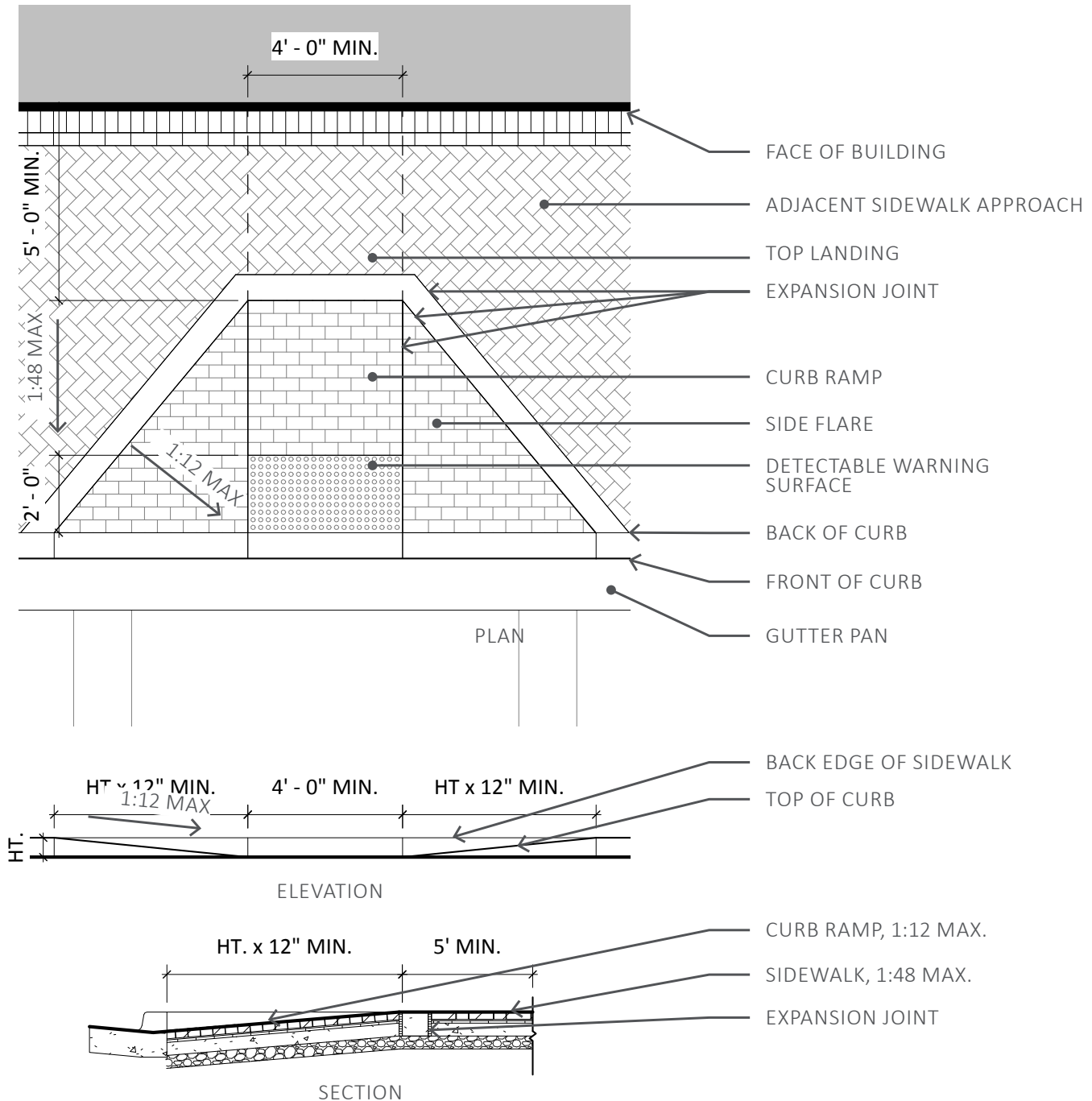


REFER TO [ADA STANDARDS](#): CURB RAMP DETAILS. ALWAYS CHECK THE MOST RECENT ADA STANDARDS FOR THE LATEST REQUIREMENTS.

5.2.2 Curb Ramp Typical Details

DESCRIPTION

The typical design dimensions shown below are based on ADA standards and best practices for maximizing accessibility for all sidewalk users.



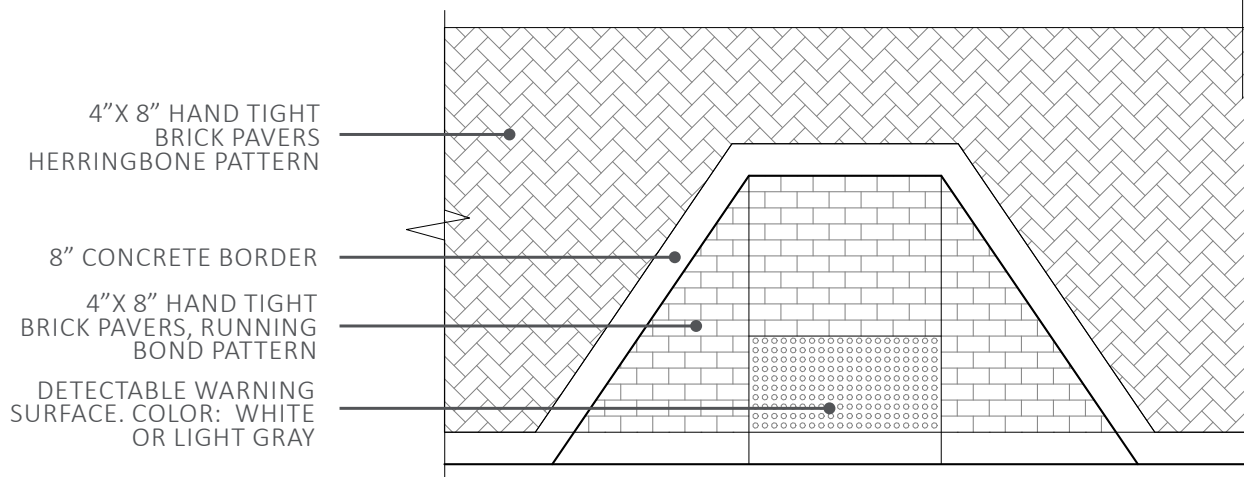
5.2.3 Curb Ramp Materials

The material selections for curb ramps are intended to comply with accessibility standards at the local, state and federal levels while also ensuring that new curb ramps built in Downtown Bethesda fit within the existing character of the streetscape.

An 8" concrete border defines the boundary between the curb ramp and the sidewalk, and will provide a high contrast band against the brick field, which will aid sidewalk users who are visually impaired.

The curb ramp and side flares will be typical Bethesda bricks laid in a running bond pattern for ease of construction.

To meet ADA's visual contrast requirements, the detectable warning surface should be white (preferably), although light gray is acceptable.



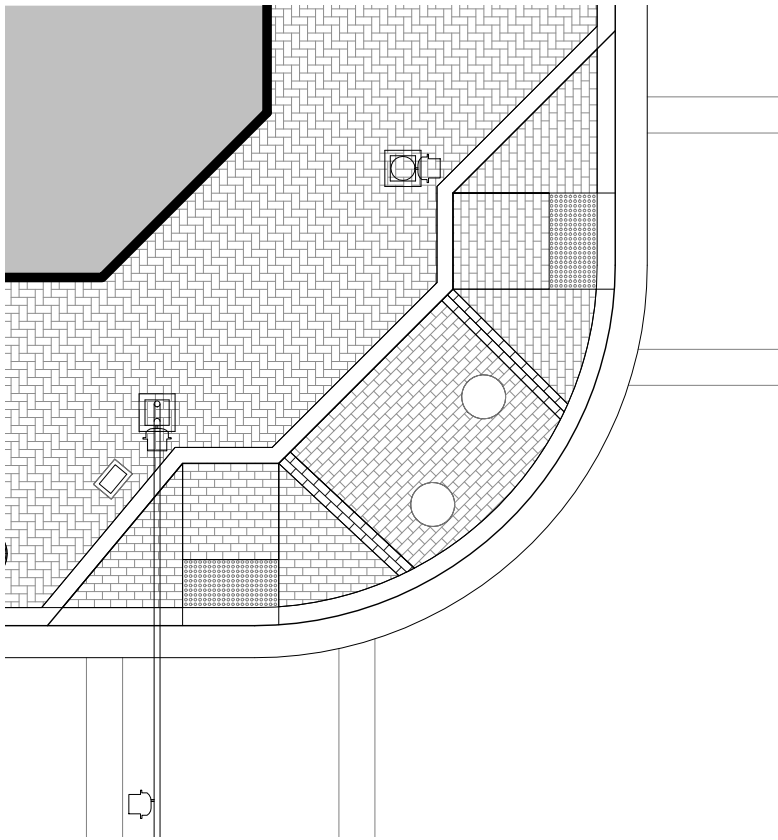


Fig. 5.8 - PERPENDICULAR RAMPS AT WIDE RADIUS 900 INTERSECTION

5.2.4 TYPE I: Perpendicular, Narrow Radius Curb Ramps

DESCRIPTION

This type of curb ramp is the most desirable configuration for intersections and is appropriate for narrow-radiused intersections (30'+) with at least 10' wide sidewalks.

PROS

- Curb ramps are aligned with the pedestrian direction of travel
- Minimizes crosswalk distance, since curb ramps are further away from the apex of the intersection

CONS

- Requires sufficiently wide sidewalks (at least 10' behind the curb) and narrow radiused intersections.

5.2.5 TYPE II: Perpendicular, Wide Radius Curb Ramp

DESCRIPTION

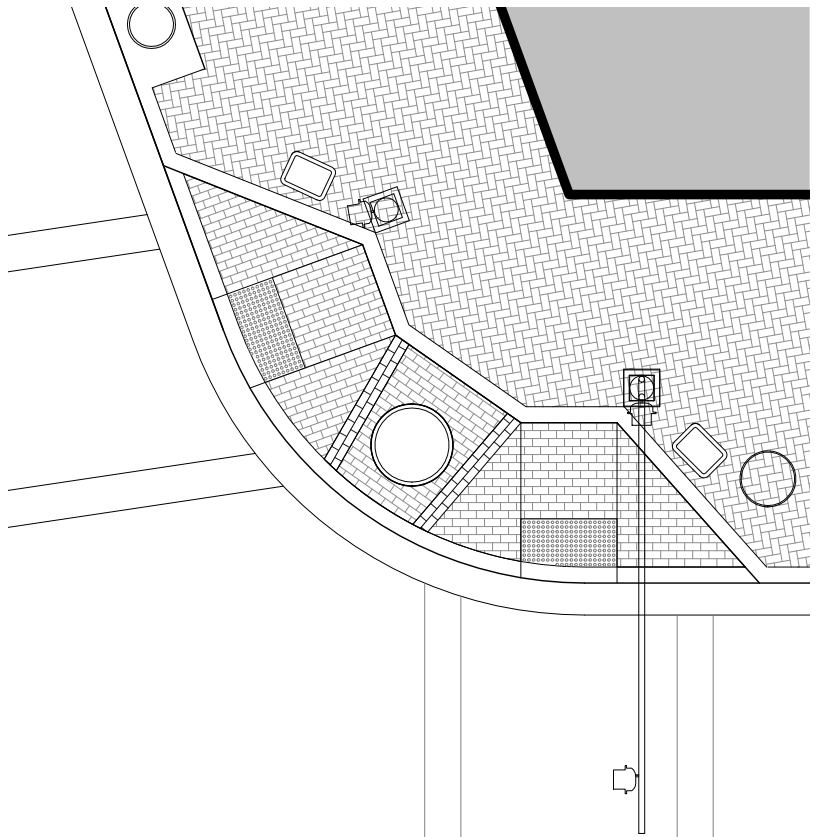
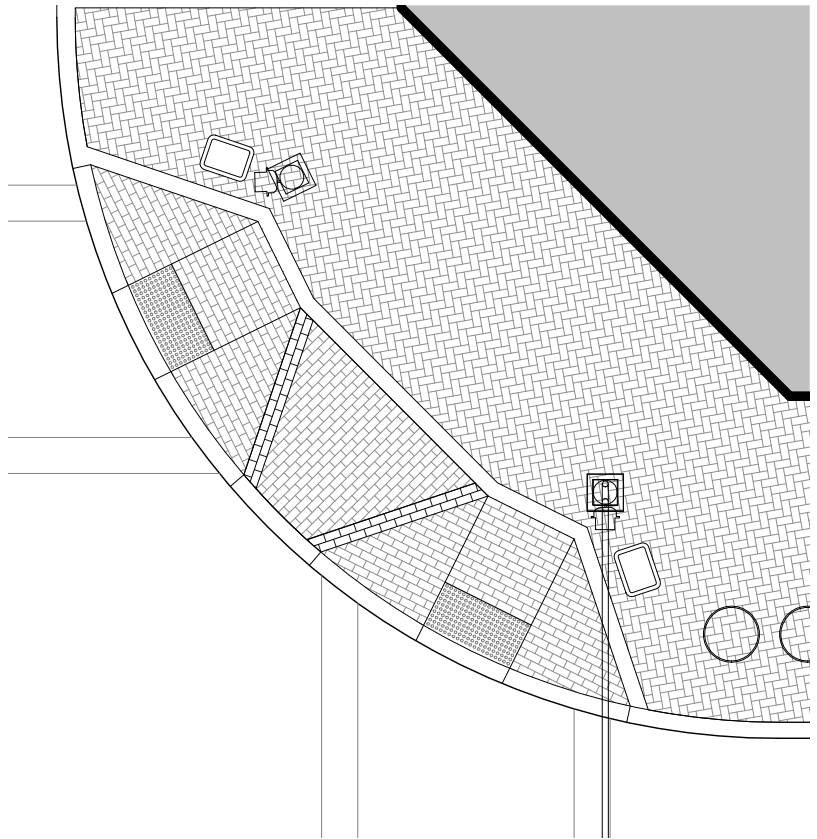
This type of curb ramp is appropriate for wide-radius intersections (30'+) with at least 10' wide sidewalks.

PROS

- Can more easily accommodate wide radius streets and narrower pedestrian through zones than Type I-A

CONS

- Curb ramps do not align with the pedestrian direction of travel, which can cause visually impaired pedestrians to move toward the center of the sidewalk.
- Location of the curb ramps closer to the apex of the intersection results in a longer crosswalk distance.



5.3 Furnishings

5.3.1 Street Light

FIXTURE:

Utility Washington FCO

Finish: Green

Pole: Columbia Aluminum

Pole Finish: Powdercoated
Paint, Green

MANUFACTURER:

Holophane

PH. 1.855.231.9466

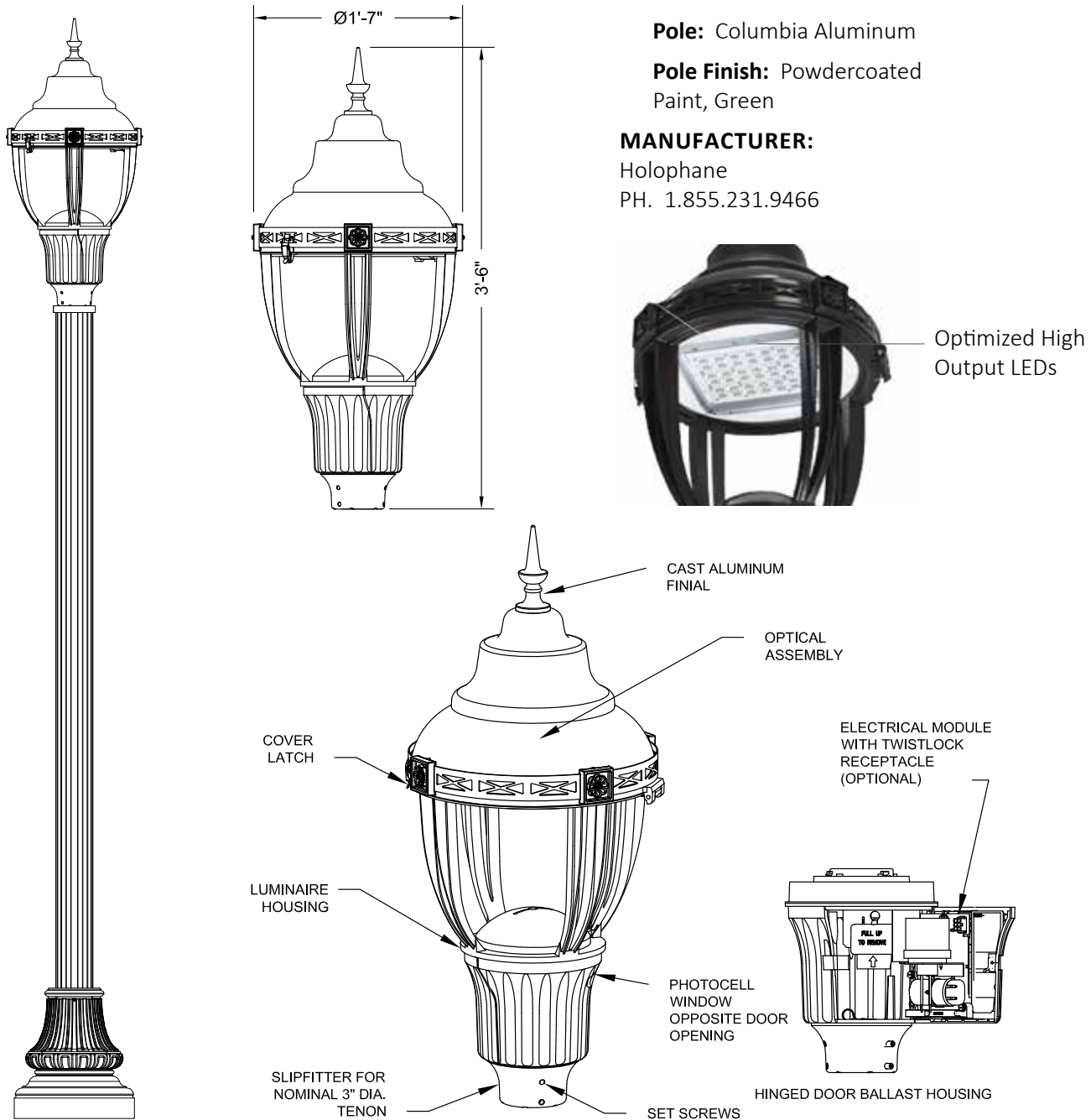


Fig.5.6. PEDESTRIAN STREET LIGHT

5.3.2 Benches

The Windermere bench collection is timeless style complements a variety of settings. Combines a subtle design with manageable scale. Made of quality teak wood and stainless steel hardware to ensure quality construction. Can be outside in a wide range of climates, requires little maintenance to maintain look. Easy assembly.

PRODUCTS:

Item #4503, Windermere Bench
Length: 6 ft.

MANUFACTURER:

Country Casual Teak
7601 Rickenbacker Drive
Gaithersburg, Maryland 20879
PH. 301-926-9195
Fax.301-926-9198
www.countrycasualteak.com

COUNTRY CASUAL TEAK[™]
OUTDOOR FURNITURE SINCE 1977




ITEM	NAME	CUSHION	WIDTH	DEPTH	HEIGHT	SEAT WIDTH	SEAT DEPTH	SEAT HEIGHT	ARM HEIGHT	WEIGHT
	#4503 6 ft. Bench	#03	72	20	35	66.5	18.5	16	25	62 lbs.

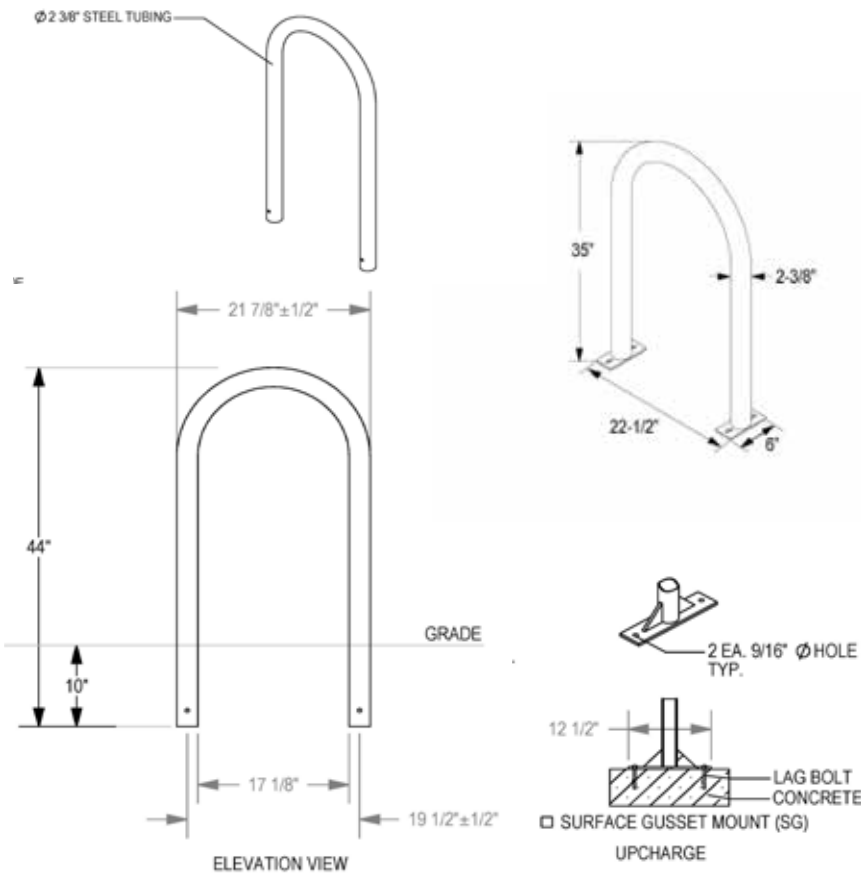
Fig. 5.9 - FIXTURE INSTALLATION: BENCH





5.3.3 Bike Racks

Popular and highly recognized, the *Inverted U Bike Rack* offers bicycle riders the ultimate in bike parking stability and security. Designed to be bolder and stronger, this Bike Rack is constructed with extra thick, 2.375" O.D. schedule 40 commercial grade steel pipe. Galvanized process results in effective corrosion resistant surface.

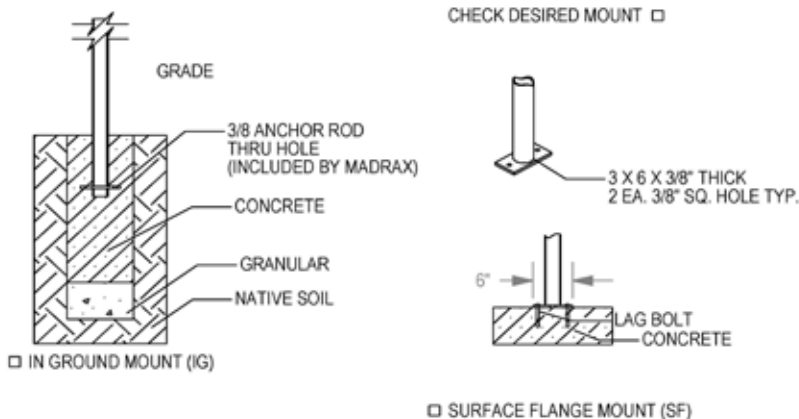


Model HRHD-FT-EPX



Surface Mount

In-ground Mount



Each Heavy Duty Hoop Rack provides secure, supportive bike parking for 2 bikes and is universally compatible with all types of bike locks. This trusted and reliable bike rack is ready for just about any streetscape and is available in galvanized, powder-coated and thermoplastic finishes.

BICYCLE PARKING GUIDELINES

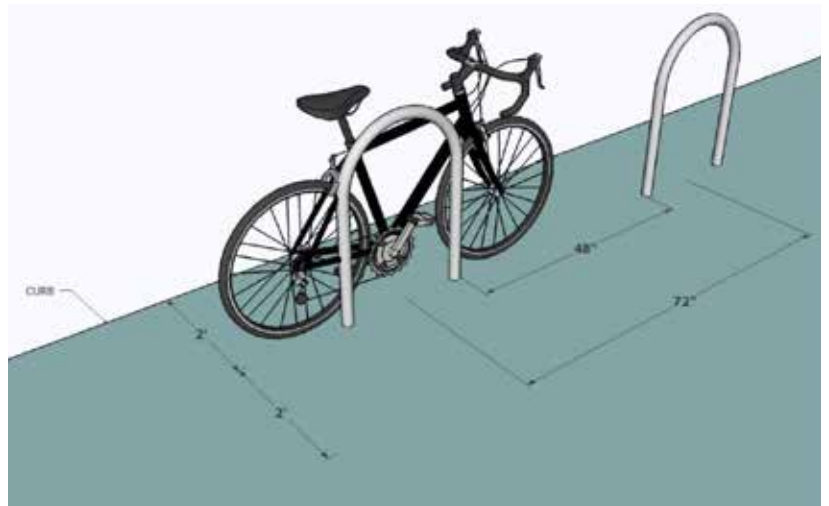
The below guidelines are adopted from the Montgomery County Planning Department Bicycle Parking Guidelines document. Please refer to the current version of this document when determining the layout of bike racks.

BIKE RACK LAYOUT - STREETSCAPES

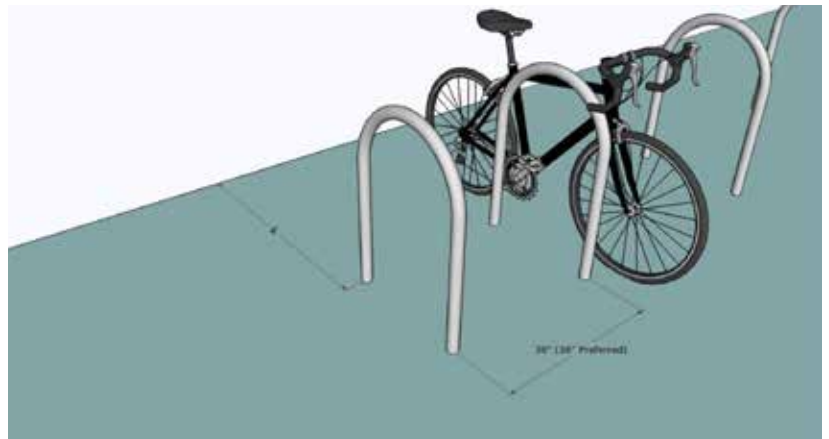
- Each bicycle parking facility is prohibited from obstructing pedestrian traffic or interfering with the use of the pedestrian area.
- Each parked bicycle must be accessible without moving another bicycle.
- Any sidewalk rack that is parallel to the curb must be located 2 feet from the curb face.
- Any sidewalk rack aligned perpendicular to the curb must be located so that the nearest vertical component of the rack is a minimum of 4 feet from the curb.
- Each sidewalk rack must be a minimum of 14 feet from any stand alone fire hydrant.
- A bicycle parking facility must have an aisle a minimum of 4 feet in width behind all occupied parking racks to allow room for bicycle maneuvering. This will also provide clear space for ADA accessibility along the sidewalk.

CUSTOM DESIGNS

Property owners that would request to install custom designed bike racks must meet the requirements set forth in the Montgomery County Zoning Ordinance and must be approved by the Montgomery County Department of Transportation and Department of Permitting Services.



MINIMUM DIMENSIONS FOR SHORT-TERM BICYCLE PARKING PARALLEL TO CURB



MINIMUM DIMENSIONS FOR SHORT-TERM BICYCLE PARKING PERPENDICULAR TO CURB



CUSTOM BIKE RACK - BETHESDA URBAN PARTNERSHIP BRANDED BIKE RACKS

5.3.4 Moveable Planting Containers

TABLE 5.01: PLANTING CONTAINER

	EPMV-31 URBAN VASE	EPMV-41 URBAN VASE
DIMENSIONS (top outside diameter x height)	31" x 25" 3/4 h	41" x 36" h
PLANTING TRAY DEPTH	13"	19"
WATER CAPACITY	18 gallons	40 gallons
SHIPPING WEIGHT	23 lbs	48 lbs
INSTALLED WEIGHT	280+ lbs, water + wet soil	550 lbs, water + wet soil
SOIL CAPACITY	3.2 cubic ft	7.3 cubic ft
PLANTERS PER PALLET	up to 10	4



TABLE 5.02: PLANTING CONTAINER

	EPUR-40 URBAN RECTANGLE
DIMENSIONS	40" l x 22" w x 24" h
PLANTING TRAY DEPTH	12"
WATER CAPACITY	23 gallons
SHIPPING WEIGHT	38 lbs
INSTALLED WEIGHT	300+ lbs, water + wet soil
SOIL CAPACITY	3.0 cubic ft
PLANTERS PER PALLET	up to 8



TABLE 5.03: PLANTING CONTAINER

	EPRR-24 SMALL ROLLED RIM	EPRR-28 MEDIUM ROLLED RIM	EPRR-32 LARGE ROLLED RIM
DIMENSIONS	23 1/2" x 20" h	27 1/2" x 24" h	31 1/2" x 28" h
PLANTING TRAY DEPTH	7 3/4"	11 3/4"	15 3/4"
WATER CAPACITY	16 gallons	21 gallons	27 gallons
SHIPPING WEIGHT	16 lbs	21 lbs	29 lbs
INSTALLED WEIGHT	170+ lbs, water + wet soil	280 lbs, water + wet soil	450+ lbs, water + wet soil
SOIL CAPACITY	1.4 cubic ft	2.9 cubic ft	3.6 cubic ft
PLANTERS PER PALLET	up to 8	up to 6	up to 6



Fig. 5.10 - PLANTER TYPES

5.3.5 Receptacles

PRODUCTS:

Models SD-42, Ironsites Series with Standard LID

MANUFACTURER:

Victor Stanley
P.O. Drawer 30
Dunkirk, Maryland 20754
PH. 301-855-8300
Fax.420-257-8300
www.victorianstanley.com

Notes:

1. All Fabricated Metal Components are Powdercoated Steel, Color: Tavern Square
2. Product must be Permanently Affixed to the Ground per Manufacturers Specifications
3. BUP Band Decal



Fig. 5.13 -FIXTURE INSTALLATION: BUP BAND DECAL

Client Layout for VSI S-42 Steel Band Decal
Client: Bethesda Urban Partnership

Graphics Application: The graphics will be digitally printed onto a pressure sensitive vinyl decal and applied to the top steel band of the receptacle

Decal Size: 37 1/2" x 2 1/4" (2 decals per band)

Decal Material Color: White

Image Color: Tomato Red (PMS 186 C)

Fig. 5.12 -FIXTURE INSTALLATION: RECYCLING RECEPTACLE

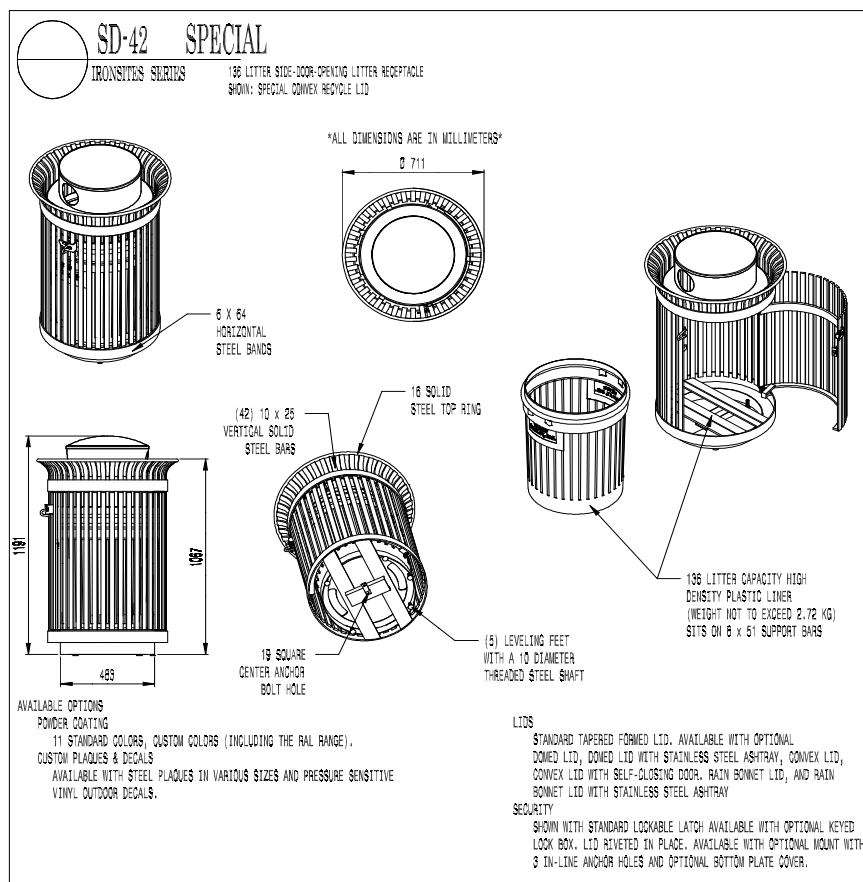
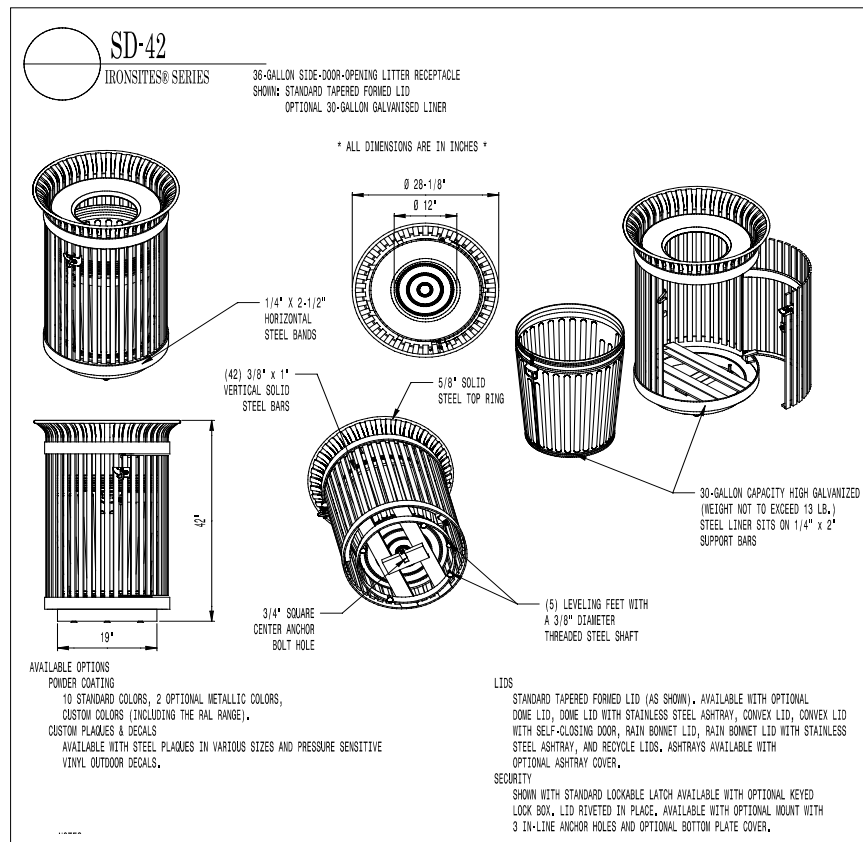


Fig. 5.11 -FIXTURE INSTALLATION: TRASH RECEPTACLE



Chapter 6: Specifications

6.1 Standard Brick Paving

BRICK PAVERS

TYPE	Watson town “Garden Blend” or approved equal. “Equal” must be submitted to staff of Area 1 Division, M-NCPPC for approval in coordination with MCDPS and Bethesda Urban Partnership (BUP).
ABSORPTION RATE	Average water absorption rate 4%
COMPREHENSIVE STRENGTH	Shall not be less than 10,000 pounds per square inch for any 5 bricks tested
FREEZE-THAW CYCLES	Shall be capable of withstanding a minimum of a 100 freeze-thaw cycles.
TOLERANCES	Shall conform to ASTM Designation C-902-79a.
BOND	Herringbone, square with curb.
BORDER	8” sailor course.

BITUMINOUS SETTING BED

TYPE	Asphalt cement shall conform to ASTM Designation D-3381. Fine aggregates shall be clean, hard sand, and free from adherent coating, lumps of clay, alkali salts and organic matter. Aggregates shall meet the standard method of test for sieve analysis of fine and coarse aggregates ASTM Designation C-136-81.
VISCOSITY GRADE	Shall be A.C. 10 or A.C. 20.
PROPORTION OF MATERIAL	Approximate proportion shall be 7: asphalt cement and 93% fine aggregate. The mix shall be heated to approximately 380 degrees Fahrenheit.
	Supports for reinforcement shall comply with CRSI recommendations. Wood, bricks or other devices will not be acceptable as supports for reinforcement.
WADMIXTURES	Air - entraining admixtures shall conform to ASTM C260. Water - admixtures shall conform to ASTM C494, Type A. Set – control admixtures shall conform to ASTM C494 as follows: Type B – Retarding Type C – Accelerating Type D – Water reducing and retarding Type E – Water reducing and accelerating Calcium chloride shall meet the requirements of AASHTO M.144, Type 1 or 2
COMPRESSIVE STRENGTH	Minimum of 3,000 psi shall be achieved by the 28 th day of a strength test. Control testing shall be in conformance with Montgomery County Standards.
SLUMP REQUIREMENTS	2”-4” range is acceptable.
AIR CONTENT	5% to 8%

NEOPRENE – MODIFIED ASPHALT ADHESIVE UNDER PAVERS

MASTIC	Solids (base)..... 75% +- 1%
(Asphalt Adhesive)	Lbs./Gal.....8 – 8.5 lbs.
	Solvent..... Varsol (Over 100 °F Flash)
BASE	Melting Point ASTM D-36..... 200°F Min.
(2% Neoprene, 10% Fibers, 88% Asphalt)	Penetration..... 77°F 100 Gram Load 5 Second (1m.m.)..... 23-27
	Ductility..... ASTM D-113-44 @ 25°C cms/per minute 125 cm Min.

JOINT FILLER

TYPE	Portland Cement shall conform to ASTM C-150 and sand shall conform to ASTM C-33
PROPORTION OF MATERIALS	One part Portland Cement to three parts sand.

CONCRETE SUBBASE

CONCRETE MATERIALS	Portland Cement – ASTM C150, Type 1. Use only one brand of cement throughout the project.
	Aggregates – ASTM C33, fine and coarse aggregates shall be clean, sharp, and free from clay, organic matter and other deleterious substances.
	Coarse aggregates shall be crushed stone with a maximum size no larger than one-fifth of the narrowest dimension between side forms, one-third depth of the slab, nor three-fourths of the minimum clear spacing between individual reinforcing bars.
	Water shall be clean, drinkable and meet the PH requirements of AASHTO T-26 Method B.

REINFORCING MATERIALS	<p>Reinforcing Bar shall conform to ASTM A615, Grade 60.</p> <p>Welded Wire Fabric shall conform to ASTM A285.</p> <p>Supports for reinforcement shall comply with CRSI recommendations. Wood, bricks or other devices will not be acceptable as supports for reinforcement.</p>
ADMIXTURES	<p>Air..... Entraining admixtures shall conform to ASTM C260.</p> <p>Water.....Admixtures shall conform to ASTM C494, Type A.</p> <p>Set.....Control admixtures shall conform to ASTM C494 as follows:</p> <ol style="list-style-type: none"> 1. Type B.....Retarding 2. Type C.....Accelerating 3. Type D.....Water reducing and retarding 4. Type E.....Water reducing and accelerating 5. Calcium chloride shall meet the requirements of AASHTO M.144, Type 1 or 2
COMPRESSIVE STRENGTH	Minimum of 3,000 psi shall be achieved by the 28 th day of a strength test. Control testing shall be in conformance with Montgomery County Standards.
SLUMP REQUIREMENTS	2" – 4" range is acceptable.
AIR CONTENT	5% to 8%

THE BETHESDA LANTERN

LAMP TYPE	The optical system consists of a precisely engineered LED circuit board located in the top cover. A gasket between the cover and ring along with a flat glass plate and gasket beneath the reflector create a sealed optical compartment that meets an IP65 rating. Optics designed to provide an I.E.S. Asymmetric or Symmetric full cutoff distribution is available.
HOUSING TYPE	The luminaire housing, cast of aluminum, anchors the optical system and provides an enclosure for the plug in electrical module. The electrical enclosure conforms to an IP55 rating. For use with units with an E.E.I.-N.E.M.A. twist lock photocell receptacle, the housing contains a glass "window" to allow light to reach the cell. The three station incoming line terminal block are pre-wired to a five conductor receptacle for ease in connecting the electrical module. A slipfitter will accept a 3" high by 2 7/8" to 3 1/8" O.D. pole tenon.
LAMP HEIGHT	16' +
POWER SUPPLY	Montgomery County.
ACTIVATION	Solar cell mounted in Lantern Housing.
HOUSING MATERIAL	Cast Aluminum base and roof, min. 1/8" wall thickness.
LANTERN POSTS	Aluminum, Ribbed design.
SHELL	1/8" "Lexan" Acrylic, 18" diameter drum.

FINISH	Dark Green heat set epoxy finish “HADCO J-Dark Green’ or staff approved equal, factory applied.
ASSEMBLY	Factory assembled, shipped assembled.
ORNAMENTATION	Cast into surface or factory welded to surface (<i>see detail</i>).
INTERIOR ORNAMENT	Cast clear glass, approximately 6” high x 8” wide (<i>see detail design</i>).
ORNAMENT REFLECTOR	Polished Brass Cone, approximately 8”
POLE TYPE	“Washington” series.
POLE HEIGHT	13” to base of lantern.
POLE MATERIAL	Cast Aluminum.
POLE FINISH	Field Painted to Match lantern (<i>shipped factory primed</i>).
POLE BRACKET	Cast Aluminum to extend over 15” beyond pole and capable of supporting a hanging basket of seasonal flowers. To be used only along Wisconsin Avenue, Old Georgetown Road, and East-West Highway. Double-collar attachment to Pole. (<i>see design detail</i>). (<i>Note: Use of bracket to be determined upon resolution of Bethesda Streetscape Management Organization.</i>)
HAND HOLE	At least 8” diameter in base, tamper-resistant installation.
FOUNDATION	Reinforced Concrete footing (<i>see detail</i>).
BOLT CIRCLE	12-1/2”, for 4 bolts.
CONDUIT	4” in, 4” out
ANCHOR BOLTS	5/8” hot-dipped steel, 24” long, with 3” leg, exposed 3” above foundation top (<i>see foundation detail</i>). All bolts concealed within base.
BALLAST	Mounted in base of lantern, provide drawer behind access panel matching lantern ornamentation.
BALLAST TYPE	To be specified.

6.2 Streetscape Planting

PLANT MATERIALS

Street trees, groundcovers and turf sod shall be furnished in accordance Section 4.1.1 . All lawns shall be certified sod and consist of 10% to 20% certified Ken blue (*Kentucky Original, certified Merion or South Dakota certified Kentucky Bluegrass* and 80% to 100% certified Kentucky 31 Tall Fescue.)

QUALITY

Plants shall be nursery grown in accordance with the latest edition of USA standards for Nursery Stock.

Plants shall be hardy under climatic conditions similar to those in the locality of the project.

Plants shall be sound, healthy and vigorous. Free from disease and insect pests, eggs or larvae.

All plants shall be typical of their species of variety and shall be well-branched and densely foliated when in leaf.

Each piece of sod shall be well covered with turf grass, free from weeds and cut to a length of not less than 1-1/2 inch nor more than 4 inches before sod is cut.

SIZE

Street trees shall be 4-1/2-5 inches in caliper and shall begin branching no less than 5-1/2 feet from the base.

Street trees shall be balled and burlapped with root balls dug larger than USA standards require.

Ground cover shall be established, well rooted in containers or peat pots, with not less than the minimum number and length of runners required by ANSI 260-1 for pot size used. Pot sizes shall be large enough to establish 90% plant coverage within 2 years.

AMENDED BACKFILL

Shall consist of 2/3 topsoil mixture and 1/3 native soil. However, if native soil is predominately composed of deleterious matter, such fill as construction materials, do not use.

QUALITY

Topsoil shall be sandy loam, uniform in composition, free of stones, lumps, roots and other debris. PH range shall be 5.0 to 7.0 and organic matter shall be a minimum of 1%.

Organic matter used in backfill mix shall be peat, composted bark or leaf mold.

MIXTURE

Top soil mixture shall be 2/3 topsoil and 1/3 organic matter. The need for Dolomite lime, fertilizer, or other soil additives shall be tested in field and adjustments shall be made to obtain proper PH and nutrient levels.

AMENDED SOIL PANELS

Sand-Based Structural Soil shall consist of a blend of approximately 60% by volume Course Sand, 15% by volume Base Loam and 25% by volume Organic Amendment. The components shall be blended to create a uniform mixture. Percentages will be adjusted as necessary to achieve a final the following grain size distribution and criteria below for material passing the #10 sieve:

U.S. Sieve Size No.	Percent Passing	
	Minimum	Maximum
10	100	----
18	68	90
35	38	63
60	18	39
140	10	18
270	8	10
0.002mm	1	4

1. Maximum size shall be one inch largest dimension. The maximum retained on the #10 sieve shall be 15% by weight of the total sample.
2. The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 3.2 or less ($D70/D20 < 3.2$).
3. The final mix shall have a saturated hydraulic conductivity of not less than 6.0 inches per hour according to test procedure ASTM D5856-96 (2000) when compacted to a minimum of 94 percent Standard Proctor ASTM D698.
4. Organic content shall be between 2.5 and 3.5 percent.
5. Unless otherwise specified or recommended by the Soil Supplier's Soil Scientist: pH shall be between 6.5 and 7.2; CEC shall be a minimum of 6; and Soluble Salts shall be less than 500 ppm/0.5 mmhos/cm.

STRUCTURAL CELLS

Manufactured Silva Cell or equal. To be installed per manufacturer guidelines.

MISCELLANEOUS LANDSCAPE MATERIALS

GRAVEL	Washed gravel shall be clean, crushed stone complying with ASTM C.33, size 8 or 9.
FILTER MAT	Fiberglass mat filter: "Poly-filter G-8", manufactured by Carthage Mills, or equal.
ANTI-DESSICANT	Emulsion type, film forming agent similar to Dowax by Dow Chemical Company, or Wilt-proof by Nursery Specialty Products, Inc., designed to retard excessive loss of moisture from plants.
WRAPPING	4" wide, standard manufactured tree wrapping paper, brown in color with crinkled surface, and installed to prevent water collection with a 2" overlap. Trees should be wrapped only for transit to the site. Wrapping should be removed upon installation.
STAKING	Trees over 4" in caliper should not be staked or received guy wires.
STEEL EDGING	Shall be 16"x4" in size and manufactured by Ryerson and Son, Inc. or an approved alternative.
P.V.C. PIPE	Type 1, Grade 1, Normal impact uplasticized, high density polyvinyl chloride. Sized according to the drawings.

6.3 Streetscape Furnishings

BENCH

Teakwood bench, model – “Windermere”, 6’ in length. Finish shall be natural teak. Bench shall be bolted into pavement. Provide certification from either the Rainforest Alliance or Friends of the Earth that the teak is plantation grown timber.

BIKE RACKS

COATING

Powder Coating: Triglycidyl isocyanurate (TGIC) power, a polyester coating. Coating is applied so that the thickness is 3.5 to 4.5 mils.

1. Color is selected by architect from manufacturer’s full range of standard colors.

Galvanizing: Standard specification for zinc (hot-dip galvanized) coatings on iron and steel products

1. Finish is bright in appearance for 6 to 12 months after processing. The finish dulls to a matte grey after during this period of time.
2. The product will have vent holes to allow gases to escape a molten galvanize to enter internal spaces.
3. Surface quality will meet the American Galvanizing Association Standards.

MATERIALS

Rack shall be constructed of 2 3/8” (60.4mm) diameter carbon steel tubing; and 3/8” x 3” (9.6mm x 76.2mm) carbon steel flat bar; and 3” x 1.4” (76.2mm x 35.6mm) carbon steel “C” channel.

NOTES

- A. Install in accordance with manufacturer’s instructions.
- B. Embedded mounting: Material is to be extended a minimum of 10” (254mm) below finish surface and cast in concrete.
- C. Surface mounting: Location and drilling of holes for inserts included.
- D. Some assembly required.

TRASH AND RECYCLING RECEPTACLES

“The Bethesda Series,” steel basket with span steel dome number S-42 and standard galvanized inner container. Produced by Victor Stanley, Inc. Shall stand 3’ high with a 2’-6” flared opening. Shall include Bethesda Urban Partnership band decal.

PLANT CONTAINERS

Commercial Self-Watering Planter Systems. Approved sizes shall be 1’-6’ dia. X 2’ high and 3’-6’ dia. X 2’ high. Potting soil and seasonal flowering plants to be approved by M-NCPPC staff.

MODEL: EPUR-40 URBAN RECTANGLE

DIMENSIONS	40” L x 22” W x 24” H, planting tray depth: 12”
WATER CAPACITY	23 Gallons
PRODUCT WEIGHT	38 lbs. (ship weight)
	300+ lbs . with water and wet soil

SOIL CAPACITY	3.0 Cubic Feet – Pro Mix BX or equivalent soil required
PLANTERS PER PALLET	Up to 8
WATERING CYCLE	Once every 2-3 weeks (average)
MATERIAL	LLDPE, Linear Low-Density Polyethylene. Embedded with UV Inhibitors to protect against sun face.
MANUFACTURING	Rotational Molded for strength & durability
COLORS	Sandstone, Millstone, Gray Granite, Black Granite, Matte Black, Rich Terra Cotta
STACKABLE	Yes
WINTERIZED	Yes

MODEL: EPMV-31 Urban Vase

DIMENSIONS	31" Top Outside Diameter x 25 ¾" H
PLANTING TRAY DEPTH	13"
WATER CAPACITY	18 Gallons
PRODUCT WEIGHT	23 lbs. (ship weight) 280+ lbs . with water and wet soil
SOIL CAPACITY	3.2 Cubic Feet – Pro Mix BX or equivalent soil required
PLANTERS PER PALLET	Up to 10
WATERING CYCLE	Once every 2-3 weeks (mid-summer average)
MATERIAL	LLDPE, Linear Low-Density Polyethylene. Embedded with UV Inhibitors to protect against sun face.
MANUFACTURING	Rotational Molded for strength & durability
COLORS	Sandstone, Millstone, Gray Granite, Blackstone, Rich Terra Cotta
STACKABLE	Yes
WINTERIZED	Yes

MODEL: EPRR-32 Large Rolled Rim

DIMENSIONS	31 ½" Top Outside Diameter x 28" H
PLANTING TRAY DEPTH	15 ¾"
WATER CAPACITY	27 Gallons
PRODUCT WEIGHT	29 lbs. (ship weight) 450+ lbs . with water and wet soil
SOIL CAPACITY	3.6 Cubic Feet – Pro Mix BX or equivalent soil required
PLANTERS PER PALLET	Up to 6
WATERING CYCLE	Once every 2-3 weeks (mid-summer average)
MATERIAL	LLDPE, Linear Low-Density Polyethylene. Embedded with UV Inhibitors to protect against sun face.
MANUFACTURING	Rotational Molded for strength & durability
COLORS	Sandstone, Millstone, Gray Granite, Blackstone, Rich Terra Cotta
STACKABLE	Yes
WINTERIZED	Yes

Bethesda

Downtown Plan

Streetscape Standards

Prepared by the Montgomery County Planning Department

MontgomeryPlanning.org

M-NCPPC
Montgomery County Planning Department
2425 Reedie Drive
Wheaton, MD 20902

MontgomeryPlanning.org

Approved October 2020

