SEPTA Bus Stop
Design Guidelines

October 2012

SEPTA | DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

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How to Use this Document

Purpose & Introduction

The purpose of this report is to provide municipalities in the SEPTA service area, local developers, and other local partners a consistent set of guidelines for designing surface transit stops. While the focus of this document is on bus stops, many of the elements addressed here also apply to trackless trolley and mixed-traffic trolley stop locations.

A high-quality transit stop is one that is well connected to the neighborhood or community it serves, accommodates the needs of all transit passengers safely and comfortably, and permits efficient and cost-effective transit operations.

The design guidelines detailed in this document are intended to guide local comprehensive plans, land development ordinances, site or subdivision plans, and transportation/mobility plans. These guidelines are based on a review of standards and best practices applied nationally, discussions with planning partners, and survey feedback from municipalities in the SEPTA service area.

SEPTA recognizes that every location is unique, and that a given transit stop's jurisdictional and physical context may offer opportunities to meet these guidelines in some ways but not in others. As a result, **this should be viewed as a guiding document, offering templates for desirable facilities and amenities wherever it is possible to provide them.** The guidelines detailed here will lead to a higher-quality, more consistent, more accessible, and better-connected network of stop facilities over time: project-by-project and stop-by-stop.

Structure of Report

There are four interrelated elements that together comprise a transit stop:

1. **Stop location:** A stop's placement relative to other stops, to the nearest intersection, and to the development it serves.

2. **In-street design:** The space allocated for the transit vehicle to curb for passenger loading and to exit and reenter the flow of traffic.

3. **Curbside design:** The space reserved for passengers to wait for and board the transit vehicle, as well as the connectivity between this space and nearby development.

4. **Passenger amenities:** Includes elements such as shelters, lighting, and seating.

This report's structure follows the same order, with a fifth section that contains case studies for common design challenges and solutions. To discuss details for a specific location or route, please email **serviceplanning@septa.org**.

CHAPTER 1

Stop Location

Introduction

There are a variety of factors that help determine where a transit stop should be located, including passenger safety, the location of other transit stops and connecting transit services, traffic conditions, and land use context.

Transit Stop Characteristics

STOP SPACING

Stop spacing refers to the distance between stops along a route, and reflects a trade-off between transit accessibility (convenient access to frequent stops) and operating efficiency. Put simply, additional stops along a route make that route more accessible by walk-up riders, but cause the route to operate more slowly for riders already on the vehicle. This impairs the transit service's efficiency and cost effectiveness and makes it less attractive to riders. Detailed stop spacing standards for both new and existing services are provided in SEPTA's *Service Standards and Process Report*, most recently updated in July 2011. Current spacing standards for different operating contexts are as follows:

Urban Areas
Established routes: minimum spacing of 500 feet (approximately one city block).
New routes: minimum spacing of 1,000 feet (approximately two city blocks).

Exception: Closer stop spacing will be considered to serve major traffic generators and transfer points or to address specific geographic or demographic conditions.

Suburban Areas
Minimum spacing of 1,000 feet in residential areas; safe, logical stopping locations at major traffic generators to be established in less dense areas.

Rural Areas
Spacing on an as-needed basis where sufficient trip generation provides demand.

TYPICAL STOP TYPES

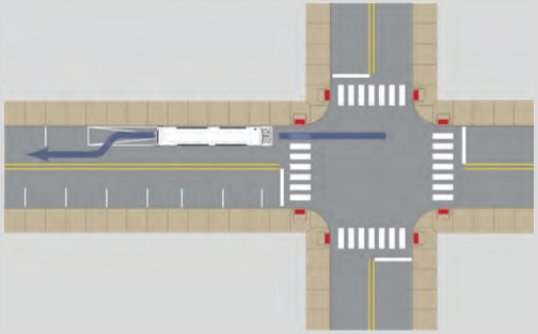
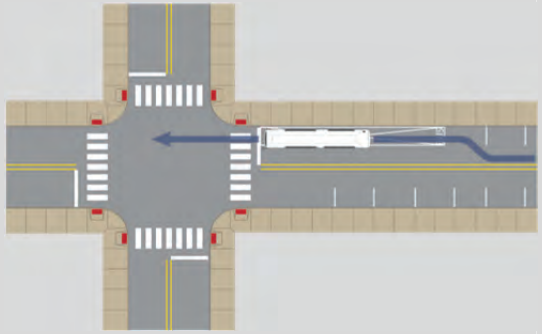
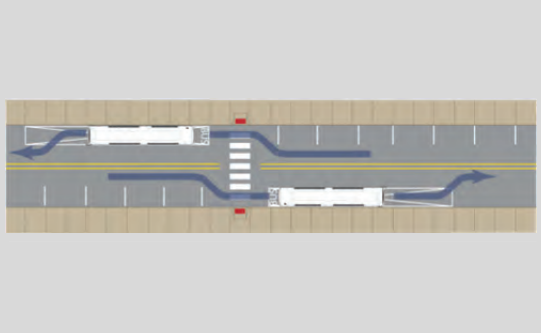
Far-side stop
Occurs when the bus stops after proceeding through the intersection. Advantages are that passengers may cross behind the bus more safely, traffic conflicts for right-hand turns are minimized, and intersection clearance times are more predictable.

Near-side stop
Occurs when the bus stops before the intersection. Advantages are that passengers can board and alight closer to the crosswalk.

Midblock stop
Occurs when the bus stops in between intersections, usually in a well-defined area. The main advantage is when the stop has a large volume of passengers, requiring a larger waiting area than space allows at the intersection.

(Refer to Table 1 for additional advantages and disadvantages for each stop type)

Table 1: Advantages and disadvantages for typical stop location types

		
Far-side stop	**Near-side stop**	**Midblock stop**
Advantages	Advantages	Advantages
▶ Minimizes conflicts with right-turning vehicles. ▶ Minimizes sight line conflicts for drivers and pedestrians. ▶ Encourages pedestrians to cross more safely behind the bus. ▶ Stopping at the far-side of the intersection creates a shorter deceleration zone for the stop area because the intersection absorbs some of the space requirement. ▶ The gap in traffic flow created by the signal allows the driver room to pull back into the travel lane. ▶ Most effective stop location for Transit Signal Priority (TSP): preferential treatment for transit vehicles at traffic signals (typically extended green or shortened red phases).	▶ Minimizes traffic interference during peak traffic flow hours. ▶ Passengers are able to board the bus closer to the crosswalk. ▶ Bus can use the intersection for acceleration space. ▶ Avoids double stopping for both signal and passenger movements. ▶ The driver has the advantage of full view of intersection activity. ▶ Can be coordinated with a far-side stop for a crossing route to allow passengers to transfer without crossing the street.	▶ Minimizes sight line obstructions for both driver and passengers. ▶ Because the stop is located away from intersection activity, conflicts with intersection traffic are minimized. ▶ A more spacious waiting area may be provided because the stop is located outside intersection sidewalk congestion. ▶ Works well when a high volume of passengers board and alight, or the bus has an extended dwell time. ▶ Greater passenger convenience at key midblock trip generators.

Far-side stop	Near-side stop	Midblock stop
Disadvantages	Disadvantages	Disadvantages
▶ If the bus is unable to fully pull through the intersection during peak hours, traffic conflicts may occur (“blocking the box”). ▶ A bus stopped near the intersection may block sight lines for pedestrians and vehicles crossing the intersection. ▶ Can cause the bus to double stop (once for the light and once for passenger activity). ▶ Rear-end incidents may be more frequent if distracted drivers do not realize the bus is stopping beyond the intersection.	▶ Conflicts between the bus and right-turning vehicles may arise. ▶ The bus can physically obscure general traffic sight lines for both intersection movements and signals. ▶ Multiple buses queuing during peak hours may obstruct traffic. ▶ Crossing pedestrian sight lines are obstructed. ▶ May present a conflict between pedestrians crossing the intersection and passengers waiting to board the bus.	▶ Can present safety concerns if a midblock crosswalk is not provided. ▶ Requires more physical space for the bus to accelerate and decelerate. ▶ Reduces space available for on-street parking because this stop type requires a longer bus zone.

Source: DVRPC 2012

CHAPTER 2

In-Street Design

Introduction

The primary area within the street devoted to bus movements is the bus zone, which allows the vehicle to pull over to the curb for the purpose of loading and unloading passengers. The geometry of the street should accommodate both transit and general traffic. Bus transit requires a stop location within the roadway that provides the vehicle sufficient space for deceleration and acceleration (to exit and reenter traffic flow), and with a clear area to discharge and receive passengers efficiently and safely.

Bus curbing at shoulder bus shelter, West Goshen, PA (Source: Chester County Planning Commission 2010)

Typical Bus Zone Configuration Options

Typical bus zone types fall into two major categories: in-line (or on-line) and off-line with respect to the roadway. In-line stops are designed as part of the street and participate in the general pattern of traffic flow. The loading and unloading of passengers occurs at the roadway edge.

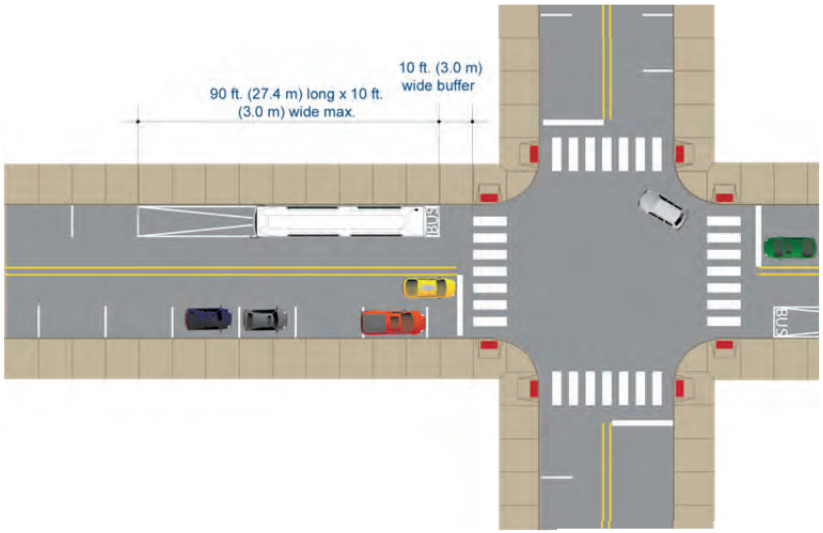
Off-line stops are out of the path of the roadway and are often designated as “bus only” locations, such as within a transportation center, shopping center, or park-and-ride facility. Passenger loading takes place in special designated areas. Although off-line facilities may have more space available and consequently permit the provision of more amenities than in-line facilities, bus route deviations into off-line facilities can add to a route’s travel time.

This section illustrates and describes typical alternatives for in-street stop design. **More detailed dimensional specifications for each stop type can be found in the following section (beginning on page 13).**

CURBSIDE/SHOULDER STOP

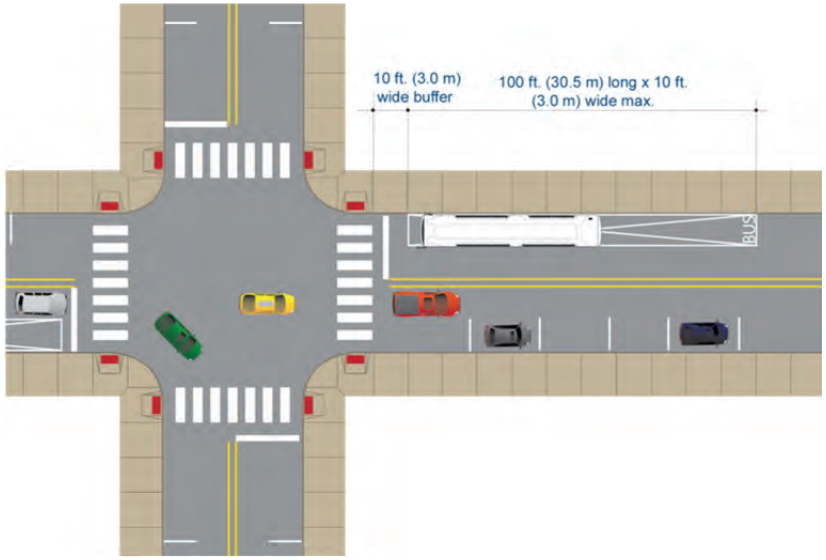
The in-line curbside stop is the most common bus stop type within SEPTA's system. The bus zone is located in the road, usually in a parking and/or loading lane area, with a typical width of 10 feet (3m). The parking lane should ideally be marked in order to identify the loading and maneuvering area for transit vehicles. The bus zone treatment typically includes painted roadway markings and a sign marking the area as a "no stopping" or "no parking" location. Typical curbside bus zone length is 90 feet (27.4m) for far-side stops, 100 feet (30.5m) for near-side stops, and 150 feet (45.7m) for midblock stops. An additional 20 feet (6.1 m) should be provided for articulated buses, plus appropriate transition zones where traffic speeds are higher (as detailed in Table 3). Curbside stops are accommodated into the normal flow of traffic, can be integrated easily within most street design schemes, and are used most effectively when traffic speeds are lower than 45 mph.

Figure 1: Typical far-side curbside stop configuration



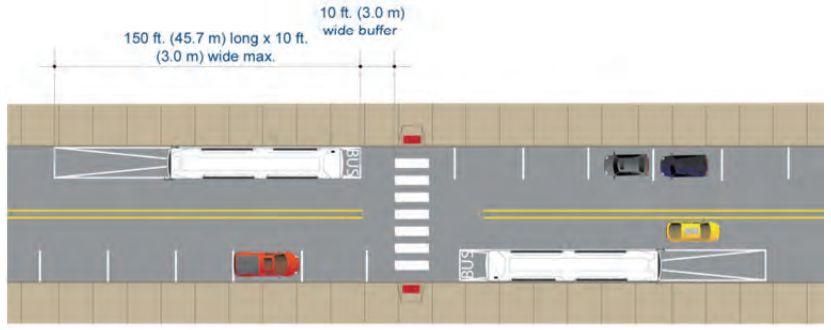
Source: DVRPC 2012

Figure 2: Typical near-side curbside stop configuration



Source: DVRPC 2012

Figure 3: Typical midblock curbside stop configuration



Source: DVRPC 2012

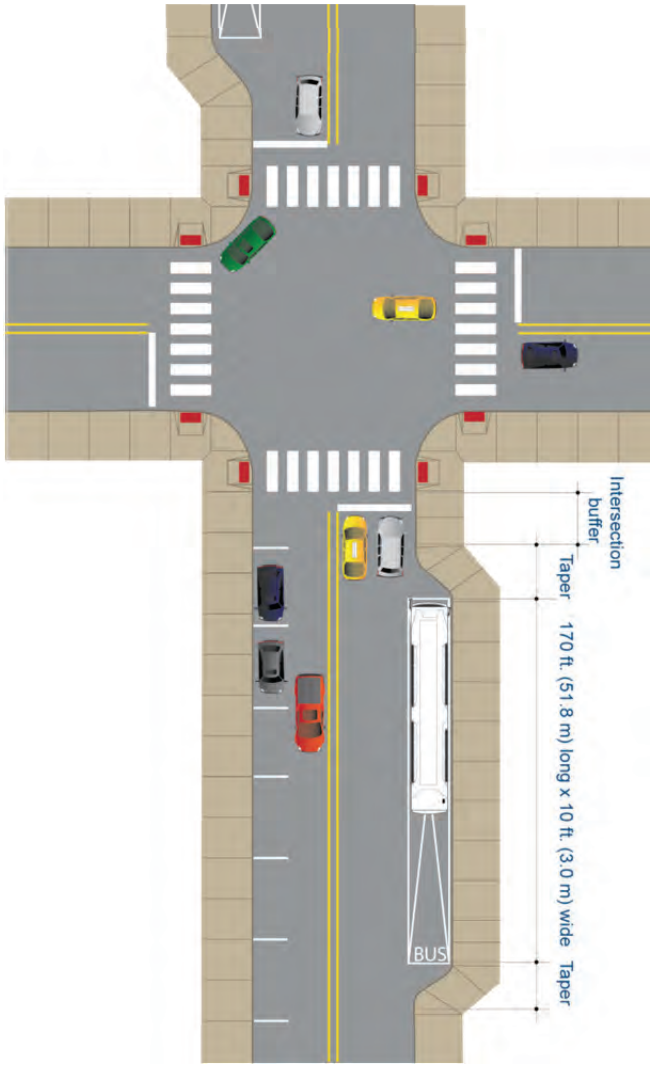
BUS BAY/TURNOUT

The bus bay or turnout is a location off-line with respect to the travel lanes, with a special curbed pull-out for buses. The bus bay allows general traffic to pass around a loading bus and interferes less with right-turning vehicles at the intersection. It can be effectively incorporated into a site design where high-volume loading is anticipated, such as an apartment complex. Typical dimensions are 170 feet (51.8m) long by 10 feet (3m) wide.

Advantages in using this configuration are where an intersection presents a particular hazard or conflict with transit operations. It is most effectively used where traffic speeds are more than 35 mph, when long dwell times are common, or as a system layover stop.

Far-side bus turnout on City Avenue (Source: SEPTA 2012)

Figure 4: Near-side bus bay example



Source: DVRPC 2012

CURB EXTENSION

A curb extension (or “bus bulb”) is a modification of the sidewalk to extend the bus loading/waiting area into the roadway. Because a curb extension can be as short as 15 feet (4.6 m)—see Table 2—it can conserve curbside space for parking relative to a curbside stop with a bus zone. It is most effectively used when travel speeds are lower than 30 mph, where pedestrian volumes are high, or where the sidewalk is narrow and additional waiting space is required. The curb extension provides a larger waiting area for passengers (to accomodate a shelter, for example), with less interference with pedestrians on the sidewalk, and can also serve as a pedestrian amenity by shortening the crossing distance. Curb extensions are most appropriate for near-side stops where there are parking lanes or multiple travel lanes.

Table 2: Curb extension dimensions for various vehicle/door configurations

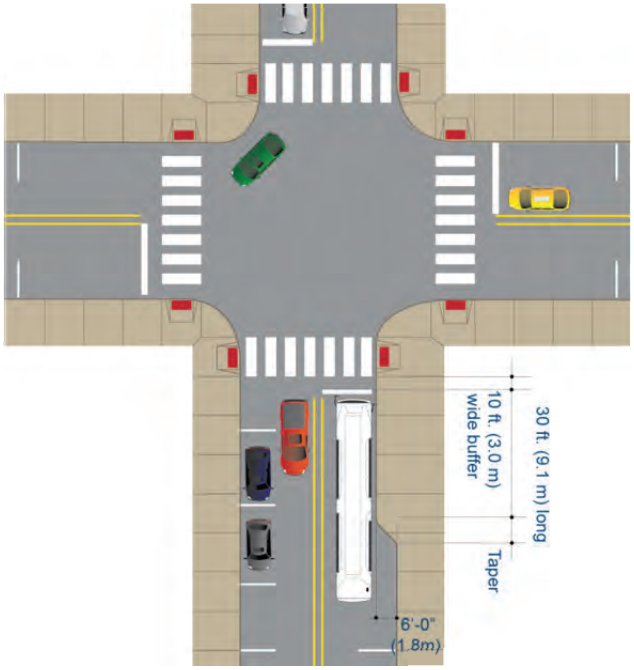
Vehicle	Vehicle length	Doors served	Bulb length (feet)*	Bulb Length (meters)*	On-street parking displaced**
All vehicle types: front doors only (min. length)	varies	1	15	4.6	1 space
Standard bus/trackless	41.5 ft.	2	30	9.1	2 spaces
Articulated bus/trackless	60.75 ft.	2-3	50	15.3	3 spaces
Kawasaki LRV Series 100, Single-end	50 ft.	2	32	9.7	2 spaces
Kawasaki LRV Series 100, Double-end	53 ft.	2	50	15.3	3 spaces
Conceptual LRV (5 door)	105 ft.	Front 2 only	45	13.7	3 spaces

Source: DVRPC 2012

*Plus 10-foot safety buffer from the crosswalk

**Assuming 20 feet length per parking stall, rounded up to the next stall

Figure 5: Near-side curb extension example



Source: DVRPC 2012

JFK Boulevard curb extension (Source: SEPTA 2012)

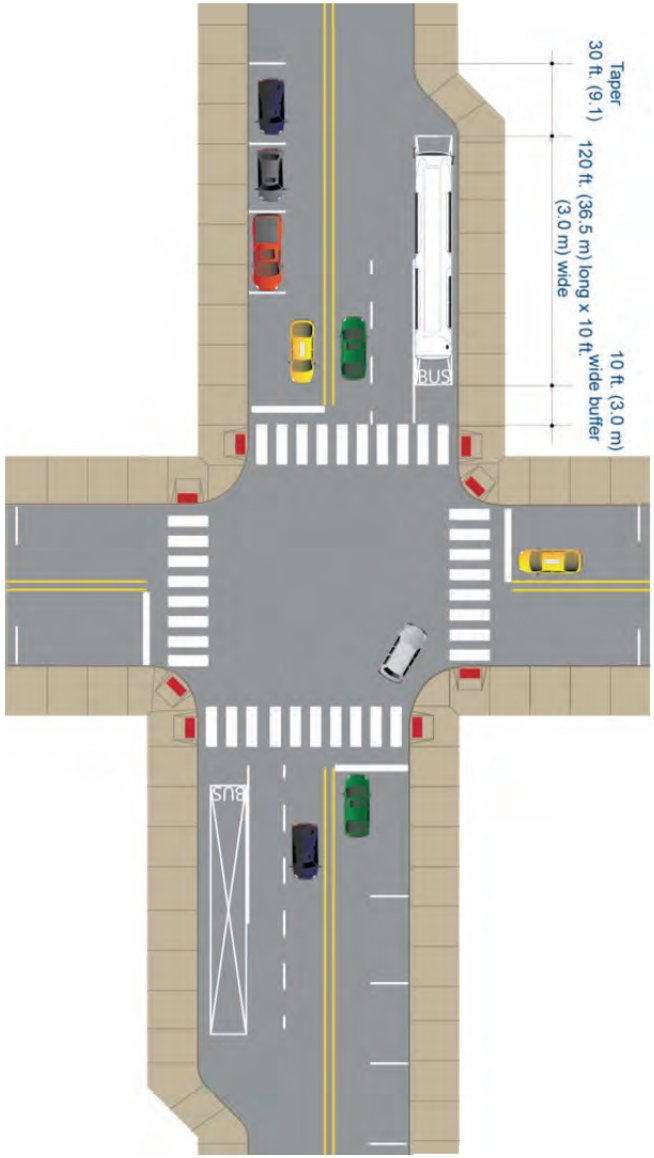
OPEN BUS BAY

The open bus bay is a variation on the bus bay which provides more maneuverability toward the upstream side of traffic flow. When used within a transportation center or depot setting, a “sawtoothed” arrangement is typical. Dimensions are 120 ft. (36.5m) for a standard bus—add 20 ft. (6.1m) for an articulated bus—plus length for acceleration and deceleration zones where required by travel speeds.

In this far-side example (Figure 6), the intersection is used as the deceleration zone. A near-side open bus bay can also be used effectively as a queue-jump lane in a Transit Signal Priority (TSP) scheme.

Sawtooth open bus bays at Norristown Transportation Center (Source: DVRPC 2011)

Figure 6: Far-side open bus bay example



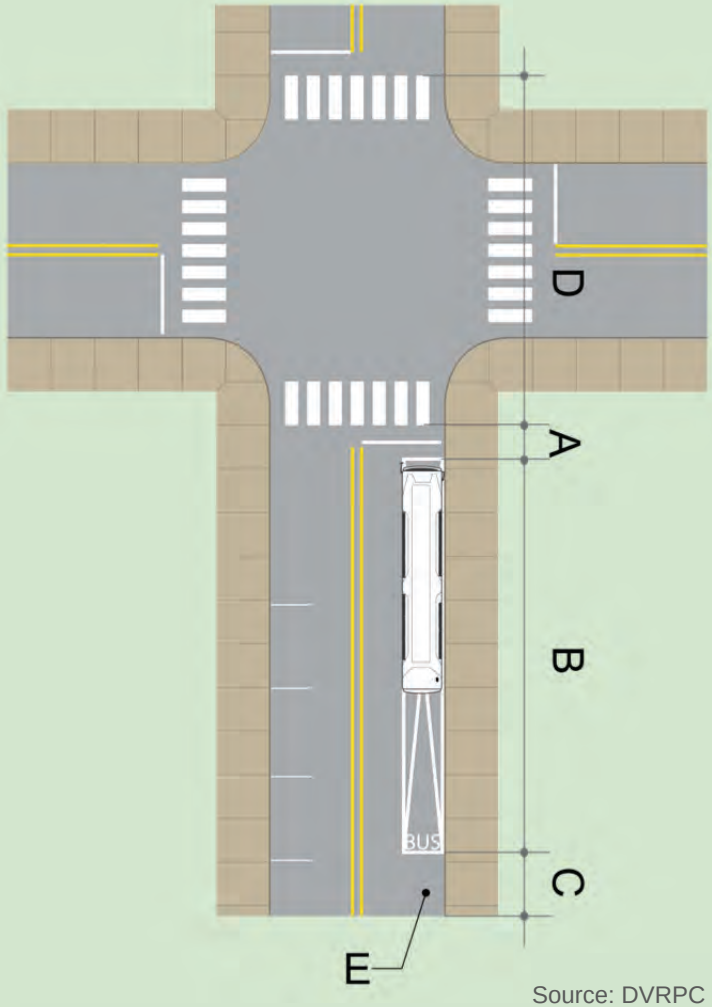
Source: DVRPC 2012

Detailed Dimensional Specifications

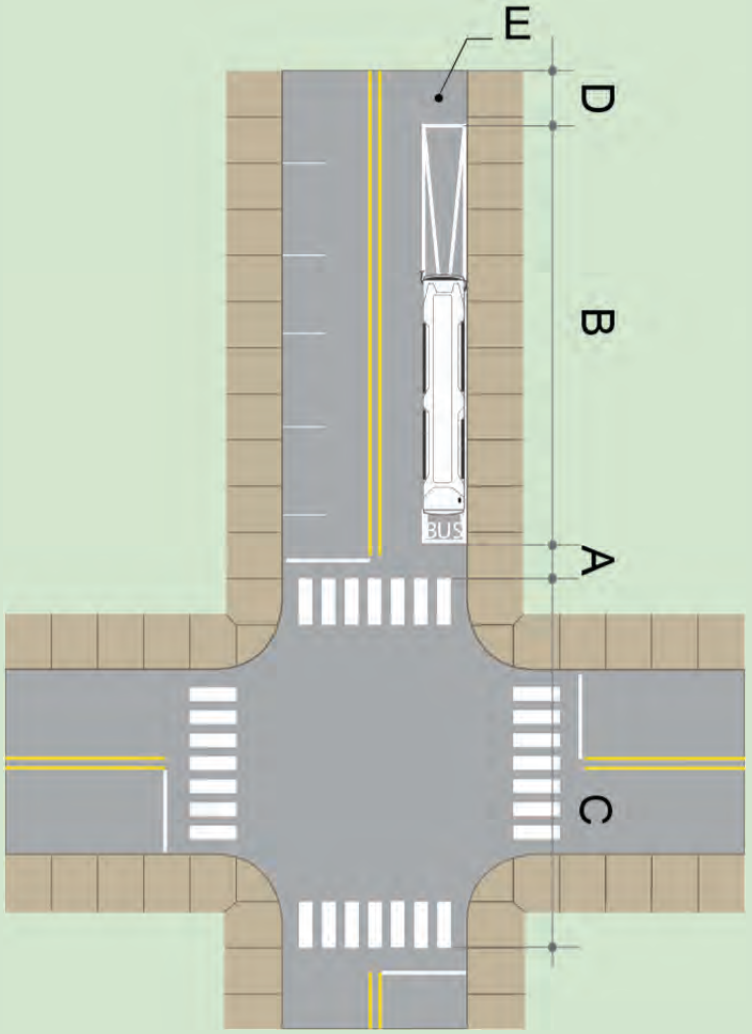
Table 3 contains dimensional specifications for transit stops and stop-related bus and traffic circulation. Each example has dimensional specifications grouped by operating context (for streets with on-street parking and other minor and major roadways). This reference table is not intended to be exhaustive, since every situation has unique characteristics. Rather, it should be used as guidance to inform design decisions based on local needs.

Bus shelter and waiting area offset from intersection, Philadelphia, PA (Source: DVRPC 2011)

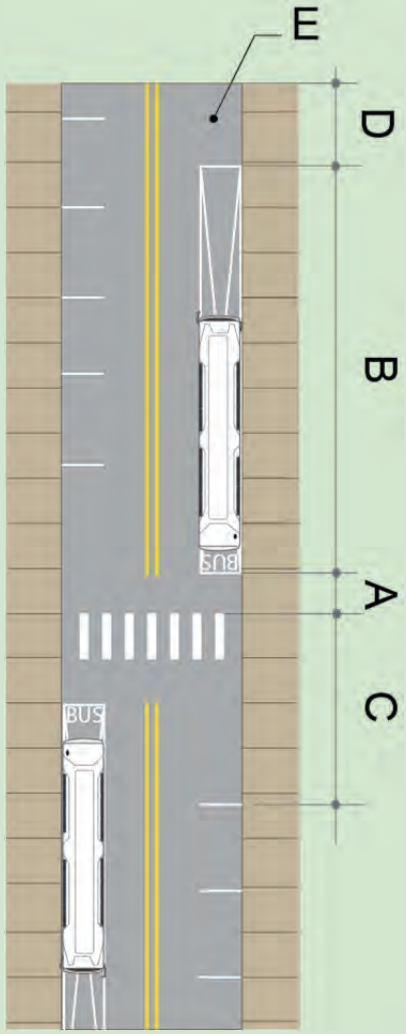
Table 3: Dimensional specifications for in-street (but outside travel lane) stop types

Stop Configuration	Roadway Characteristic	Minimum Safety Buffer	Primary Bus Zone Length	Additional Deceleration Space	Additional Acceleration Space	Equiv. Parking Spaces
Curbside/shoulder stop (near side)		A	B	C	D	E
 Source: DVRPC 2012	**Urban street with on-street parking:** typical posted speeds 25-30 mph; Bus enters stop area at 10 mph	10 ft. (3.0m) safety buffer behind crosswalk	100 ft. (30.5m) l x 10 ft. (3.0m) w in parking lane; add 20 ft. (6.1m) for articulated bus*	No additional space required	N/A: Uses intersection to accelerate	Up to 5 spaces needed to create bus zone
	Minor road with no on-street parking: typical posted speeds 25-35 mph; Bus enters stop area at 15 mph	10 ft. (3.0m) safety buffer behind crosswalk	100 ft. (30.5m) l x 10 ft. (3.0m) w in shoulder; add 20 ft. (6.1m) for articulated bus*	50 ft. (15.2 m) transition	N/A: Uses intersection to accelerate	None; road shoulder is used
	Major road with no on-street parking: typical posted speeds 35-45 mph; Bus enters stop area at 20 mph	10 ft. (3.0m) safety buffer behind crosswalk	100 ft. (30.5m) l x 11 ft. (3.4 m) w in shoulder; add 20 ft. (6.1m) for articulated bus*	100 ft. (30.5 m) transition	N/A: Uses intersection to accelerate	None; road shoulder is used

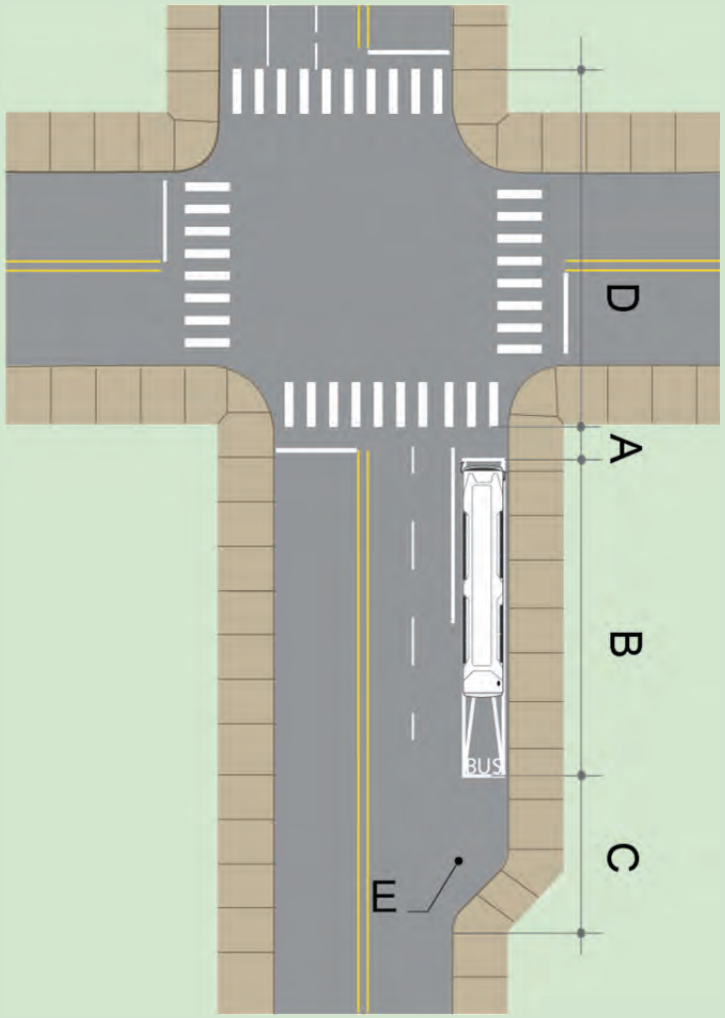
*The standard bus zone length in the City of Philadelphia has been 60 feet for standard buses and 90 feet for articulated buses. This practice will remain in place for city stops, with new bus zones meeting the standards in this table wherever possible.

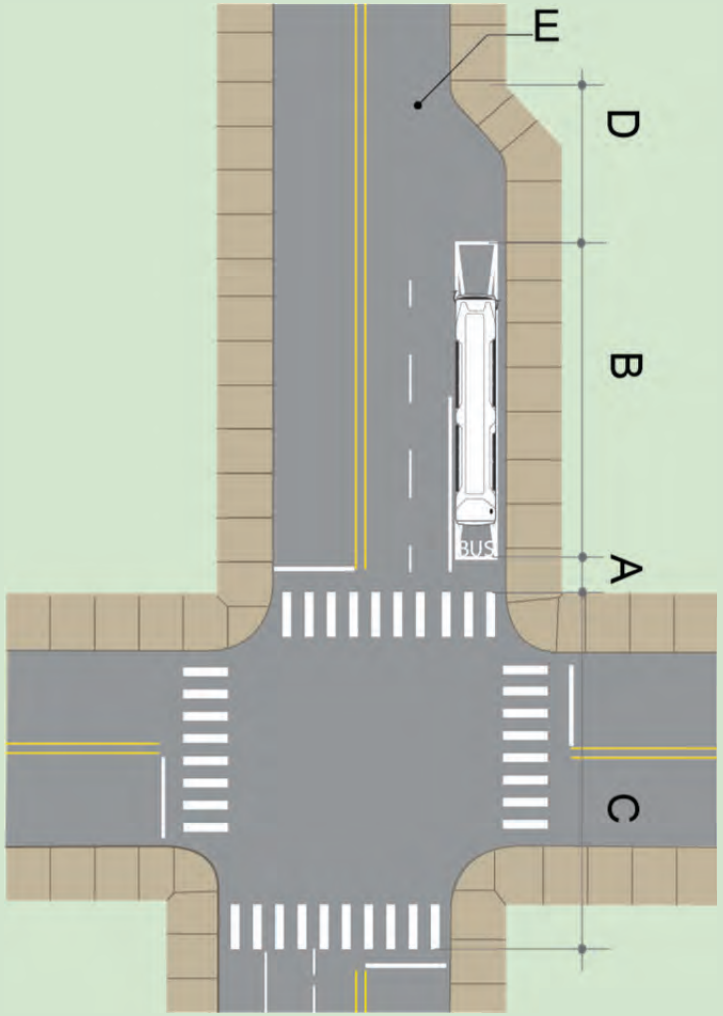
Stop Configuration	Roadway Characteristic	Minimum Safety Buffer	Primary Bus Zone Length	Additional Deceleration Space	Additional Acceleration Space	Equiv. Parking Spaces
Curbside/shoulder stop (far side)		A	B	C	D	E
 Source: DVRPC 2012	**Urban street with on-street parking:** typical posted speeds 25-30 mph; Bus enters stop area at 10 mph	10 ft. (3.0m) safety buffer beyond crosswalk	90 ft. (27.4m) l x 10 ft. (3.0m) w in parking lane; add 20 ft. (6.1m) for articulated bus*	N/A: Uses intersection to decelerate	No additional space required	Up to 5 spaces needed to create bus zone
	Minor road with no on-street parking: typical posted speeds 25-35 mph; Bus enters stop area at 15 mph	10 ft. (3.0m) safety buffer beyond crosswalk	90 ft. (27.4m) l x 10 ft. (3.0m) w in shoulder; add 20 ft. (6.1m) for articulated bus*	N/A: Uses intersection to decelerate	50 ft. (15.2 m) transition	None; road shoulder is used
	Major road with no on-street parking: typical posted speeds 35-45 mph; Bus enters stop area at 20 mph	10 ft. (3.0m) safety buffer beyond crosswalk	90 ft. (27.4m) l x 11 ft. (3.4 m) w in shoulder; add 20 ft. (6.1m) for articulated bus*	N/A: Uses intersection to decelerate	100 ft. (30.5 m) transition	None; road shoulder is used

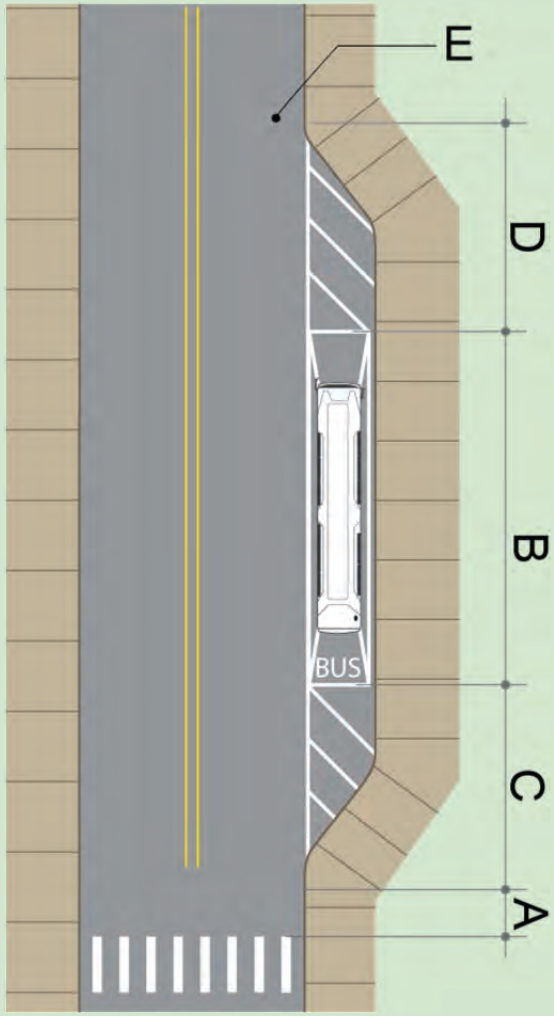
*The standard bus zone length in the City of Philadelphia has been 60 feet for standard buses and 90 feet for articulated buses. This practice will remain in place for city stops, with new bus zones meeting the standards in this table wherever possible.

Stop Configuration	Roadway Characteristic	Minimum Safety Buffer	Primary Bus Zone Length	Additional Deceleration Space	Additional Acceleration Space	Equiv. Parking Spaces
Curbside/shoulder stop (midblock)		A	B	C	D	E
 Source: DVRPC 2012	**Urban street with on-street parking:** typical posted speeds 25-30 mph; Bus enters stop area at 10 mph	10 ft. (3.0m) safety buffer beyond crosswalk	150 ft. (45.7 m) l x 10 ft. (3.0m) w in parking lane; add 20 ft. (6.1m) for articulated bus*	No additional space required	No additional space required	Up to 8 spaces needed to create bus zone
	Minor road with no on-street parking: typical posted speeds 25-35 mph; Bus enters stop area at 15 mph	10 ft. (3.0m) safety buffer beyond crosswalk	150 ft. (45.7 m) l x 10 ft. (3.0m) w in shoulder; add 20 ft. (6.1m) for articulated bus*	40 ft. (12.2 m) transition	50 ft. (15.4 m) transition	None; road shoulder is used
	Major road with no on-street parking: typical posted speeds 35-45 mph; Bus enters stop area at 20 mph	10 ft. (3.0m) safety buffer beyond crosswalk	150 ft. (45.7 m) l x 11 ft. (3.4 m) w in shoulder; add 20 ft. (6.1m) for articulated bus*	90 ft. (27.4 m) transition	100 ft. (30.7 m) transition	None; road shoulder is used

*The standard bus zone length in the City of Philadelphia has been 60 feet for standard buses and 90 feet for articulated buses. This practice will remain in place for city stops, with new bus zones meeting the standards in this table wherever possible.

Stop Configuration	Roadway Characteristic	Minimum Safety Buffer	Primary Bus Zone Length	Additional Deceleration Space	Additional Acceleration Space	Equiv. Parking Spaces
Open bus bay stop (near side)		A	B	C	D	E
 Source: DVRPC 2012	**Urban street with on-street parking:** typical posted speeds 25-30 mph; Bus enters stop area at 10 mph	10 ft. (3.0m) safety buffer beyond crosswalk	120 ft. (36.5 m) l x 10 ft. (3.0m) w in bus bay; add 20 ft. (6.1m) for articulated bus	50 ft. (15.2 m) taper	N/A: Uses intersection to accelerate	Up to 9 spaces
	Minor road with no on-street parking: typical posted speeds 25-35 mph; Bus enters stop area at 15 mph	10 ft. (3.0m) safety buffer beyond crosswalk	120 ft. (36.5 m) l x 10 ft. (3.0m) w in bus bay; add 20 ft. (6.1m) for articulated bus	40 ft. (12.2 m) transition plus 50 ft. (15.2 m) taper	N/A: Uses intersection to accelerate	N/A
	Major road with no on-street parking: typical posted speeds 35-45 mph; Bus enters stop area at 20 mph	10 ft. (3.0m) safety buffer beyond crosswalk	120 ft. (36.5 m) l x 11 ft. (3.4 m) w in bus bay; add 20 ft. (6.1m) for articulated bus	90 ft. (27.4 m) transition plus 55 ft. (16.8 m) taper	N/A: Uses intersection to accelerate	N/A

Stop Configuration	Roadway Characteristic	Minimum Safety Buffer	Primary Bus Zone Length	Additional Deceleration Space	Additional Acceleration Space	Equiv. Parking Spaces
Open bus bay stop (far side)		A	B	C	D	E
 Source: DVRPC 2012	**<u>Urban street with on-street parking:</u>** typical posted speeds 25-30 mph; Bus enters stop area at 10 mph	10 ft. (3.0m) safety buffer beyond crosswalk	120 ft. (36.5 m) l x 11 ft. (3.4 m) w in bus bay; add 20 ft. (6.1m) for articulated bus	N/A: Uses intersection to decelerate	30 ft. (9.1 m) taper	Up to 8 spaces
	<u>Minor road with no on-street parking:</u> typical posted speeds 25-35 mph; Bus enters stop area at 15 mph	10 ft. (3.0m) safety buffer beyond crosswalk	120 ft. (36.5 m) l x 11 ft. (3.4 m) w in bus bay; add 20 ft. (6.1m) for articulated bus	N/A: Uses intersection to decelerate	40 ft. (12.2 m) transition plus 30 ft. (9.1 m) taper	N/A
	<u>Major road with no on-street parking:</u> typical posted speeds 35-45 mph; Bus enters stop area at 20 mph	10 ft. (3.0m) safety buffer beyond crosswalk	120 ft. (36.5 m) l x 11 ft. (3.4 m) w in bus bay; add 20 ft. (6.1m) for articulated bus	N/A: Uses intersection to decelerate	90 ft. (27.4 m) transition plus 33 ft. (10.1 m) taper	N/A

Stop Configuration	Roadway Characteristic	Minimum Safety Buffer	Primary Bus Zone Length	Additional Deceleration Space	Additional Acceleration Space	Equiv. Parking Spaces
Bus bay stop		A	B	C	D	E
 Source: DVRPC 2012	**Urban street with on-street parking:** typical posted speeds 25-30 mph; Bus enters stop area at 10 mph	10 ft. (3.0m) safety buffer beyond crosswalk	170 ft. (51.8 m) l x 10 ft. (3.0m) w in bus bay; add 20 ft. (6.1m) for articulated bus	50 ft. (15.2 m) taper	30 ft. (9.1 m) taper	Up to 13 spaces
	Minor road with no on-street parking: typical posted speeds 25-35 mph; Bus enters stop area at 15 mph	10 ft. (3.0m) safety buffer beyond crosswalk	170 ft. (51.8 m) l x 10 ft. (3.0m) w in bus bay; add 20 ft. (6.1m) for articulated bus	50 ft. (15.2 m) transition plus 50 ft. (15.2 m) taper	70 ft. (21.3 m) transition plus 30 ft. (9.1 m) taper	N/A
	Major road with no on-street parking: typical posted speeds 35-45 mph; Bus enters stop area at 20 mph	10 ft. (3.0m) safety buffer beyond crosswalk	170 ft. (51.8 m) l x 11 ft. (3.4 m) w in bus bay; add 20 ft. (6.1m) for articulated bus	90 ft. (27.4 m) transition plus 55 ft. (16.8 m) taper	140 ft. (42.7 m) transition plus 33 ft. (10.1 m) taper	N/A

Engineering Considerations to Accommodate SEPTA Buses

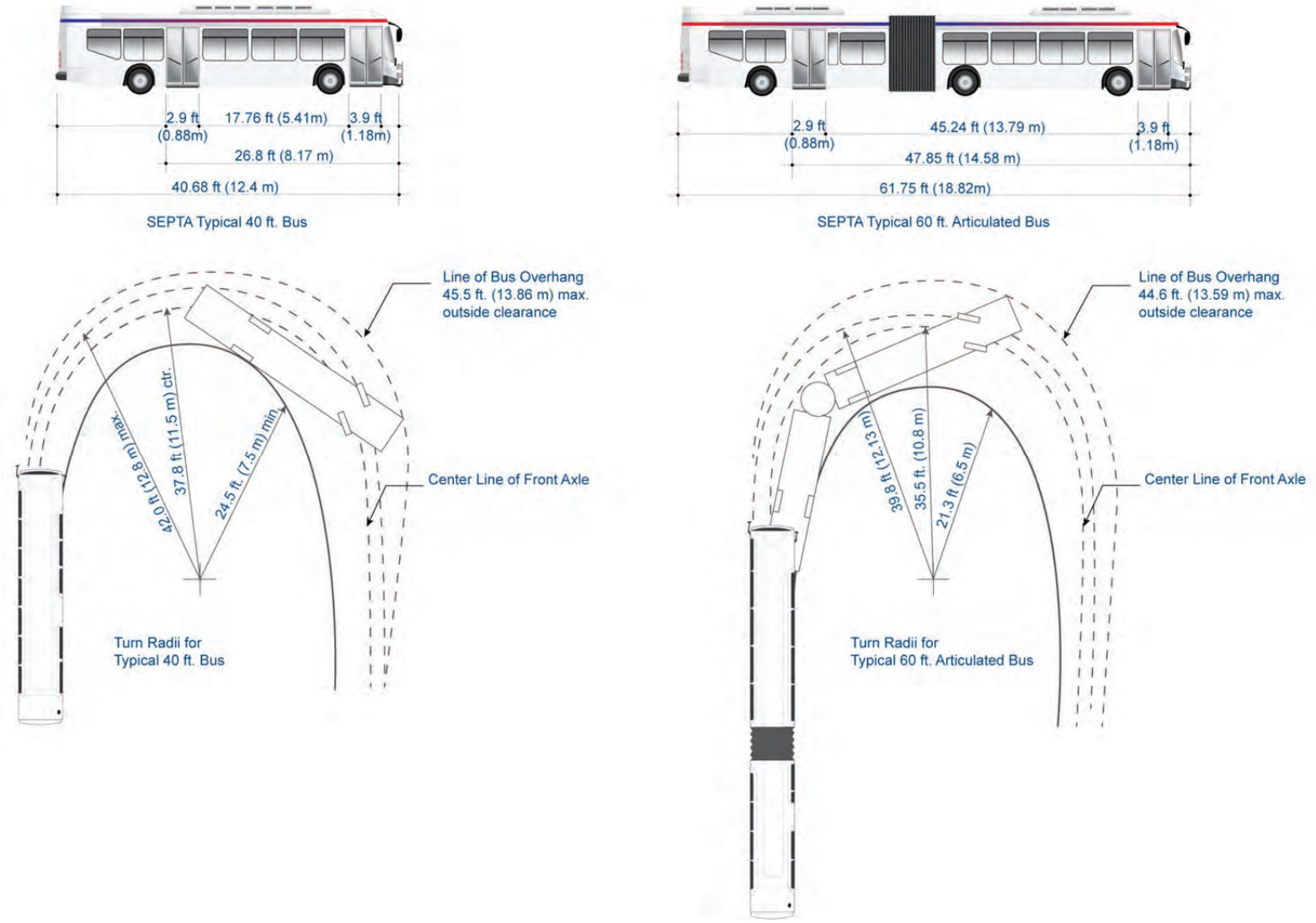
Vehicle dimensions for bus equipment in the U.S. are commonly 40 feet (12.2m) long for a standard bus and 60 feet (18.3m) for an articulated bus. The North American Bus Industries (NABI) LFW Gen III used by SEPTA is 40.7 feet (12.4m) long bumper-to-bumper, and the articulated version is 61.8 feet (18.82m) long. Consideration in the bus zone should also be given to the loading and unloading of bicycles from the front-of-bus rack, which adds an additional six feet (1.8m) to the loading zone vehicle length. Vehicle height is 11.1 feet (3.4m) for both types.

In-street stop design also requires consideration of horizontal and vertical clearances for both passengers and vehicles. The curbside stop area should be free of horizontal obstructions at least two feet (0.6m) from the curb face. Vertical obstructions should be clear from the loading area surface to a height of at least nine feet (2.7m), and preferably 12 feet (3.7m) or more.

Turning radii are important considerations for stop locations where the bus makes a turn or deviates from its primary corridor. The required turning radius must be accommodated so a bus will not halt in the pedestrian way or impede other traffic flow. Figure 7 illustrates the specific radii requirements for the NABI LFW Gen II buses used by SEPTA. As a general rule to permit comfortable bus movements, corners should be designed for 50 feet (15.24m) outside and 30 feet (9.14m) inside turning radii.

Bus lane with multiple waiting areas, Metroplex Shopping Center, Plymouth Meeting, PA (Source: SEPTA 2012)

Figure 7: Turning radii for SEPTA standard and articulated buses



Source: DVRPC 2012, AASHTO 2002 (*Interim Guide, Geometric Design for Transit Vehicles on Highways and Streets*)

ROADWAY PAVING CONSIDERATIONS

Roadway design must accommodate the wear and tear of constant vehicle traffic and passenger loading. A transit stop's road surface should be durable enough to withstand heavier loads than average daily traffic under normal conditions. Traffic flow may be disrupted due to excessively damaged road surfaces, which would also increase vehicle maintenance needs.

In general, roadway pavement design must be evaluated using the American Association of State Highway and Transportation Officials' (AASHTO) *Guide for the Design of Pavement Structures*. Most states and many municipalities have a version of this standard, which would be used to engineer the appropriate design for a particular site and climate condition. Some basic steps used to evaluate an appropriate paving surface required for a bus stop location would include:

1. **Defining a scope of work:** Identify what considerations will be needed for a location. Evaluate the type of paving required (new paving, reconstruction, resurfacing, or reclaiming existing paving). Identify the type of paving treatment desired: flexible Hot Mix Asphalt (HMA), rigid (concrete), composite (combination HMA and concrete), or permeable (porous asphalt or pavers) treatments may be considered.

2. **Collecting data:** Perform field investigation of site, drainage, soils, etc. Determine site design criteria, including the bus loading areas and the bus travel path to determine lane widths and necessary turning radii. If existing paved areas are to be reused, determine the thickness, composition, and subbase conditions. Test existing conditions to determine suitability to add bus transit to the location.

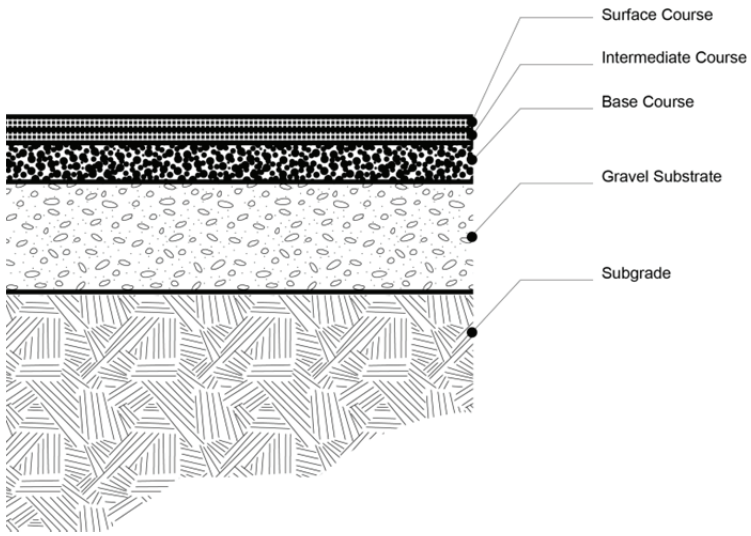
3. **Collect traffic data:** This is one component used to determine a Design Bearing Ratio (DBR) for the paved surface design criteria. The Annual Average Daily Traffic (AADT) along the roadway must be determined using current traffic count data plus estimated traffic counts for the next 20 years.

4. **Determine the final design criteria** based upon all the information gathered from previous steps. All roadway or parking area designs where transit service is provided must be reviewed by a qualified engineer to ensure that the roadway can reasonably withstand regular transit use.

Concrete pad in street at bus stop area, Suburban Square, Ardmore, PA (Source: SEPTA 2012)

A reinforced concrete pad is recommended for bus stop areas, particularly in park-and-ride or depot situations, where multiple routes and heavier loads can be expected. A concrete pad can be incorporated or retrofitted into the roadway design to provide a heavy-duty surface that will handle constant heavy vehicle stress; however, local conditions must be evaluated to determine the best design for a particular site.

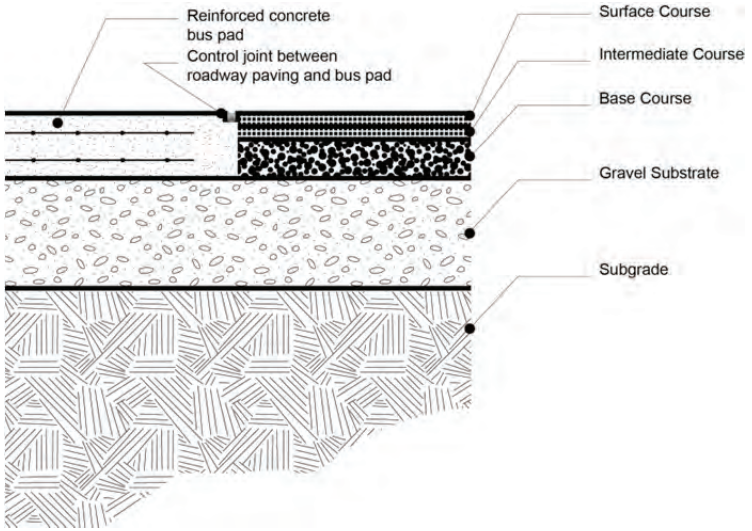
Figure 8: Flexible paving components for high-volume roadway



Source: DVRPC 2012

Figures 8 and 9 illustrate typical asphalt and concrete cross-sections to accommodate transit. However, because SEPTA is not the final evaluating authority, all roadway recommendations should be based upon local construction and safety code requirements. Consult with local officials, engineering professionals, and design professionals for specific details.

Figure 9: Concrete bus pad integrated into flexible paving roadway design



Source: DVRPC 2012

CHAPTER 3

Curbside Design

Introduction

Curbside design addresses all aspects of the interface between a transit stop and the development it serves.

Universal Design and ADA

Universal design means that facilities for transportation are designed to be not only used easily by those with disabilities, but also by users who may be temporarily encumbered, such as someone carrying a large load of groceries, a parent with a stroller, or someone temporarily using crutches. Special attention is given to the path of travel for pedestrians to the bus stop, the loading area clearances, and any furnishings that may be part of the bus stop. All new or newly renovated facilites must be designed and upgraded to meet current Americans with Disabilities Act (ADA) accessibility standards.

SEPTA Curbside Passenger Facility Design

Curbside passenger facilities have three primary elements: a loading area, which provides ample space for loading and unloading passengers; an adjacent waiting area; and an accessible pedestrian path to reach the stop. Appropriate stop dimensions and amenities are determined using factors such as passenger volume, nearby trip generation, and local needs. When evaluating stops, consideration should be given to persons with disabilities. Design guidelines for specific stop types are detailed in Table 4.

Loading area:

A level loading area should be provided at a minimum where the front doors of the bus open to receive and discharge passengers. Locating a clear area at the front of the bus allows easy deployment of the front door ramp or the kneeling feature of the vehicle for disabled persons. Where space permits, a second loading pad should also be installed to provide space for passengers alighting from the bus' rear doors. Loading areas/pads should be a minimum of five feet (1.5m) wide along the curb by eight feet (2.4m) deep, which is the ADA standard. Loading pads can be configured with a detectible edge to be easily located by drivers and passengers, and should be comprised of a firm, slip resistant surface suitable for use in all weather conditions.

Passenger boarding bus from front door loading pad (Source: Delaware County Planning Department 2010)

Waiting area:

A bus stop waiting area should be sized to reflect expected passenger volumes and, at a minimum, be wide enough at the curbline to provide a safe place for passengers to wait outside of the loading area. In locations where both pedestrian volumes and the number of transit passengers expected to use a stop are relatively low, the waiting area may overlap with the pedestrian path. Where pedestrian and/or passenger volumes are higher, care should be given to separate the waiting area and pedestrian path to the greatest extent practical.

The waiting area typically extends outside of a shelter (if present) to connect with the loading area (Source: Chester County Planning Commission 2010)

A detectable edge at the curbline that clearly defines the bus stop is desirable and can be comprised of any appropriate material in a contrasting color. Well-defined waiting and loading areas speed up passenger movements. The surface must be durable, slip resistant, and free of horizontal or vertical obstructions or tripping hazards. All clearances must meet ADA Accessibility Guidelines (ADAAG) 2010 criteria and local codes. Refer to Table 4 for dimensions and examples.

Space allocation for detailed waiting area calculations: The Transit Capacity and Quality of Service Manual (TCQSM; TCRP Report 100) indicates in Table 7.8 (Levels of Service for Queueing Areas) that a standing waiting area should consist of seven square feet (0.65 m²) per person net area to achieve a level of service between C and D. The net area is defined as the area remaining after subtracting the areas reserved for pedestrian pathways and the bus loading pad from the total area. Excluding the ADA-specified clearances for the loading pad and other street furnishings, additional clearance space for obstructions by local barriers, such as poles or hydrants, should be evaluated.

Large shelters such as this one at Montgomery County Community College can accommodate higher numbers of waiting passengers
(Source: SEPTA 2012)

Pedestrian access to Stops:
A minimum four foot (1.2m) wide clear pedestrian path should be provided for access to the bus stop waiting area and loading area. A sidewalk that connects the bus stop to adjacent development or neighborhoods is the most common solution. The sidewalk or trail should provide a clear pedestrian path to and from the bus stop area, the bus stop loading pad, and the bus shelter or bench, when present.

Pedestrian path connecting stop area to surrounding development (Source: SEPTA 2012)

A stop location adjacent to a trail can be accommodated by providing a short pedestrian link to the bus pad and waiting area. The trail can be used as a loading pad if it is wide enough to provide pedestrian passing space in addition to the loading pad area and is located adjacent to the roadway. Cinder, gravel, or dirt trail surfaces are not suitable to withstand wear from waiting passengers. A hard or impervious surface can be incorporated into the area of the trail used for the bus stop.

When a bus stop is required in an area that does not have a formal sidewalk, a portion of the pedestrian path may be located within the shoulder unless pedestrian use of the shoulder is prohibited. For such use, the shoulder should be 8 feet (2.4 m) wide, have slopes not exceeding five percent, and cross slopes and running slopes equal to the roadway geometry but not more than 8.3 percent in the direction of roadway travel.

OTHER ELEMENTS

Signage: The bus pad should be well marked with a double-sided sign, preferably on its own pole. Stop signage will be provided by SEPTA. Clear and distinct signage differentiates the stop area from other roadside information and indicates locations to connect with other SEPTA service. The sign location assists passengers in visually gauging the stopping point for the vehicle, and for those who are visually impaired, the sign post can provide a landmark in locating the bus loading pad with the aid of a cane.

Current SEPTA signage standards (detailed in Appendix A) include a standard sign 18 inches (457mm) tall and 12 inches (305mm) wide, with lettering indicating the bus route number, unique stop identifier number, and route destination points. All basic information contained on the sign is designed to be ADA compliant, including graphic symbols and type sizes per section 703-Signs, ADAAG 2010. Standard signage also contains phone numbers for SEPTA customer service and TDD/TYY messaging for the hearing impaired and those with disabilities.

Transit stop signs should be displayed along the roadway in a way that does not interfere with traffic signage. The preferred sign location is set back from the curb edge two feet (0.6m) and with two feet (0.6m) clearance from the bus loading pad.

Lighting: Lighting within the bus stop area enhances safety by improving both SEPTA driver and passenger visibility. It also provides a sense of security and contributes to defining the waiting area. Lighting may take several forms in any combination to provide an average level of 1.3 to 2.6 f.c. (horizontal foot candles) or 13 to 26 lux, which is roughly the typical light level around a building entrance. A nearby street light can also be used for stop-area lighting. The bus stop signage should be illuminated and, if present, shelter fixtures can provide added light levels. Wherever possible, energy saving devices, such as efficient lamps, solar power, and daylight sensing equipment, should be used.

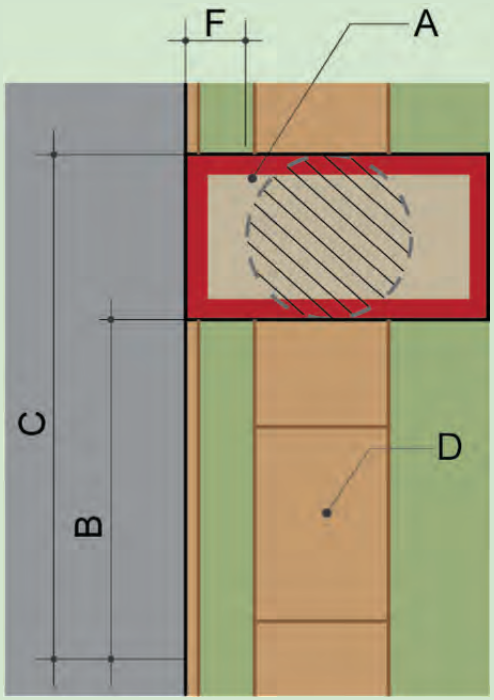
Detailed Dimensions for Curbside Passenger Facilities

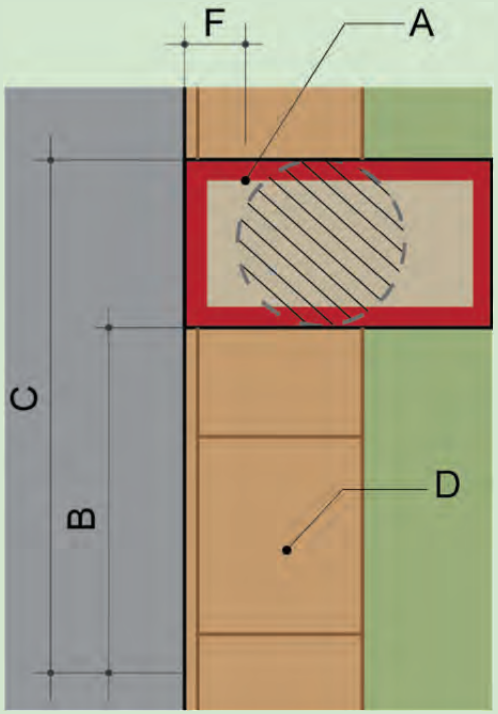
Table 4 details dimensions and specifications for common curbside stop types and operating contexts. **Each stop type includes the basic building block of a five foot (1.5m) long parallel to the curb by eight foot (2.4m) deep loading pad connected to a pedestrian path that is four feet (1.2m) wide or wider, as called for by local sidewalk standards.** Waiting areas are separate from the loading pad. Bus stops can be sized to meet community-specific needs; however, the minimum bus loading pad should be maintained.

This reference table is not intended to be exhaustive, since every situation has unique characteristics. Rather, it should be used as guidance to inform design decisions based on local needs.

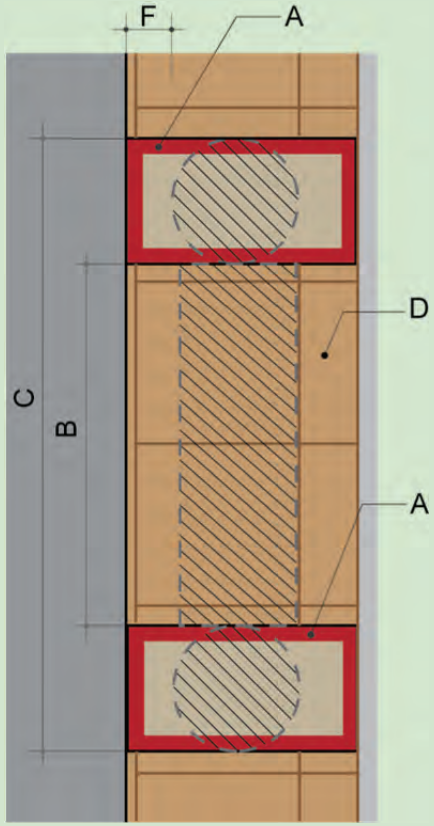
Shelter and stop area along Chestnut Street in Center City Philadelphia (Source: DVRPC 2011)

Table 4: Dimensional specifications for curbside passenger facilities

TYPE 1: **Minimum stop with recessed pedestrian path**	**Element**		**Details**
 Source: DVRPC 2012	A	Loading pad	5 ft. (1.5m) long x 8 ft. (2.4m) deep; pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. (1.5m) diameter clear turning radius for wheelchair users. Sign should be located adjacent to the loading pad to clearly indicate bus stop.
	B	Waiting area	7 ft. (2.1m) long x 4 ft. (1.2m) deep; waiting area can be accommodated in the pedestrian path if pedestrian volumes are low. Provides enough area for 4 passengers at 7 SF (0.65m^2) per person, 28 SF (2.6 m^2) total.
	C	Stop area	A 12 ft. (3.7m) area along the curbline should be kept free from obstructions. The length should provide free access to the vehicle's front doors.
	D	Pedestrian path	Minimum 4 ft. (1.2m) deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or similar walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad. Wider path is desirable to provide space for passing.
	E	Furniture	N/A
	F	Clear area	2 ft. (0.6 m) from the curb edge, 9 ft. (2.7 m) minimum height.

TYPE 2: Minimum stop with curbside pedestrian path		Element	Details
 Source: DVRPC 2012	A	Loading pad	5 ft. (1.5m) long x 8 ft. (2.4m) deep; pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. (1.5m) diameter clear turning radius for wheelchair users. Sign should be located adjacent to the loading pad to clearly indicate bus stop.
	B	Waiting area	7 ft. (2.1m) long x 4 ft. (1.2m) deep; waiting area can be accommodated in the pedestrian path if pedestrian volumes are low. Provides enough area for 4 passengers at 7 SF (0.65m²) per person, 28 SF (2.6 m²) total.
	C	Stop area	A 12 ft. (3.7m) area along the curbline should be kept free from obstructions. The length should provide free access to the vehicle's front doors.
	D	Pedestrian path	Minimum 4 ft. (1.2m) deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or similar walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad. Wider path is desirable to provide space for passing.
	E	Furniture	N/A
	F	Clear area	2 ft. (0.6 m) from the curb edge, 9 ft. (2.7 m) minimum height.

TYPE 3:
Narrow urban stop

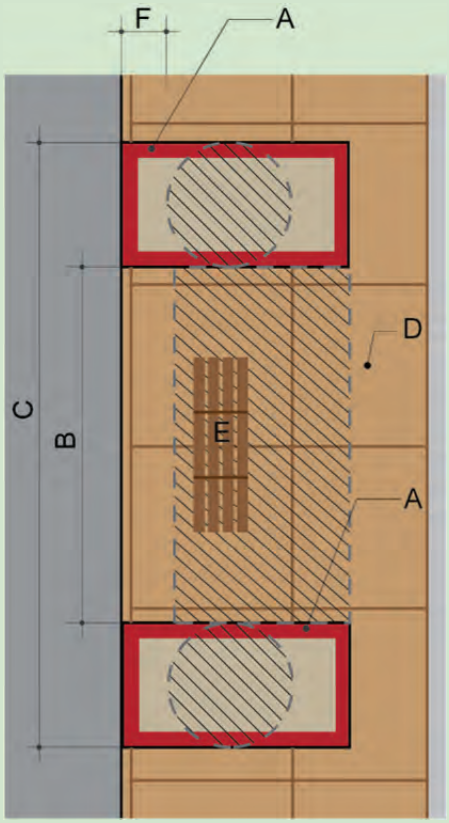


NOTE:
This example assumes an 8 ft. (2.4m) sidewalk.

Source: DVRPC 2012

Element		Details
A	Loading pad	5 ft. (1.5m) long x 8 ft. (2.4m) deep; pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. (1.5m) diameter clear turning radius for wheelchair users. Where possible, loading pads should be provided for both front and rear doors (as pictured here). Sign should be located adjacent to the front loading pad to clearly indicate bus stop.
B	Waiting area	16 ft. (4.6m) long x 4 ft. (1.2m) deep between bus doors; waiting area can be accommodated in the pedestrian path if pedestrian volumes are low. Provides enough area for 9 passengers at 7 SF (0.65 m^2) per person, 64 SF (6.0 m^2) total.
C	Stop area	26 ft. (7.9m) long area should be kept free from obstructions along the curb edge. The length should provide free access to vehicle's front and rear doors.
D	Pedestrian path	Minimum 4 ft. (1.2m) deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad.
E	Furniture	N/A
F	Clear area	2 ft. (0.6 m) from the curb edge, 9 ft. (2.7 m) minimum height.

TYPE 4:
Urban stop with seating

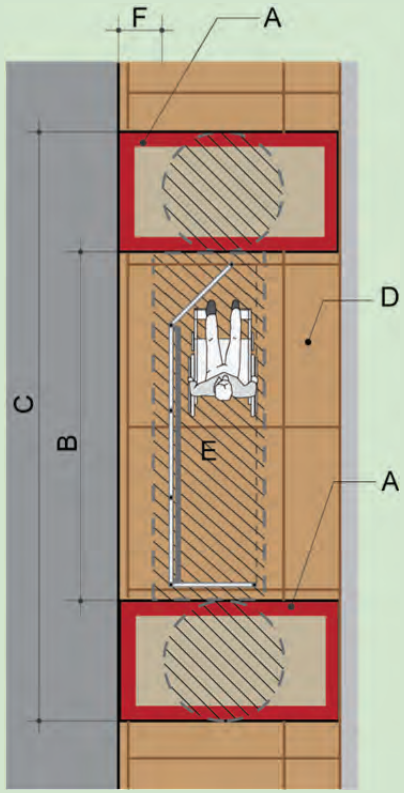


NOTE:
This example assumes a 12 ft. (3.6m) sidewalk.

Source: DVRPC 2012

Element		Details
A	Loading pad	5 ft. (1.5m) long x 8 ft. (2.4m) deep; pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. (1.5m) diameter clear turning radius for wheelchair users. Where possible, loading pads should be provided for both front and rear doors (as pictured here). Sign should be located adjacent to the front loading pad to clearly indicate bus stop.
B	Waiting area	16 ft. (4.6m) long x 6 ft. (1.8m) deep between bus doors; waiting area can be accommodated in the pedestrian path if pedestrian volumes are low. After subtracting the bench dimension, waiting area provides enough space (86 SF; 8.0 m²) for 12 standing passengers at 7 SF (0.65 m²) per person, plus seating space for 3.
C	Stop area	26 ft. (7.9m) long area should be kept free from obstructions along the curb edge. The length should provide free access to vehicle's front and rear doors.
D	Pedestrian path	Minimum 4 ft. (1.2m) deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad. Wider path is desirable to provide space for passing.
E	Furniture	6.5 ft. (2m) long bench, 3 seats with hand rails for seniors and those with disabilities. Made of a durable material, with or without a back. Keep at least 3 ft. (0.9m) clear around all furniture, which should be located close to the street or adjacent to buildings rather than in the middle of the primary pedestrian path.
F	Clear area	2 ft. (0.6 m) from the curb edge, 9 ft. (2.7 m) minimum height.

TYPE 5:
Stop with narrow shelter

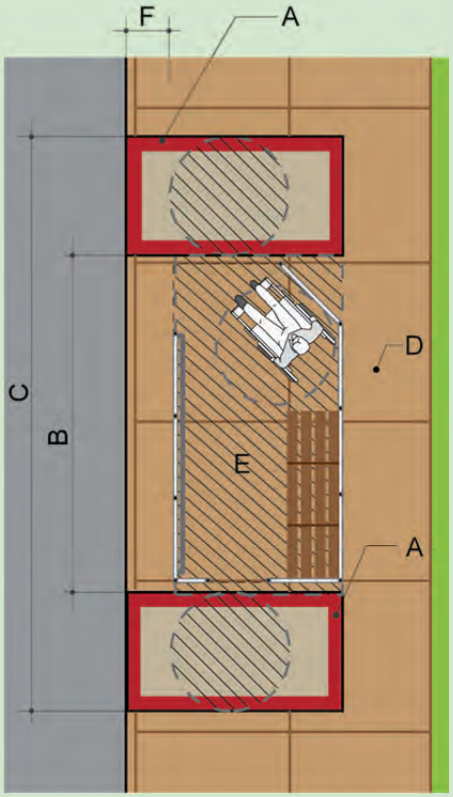


NOTE:
This example assumes an 8 ft. (2.4m) sidewalk. A narrow shelter may also be a good option where sidewalks are wider but pedestrian volume is high or pedestrian accommodations are prioritized.

Source: DVRPC 2012

Element		Details
A	Loading pad	5 ft. (1.5m) long x 8 ft. (2.4m) deep; pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. (1.5m) diameter clear turning radius for wheelchair users. Where possible, loading pads should be provided for both front and rear doors (as pictured here). Sign should be located adjacent to the loading pad to clearly indicate bus stop.
B	Waiting area	16 ft. (4.6m) long x 4 ft. (1.2m) deep between doors; waiting area can be partially accommodated in the pedestrian path if pedestrian volumes are low. Provides enough net area for 9 passengers, including 6 within the shelter at 7 SF (0.65m²) per person, 64 SF (6.0 m²) total. Shelter design and configuration may vary.
C	Stop area	26 ft. (7.9m) long area should be kept free from obstructions along the curb edge. The length should provide free access to vehicle's front and rear doors.
D	Pedestrian path	Minimum 4 ft. (1.2m) deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad. Keep 3 ft. (.9m) clear around all street furniture and building elements.
E	Furniture	15 ft. (4.6m) long x 3 ft. (0.9m) wide x 9 ft. high shelter with lean rail, stop information, and advertising panel. Glass panels allow view of arriving bus and weather protection. 45 interior SF (4.2 m²) can accommodate 6 passengers.
F	Clear area	2 ft. (0.6 m) from the curb edge, 9 ft. (2.7 m) minimum height.

TYPE 6:
Stop with standard shelter



NOTE:.
This example assumes a 12 ft. (3.6m) sidewalk. A shelter with narrower width than 6 ft. (1.8m) may be appropriate where pedestrian volumes are high. In this case, consider excluding seating to maximize capacity and preserve space for comfortable wheelchair turning.

Source: DVRPC 2012

Element		Details
A	Loading pad	5 ft. (1.5m) long x 8 ft. (2.4m) deep; pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. (1.5m) diameter clear turning radius for wheelchair users. Where possible, loading pads should be provided for both front and rear doors (as pictured here). Sign should be located adjacent to the loading pad to clearly indicate bus stop.
B	Waiting area	16 ft. (6.1m) long x 6 ft. (1.8m) deep between doors. After subtracting bench dimension, provides enough net area for 12 standing passengers at 7 SF (0.65m²) per person (86.3 SF total), plus seating space for 3. Shelter design and configuration may vary.
C	Stop area	26 ft. (7.9m) long area should be kept free from obstructions along the curb edge. The length should provide free access to vehicle's front and rear doors.
D	Pedestrian path	Minimum 4 ft. (1.2m) deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad and separate from waiting area. Keep 3 ft. (0.9m) clear around all street furniture and building elements.
E	Furniture	15 ft. (4.6m) long x 6 ft. (1.8m) wide x 9 ft. (2.7m) high shelter with lean rail, 3-seat bench, information, & ad panel. Glass panels allow view of arriving bus and weather protection. 78 net interior SF (7.2 m²) can accommodate 10-11 standing passengers plus seating for 3.
F	Clear area	2 ft. (0.6 m) from the curb edge, 9 ft. (2.7 m) minimum height.

CHAPTER 4

Passenger Amenities

Introduction

Passenger amenities are the stop features that provide added convenience and comfort to the trip. Bus stop amenities are commonly provided by a sponsor other than SEPTA. In some cases, they may reflect a visual identity treatment for a locality and be viewed as a community asset. Collectively, passenger amenities help enhance the visibility of transit in a corridor and raise general awareness of transit as a mobility option.

Bus Stop Comforts

STREET FURNITURE

Bus-stop-related street furniture can include benches, shelters, signage and information systems, trash receptacles, bike racks, publications racks, and lighting. This section contains some basic guidance for desirable elements to be considered when choosing appropriate amenities.

Transit Shelters:
Shelters provide important protection for passengers from weather conditions while waiting. A quality shelter should have the following features:

- The shelter should be constructed of durable, architecturally sound materials to withstand heavy use and continual exposure to the elements. It should have a roof and be enclosed on at least two sides to provide a screen from prevailing winds. A clear view of the approaching bus and bus loading pad is necessary and can be accomplished using tempered, clear glass panels. Films or clear view materials can add design elements to the shelter exterior.
- Sun and rain or snow protection are equally important. The shelter should be oriented and enclosed to protect against exposure. A site-specific design for the protective sides or solar shading material may be necessary depending on local weather conditions.
- The shelter opening should be oriented toward the path that leads to the bus loading pad. Refer to Table 4 in Chapter 3 for dimensional guidelines.

Custom shelter serving retirement community, Glen Mills, PA (Source: SEPTA 2012)

Stop area seating:

When present, a bench should be made of a durable material, resistant to vandalism and wear from exposure to weather. The bench should be ADA-compliant in dimension, with a recommended minimum length of 6.5 ft. (2.0m), or the equivalent of three seats. Arms are an important feature to assist seniors and the disabled. Antisleeping bars are recommended to prevent unintended use.

Other forms of seating, such as a resting or leaning rail, can also be used as an alternative to benches. Options include a large diameter tube or ledge slightly higher than seat height, or about 2.5 ft. (0.8m) high above the stop location surface. A low masonry wall also makes a convenient resting spot and can provide an opportunity for landscape integration of the bus stop area.

Stop area benches, West Chester, PA (Source: SEPTA 2012)

Bicycle racks and bicycle storage shelters:

Bicycle racks and storage shelters are increasingly used to accommodate commuters who use a bicycle to access transit but prefer not to use on-board bike racks. Supplying bicycle parking in a well-lighted, secure area will help to deter theft.

Bicycle parking at tourist bus stop, Philadelphia, PA
(Source: DVRPC 2012)

CHAPTER 5

Development Context & Case Studies

Introduction

This chapter includes a series of visual case studies (Figures 11-14) that illustrate the ways in which this document's design standards can be applied in various typical development contexts, both urban and suburban. Table 5 is a checklist for appropriate consideration of transit operating and passenger needs as part of development design and review.

Figure 10: Legend for case study graphics

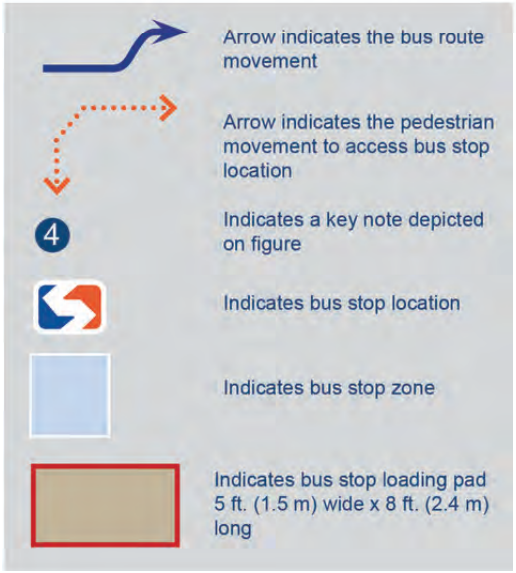


Table 5: Development review checklist for consideration of SEPTA operating and passenger needs

Transit circulation and stop placement	
	Has SEPTA been contacted to verify that transit service currently exists adjacent to a proposed development, or may be feasible to provide in the future? Please email serviceplanning@septa.org. Local factors will influence SEPTA's decision.
	Are large developments designed to permit safe routing of buses through the development? (Note that deviating from the primary route to serve a development adds travel time, and will be considered only if SEPTA deems it to be appropriate.)
	For all intersections and driveways that will accommodate buses, are corners designed for a 50 ft. (15.2m) outside and 30 ft. (9.1m) inside turning radius?
	For all roadways and driveways that will accommodate buses, are grades 6% or less?
	For all roadways and driveways that will accommodate buses, are lane widths 10-12 ft. (3.0-3.6m)?
	For all roadways, driveways, and stop areas that will accommodate buses, have pavement cross-sections been designed to withstand the wear-and-tear that will be generated by heavier vehicles (ideally including concrete pads at bus stop areas)?
	Will structures and landscaping outside the cartway permit sufficient vertical and horizontal clearance for buses, with all areas within 2 ft. (0.6m) of curbs kept clear of obstructions to a height of at least 9 ft. (2.7m)?
	Are proposed stops connected to primary destinations with an ADA-compliant pedestrian access path free of obstacles?
Bus stop design	
	Has SEPTA been contacted to explore whether new or relocated transit stops can be provided on or adjacent to the proposed development?
	If the developer is to provide stop improvements or amenities, have the proposed stop elements been designed to be consistent with the guidelines in this document and approved by SEPTA?
	If new or relocated transit stops are proposed, are they located in a safe, visible, and well-lit location, in reasonable proximity to primary destinations, as well as stops serving the opposite direction?

Source: DVRPC 2012

Case Study 1

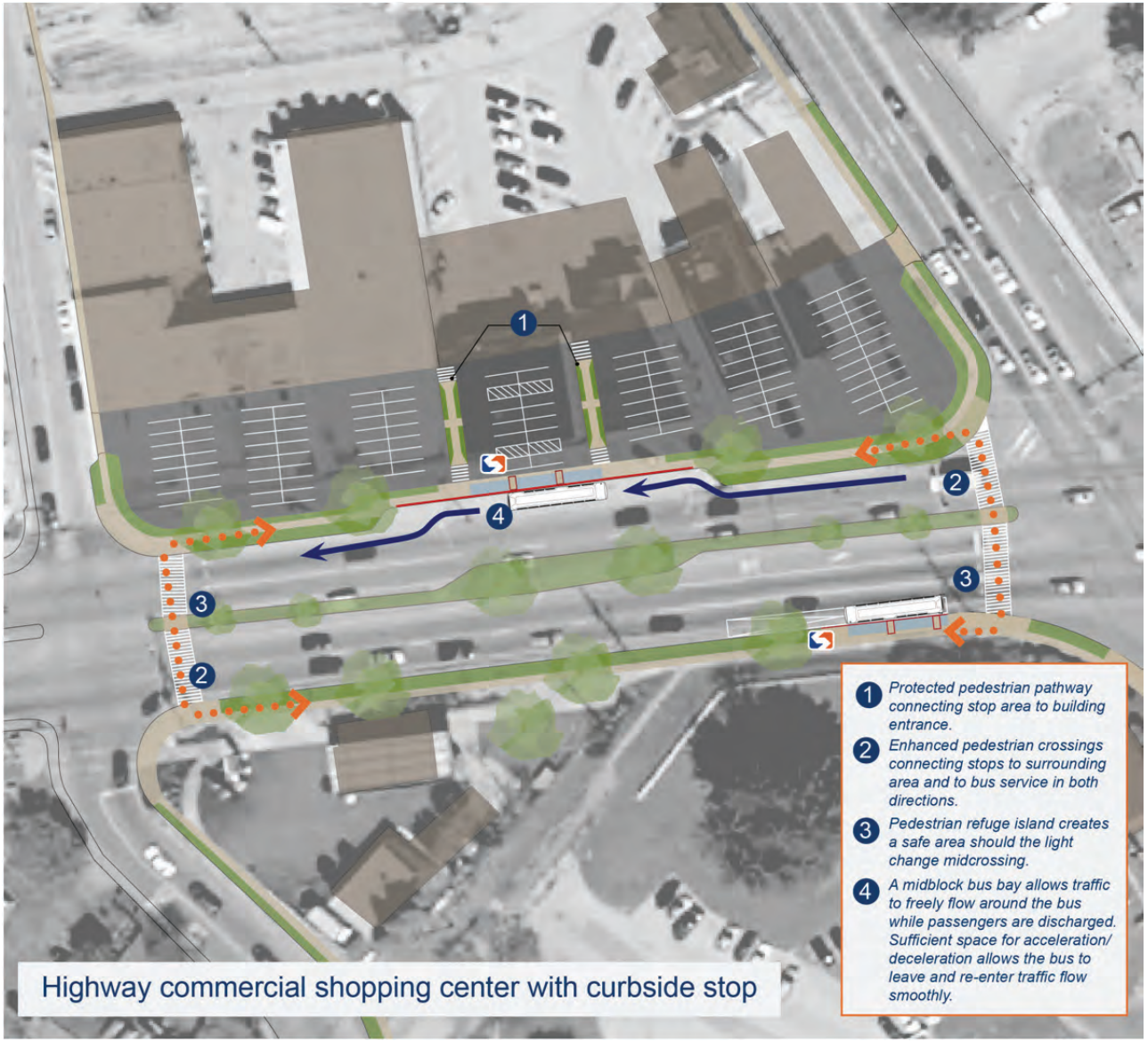
Serving “strip” commercial development with a curbside stop

A highway commercial or “strip” shopping center typically has off-street parking located between building entrances and the primary frontage street. If the bus does not deviate from its primary route onto the site, the challenge is in connecting passengers from the curbside (in-line) stop location to the buildings that the stop is intended to serve.

This case study illustrates the use of a high-quality pedestrian network to close this gap, including the provision of landscaped pedestrian walkways connecting the stop area to building entrances across the parking lot.

This example also illustrates the use of a midblock bus bay. A bus bay that brings the bus out of the flow of traffic may be particularly appropriate for suburban stops where dwell times (the amount of time spent by the bus at the stop) are likely to be higher, such as at a supermarket where passengers may be carrying grocery bags or parcels. If a bus bay is used, it should be of sufficient length for the bus to decelerate and accelerate appropriately. If sufficient space is not available, a bus bay should not be used (bus bays that are too short can lead to significant time delay for buses).

Figure 11



Source: DVRPC 2012

Figure 12

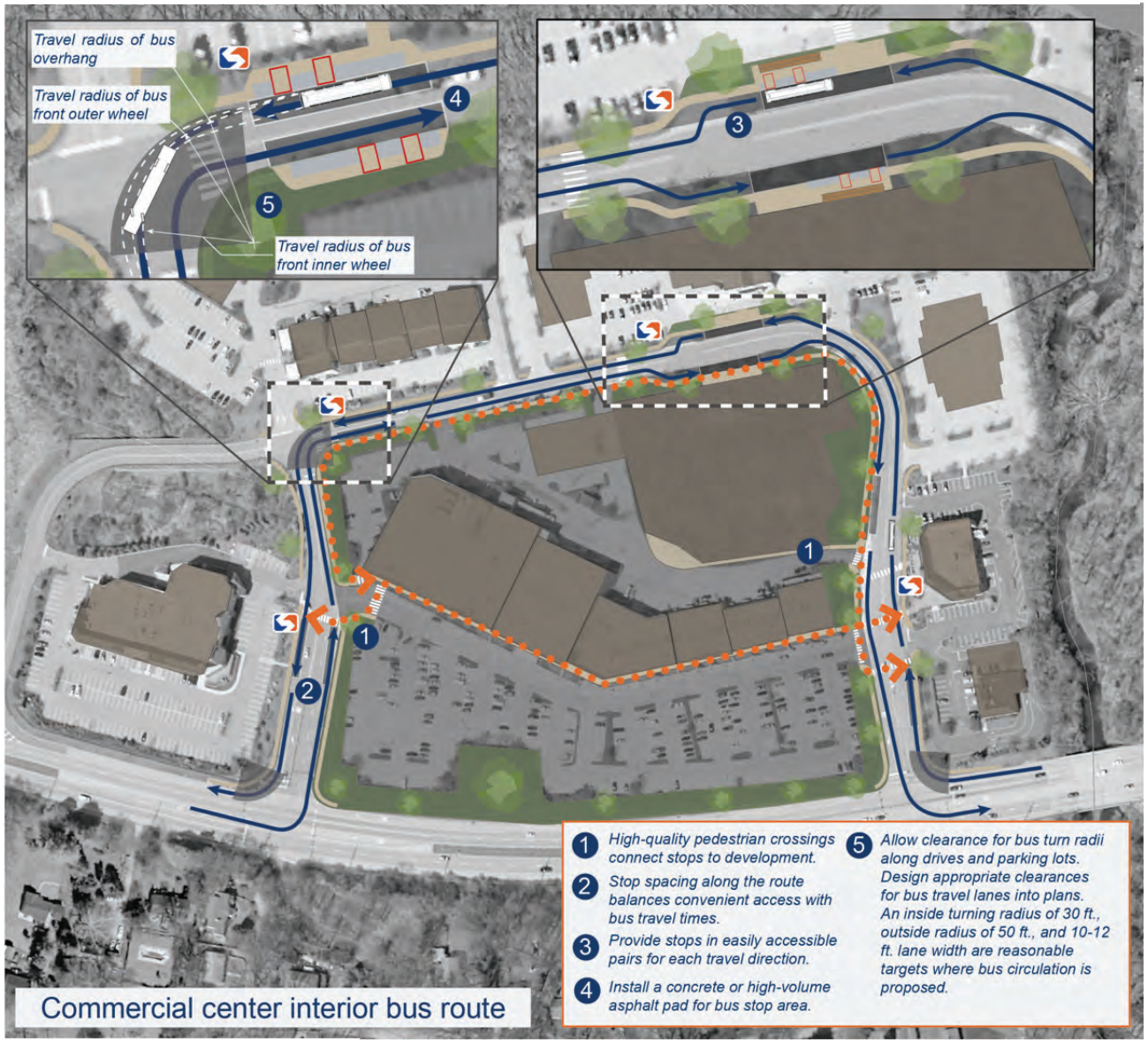
Case Study 2

Deviating from the primary route to serve a large commercial center

For large developments with multiple interior destinations, it may be appropriate for the bus route to deviate from the frontage street and operate through the development. SEPTA's decision to enter a development is based on a variety of factors, including potential demand, consideration of delay to existing customers, and additional operating expense.

Where this kind of transit service is appropriate, it is important that the development be designed from the outset with transit operations in mind. Buses are heavy vehicles that can generate significant wear-and-tear, increasing pavement maintenance and upkeep costs over time if inappropriate design choices are made.

Stops should be well connected with quality pedestrian paths to the individual buildings that they are intended to serve, and should be placed in visible, well-lit locations.



Source: DVRPC 2012

Case Study 3

Elements of a successful transit center at a suburban mall

Suburban malls can be good locations for transit centers or hubs, since they are often served by multiple bus routes and can generate high ridership among both mall customers and employees.

This case study highlights the transit center at King of Prussia Mall, which serves multiple bus routes and includes desirable elements, such as a short bus-only right of way and both indoor and outdoor passenger waiting areas.

Mall transit hubs should be well connected with quality pedestrian paths to mall entrances, and should be placed in visible, well-lit locations. As detailed for case study 2, pavement intended to carry high volumes of buses should be designed to withstand the wear-and-tear that they will generate.

Figure 13

Source: SEPTA 2012, DVRPC 2012

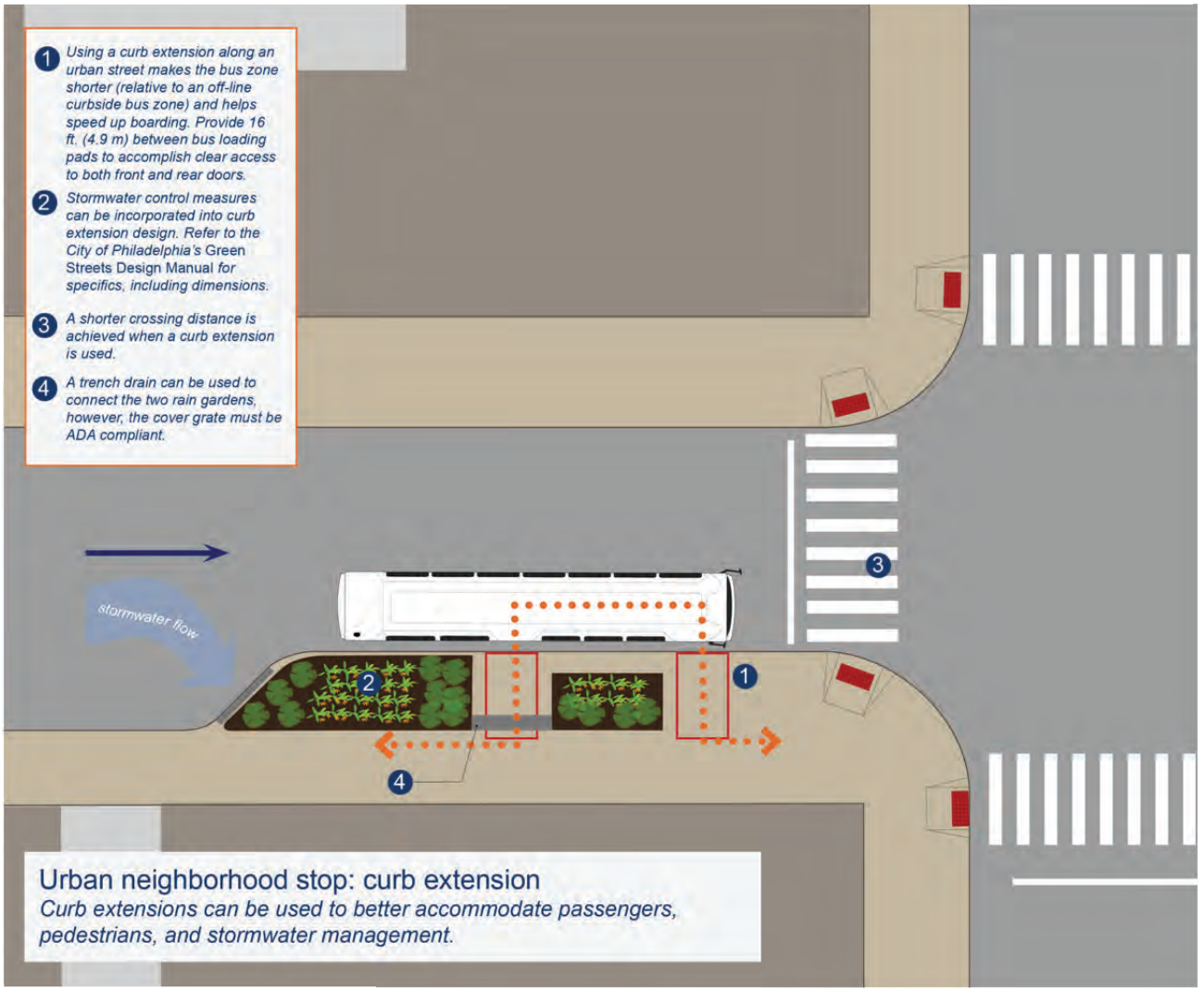
Case Study 4

Using a curb extension to meet multiple needs

Philadelphia is a city of narrow neighborhood streets. As a result, space in the public right-of-way is often at a premium, making it a challenge to meet the needs of pedestrians, transit passengers, bicyclists, and motor vehicles (including on-street parking). Well-designed curb extensions (or "bus bulbs") offer the opportunity to improve accommodations for multiple groups of street users with one slice of streetscape. This example illustrates how curb extensions can improve conditions for:

- Pedestrians, by shortening the street crossing distance and providing space for boarding/alighting transit patrons outside the primary sidewalk walking zone;
- SEPTA and its riders, by expanding loading space to help ease boarding and alighting;
- Neighborhood residents, by taking up fewer would-be on-street parking stalls than a bus zone; and
- The Philadelphia Water Department (PWD) and city residents, by accommodating landscaped beds that meet stormwater management needs. The design shown here reflects a PWD concept for transit stop areas.

Figure 14



Source: PWD 2012, DVRPC 2012

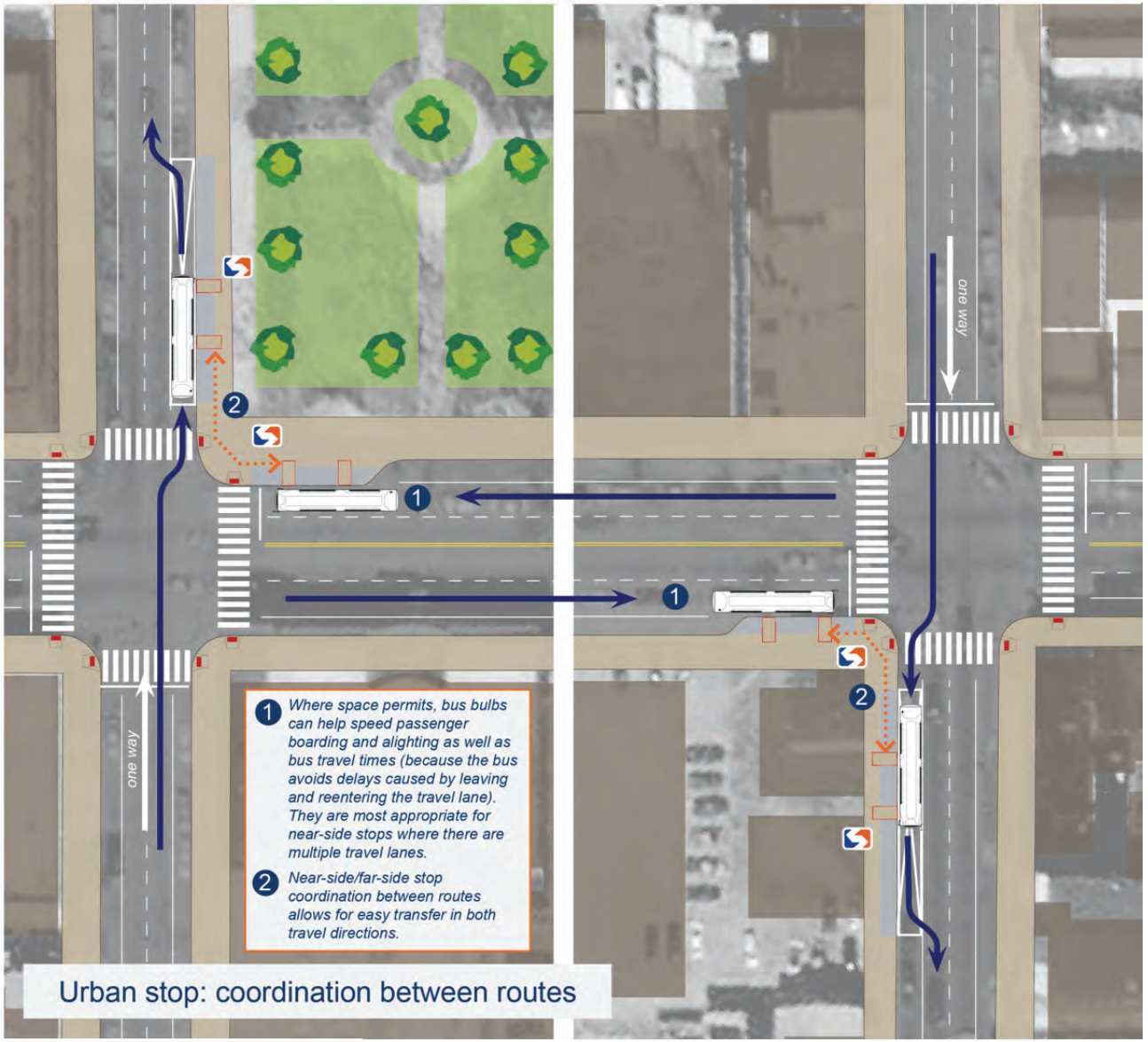
Case Study 5

Coordinating stop design/location to enhance customer mobility

SEPTA provides an interconnected network of surface transit routes with frequent service in Philadelphia and many other walkable town centers in the region. This dense “grid” of routes provides good mobility for passengers between many different sets of trip origins and destinations, and this mobility is enhanced where transfers are fast, comfortable, and convenient for passengers.

This example illustrates how stop location and design can be coordinated to minimize transfer walking distance and enhance safety. Pairing a near-side stop for one route with a far-side stop for a crossing route can allow a passenger to make a transfer without crossing the intersection.

Figure 15

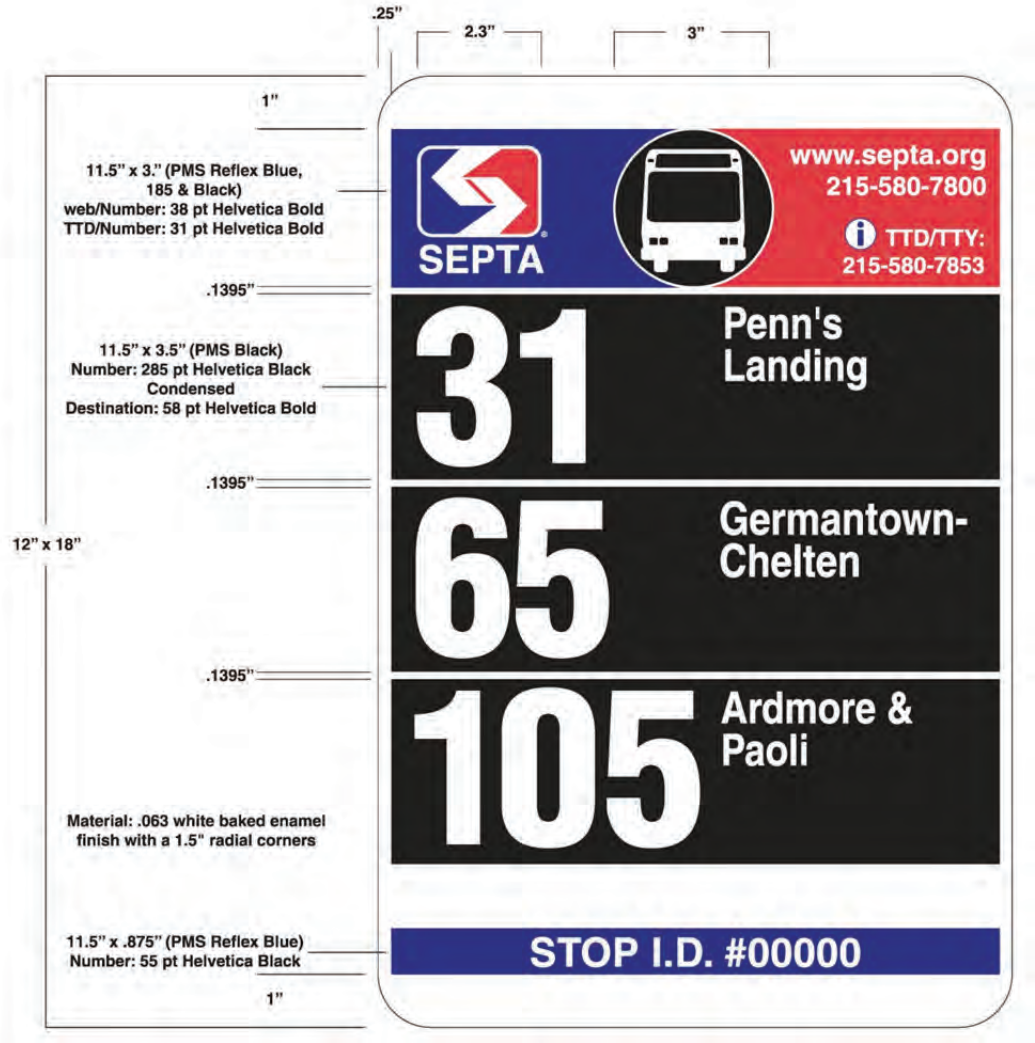


Source: DVRPC 2012

APPENDIX A

SEPTA Stop Signage

Standard SEPTA Bus Stop Signage



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Abstract:

The purpose of this document is to provide SEPTA, municipalities in the SEPTA service area, local developers, and other local partners a consistent set of guidelines for designing surface transit stops. While the focus of this document is on bus stops, many of the elements addressed here also apply to trackless trolley and mixed-traffic trolley stop locations.

The design guidelines detailed in this document are intended to guide local comprehensive plans, land development ordinances, site or subdivision plans, and transportation/mobility plans. These guidelines are based on a review of standards and best practices applied nationally, discussions with SEPTA staff and planning partners, and survey feedback from municipalities in the SEPTA service area.

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