

Building Better Bus Stops

Resource Guide

Developed by



In partnership with



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Introduction

About this Guide

Bus stops provide a vital connection between transit service and the communities they serve. Ensuring bus stops meet the needs of all riders, transit agencies, and the community is essential in providing quality, efficient transit service. In Pennsylvania meeting the needs of all transit riders is particularly important as the Commonwealth's 67 counties and 2,560 municipalities vary from densely populated urban centers to rural communities with just a few residents. Bottom-line, there is no one size fits all bus stop solution in Pennsylvania.

Recognizing the vital transit connection point that bus stops provide, Pennsylvania Public Transportation Association (PPTA), in partnership with the Pennsylvania Department of Transportation (PennDOT), developed this resource guide to support the planning and design of better bus stops across the Commonwealth.

A core group of Pennsylvania public transportation agency partners provided insight and direction during the development of this guide. Additional input from planners, engineers, and local government associations helped to refine the document.

Purpose

The purpose of this guide is to provide a common set of tools and resources for municipalities, transit agencies, local planning and engineering staff, and the development community to use in planning, designing, and constructing new or upgrading existing fixed route bus stops.

The guide is based on applicable design guidelines and best practices found across Pennsylvania and throughout the country. It includes resources for municipalities and transit agencies to enhance the safety, accessibility, attractiveness, connectivity, and uniformity of fixed route bus stops.

Public Transportation Services in Pennsylvania

This guide is focused on bus stops for fixed route public transportation services. The Federal Transit Administration (FTA) defines fixed route as public transportation service provided in vehicles operated along a prescribed route according to a fixed schedule. For the purpose of this guide, fixed route public transportation does not include school bus service, charter services, intercity bus transportation, or sightseeing buses.

There are 34 transit systems in Pennsylvania that operate fixed route scheduled bus and other public transit services. Collectively, these transit systems provided over 387 million passenger trips in fiscal year 2018-2019.

While this guide is focused on providing resources related to bus stops for fixed route public transportation services, there are components that may be relevant for some types of demand responsive transportation services. A demand responsive service does not typically operate on a fixed route or a fixed schedule, and rather individuals schedule rides in advance. However, some demand responsive services operate to/from predetermined stop locations and providing an ADA compliant bus stop at these locations may benefit transit operators, riders, and the community.



This guide is focused, in part, on ensuring that over time each passenger trip begins or ends at a bus stop that has been planned for at the local level and is designed to meet local, federal, and state standards.

Roles, Responsibilities, and Partnerships

Interagency coordination and partnerships are needed for the successful planning and design of bus stops. Starting this process requires transit supportive partnerships between municipalities, which control land use and community design, and transit agencies that provide the transit service. Building a robust partnership extends to citizens who use transit services and the development community that can incorporate transit into development plans. Effective transit supportive partnerships, which include the roles and responsibilities outlined below, will result not only in coordinated planning for better bus stops, but implementation through development plans and projects.

Municipalities: Municipalities are responsible for establishing land use regulations, including transportation planning and design, and can convene and set the direction for planning partnerships. In addition, municipalities have jurisdiction over local roadways and sidewalks that support fixed route bus service.

Transit Agencies: Transit agencies provide public transportation services, as well as oversight for transit facilities and related capital improvements. Transit agencies should work cooperatively with municipalities and other partners to communicate operational needs and educate citizens about transit.

PennDOT: PennDOT is responsible for administering federal and state funds for public transit and roadways. Additionally,

PennDOT is directly responsible for maintaining and improving state-owned roadways.

- PennDOT Bureau of Public Transportation (BPT): PennDOT BPT oversees operating and capital investments for 34 fixed route (scheduled local bus, light rail and commuter rail) systems, 44 community transportation systems, passenger rail service between Pittsburgh and Philadelphia, and 13 intercity bus routes provided by four intercity bus companies. BPT is directly responsible for administering a variety of FTA grant programs for public transportation and provides both financial and technical resources to the transit agencies across Pennsylvania.
- PennDOT Regional Offices / Engineering Districts: PennDOT has 11 regional offices, also known as engineering districts. Each regional office/district covers certain Pennsylvania counties and oversees programs and policies affecting highways, urban and rural public transportation, airports, railroads, ports, and waterways. In particular, each regional office/district plans and manages maintenance and improvements to state owned roadways, including those that support fixed route bus service. Through initiatives like PennDOT Connects, PennDOT works with municipalities, transit agencies, and others to consider community needs before undertaking improvements to the transportation system. PennDOT helps transit supportive partnerships collaborate on integrating transportation and land use.

MPOs/RPOs: There are 23 Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) in Pennsylvania that have authority and responsibility for transportation planning. Each MPO and RPO works closely with PennDOT and public transportation agencies to develop regional transportation plans, including Long Range Transportation Plans (LRTP), Transportation Improvement



Programs (TIP), and Coordinated Human Services Transportation Plans. MPOs and RPOs play a key role in establishing priorities for investments of federal and state transportation funds, including public transportation improvements.

Developers: Developers transform existing properties or buildings into something new or different. Developers can take responsibility for assembling land, identifying a building program and design, obtaining necessary permits and approvals, and constructing new residences and businesses. Developers can incorporate bus stops elements into a new development or help to plan and design for accommodating future transit service.

Planning and Design Professionals: Planners, engineers, landscape architects and other design professionals can provide technical assistance for the planning and design of bus stops.

Community: Community members, including transit riders and their employers, can ensure a transit partnership meets rider needs, maximizing public transportation potential in each community.

Importance of Coordinating with Transit Agencies

Transit agencies must be involved in planning and design of bus stops within the communities they serve. Transit agencies have unique first-hand knowledge of bus operations, ridership data and trends, transit vehicle specifications, and ADA requirements. They bring knowledge and experience that is necessary for the design of safe, convenient, and accessible bus stops. It is important for all partners to work closely with transit agencies early and often throughout the bus stop planning and design process.

Using This Guide

The Resource Guide includes three parts.

Part 1: Planning and Policy Resources—This component provides guidance to incorporate fixed route bus stops into comprehensive plans, land development ordinances, and transportation plans. It emphasizes the importance of partnerships in achieving effective transit planning. It also introduces the model ordinance and plan review check list, which are provided in the appendix.

Part 2: Design Resources—This part provides guidance related to the design of bus stops. It covers fixed route bus stop placement, configuration, key elements, and amenities.

Part 3: Bus Stop Typologies—This part includes graphical renderings and notes regarding design treatments for eight different bus stop configurations. The bus stop typologies reflect different contexts and different levels of supportive infrastructure for bus stops.

Intent

This guide serves as a reference document only; tools and resources herein are not required per legislation or regulation. PPTA recognizes that not each existing bus stop in Pennsylvania is designed per the specifications presented in this guide. Local and financial capacity might not currently be in place to implement some of the tools or resources presented. Further, each community is unique, and some of the guidance might not be relevant to every municipality. Additionally, some communities and transit agencies have developed their own bus stop design resources. It is PPTA's intent that over time and with sufficient financial resources, the transit planning and design concepts presented in this guide can be implemented in communities, as required.





[1] Planning and Policy Resources

Introduction

Public transportation is inherently linked to the people it transports *and* the land uses those people frequent. Public transportation moves people between work, shopping, medical appointments, leisure activities, and home. A concentration of people and land use is typically required to effectively serve the needs of riders and to cost-effectively operate and maximize the efficiency of transit.

In Pennsylvania, municipalities have the power to plan and regulate land use. Public transportation agencies or authorities are responsible for planning and operating transit services, including fixed route bus service. While roles and responsibilities are separated, land use and transit are closely related. Land use development and design directly impact public transportation services and ridership.

The Building Better Bus Stops Resource Guide identifies tools available to local governments to incorporate and consider transit in land use plans and policies. The guide focuses on fixed route bus service and specifically bus stops, because they are the first and last touch point between a transit rider and a public transportation provider. The individual's journey does not end at the bus stop; they must navigate through the built environment to reach their destination. Coordination between municipalities, transit agencies, property owners, developers, and residents can increase the use of public transportation, offering numerous community benefits.

Benefits of Public Transportation

Provides economic opportunities

- Pennsylvania's transit agencies spend more than \$1 billion annually with businesses in the state.
- Investments in Pennsylvania's public transportation generates more than \$10 billion in economic activity per year.

Safer than travel by cars

- Traveling by public transportation is 10 times safer per mile than traveling by car.

Saves money

- A household can save nearly \$10,000 by using public transportation and living with one less car.

Reduces gasoline consumption

- For every passenger mile traveled, public transportation uses about one-half of the fuel of private cars, SUVs, and light trucks.

Reduces air pollution

- Public transportation produces 95% less carbon monoxide, more than 92% fewer volatile organic compounds, and nearly half as much carbon dioxide and nitrogen oxides than automobiles for every passenger mile traveled.

Increases mobility

- Public transportation provides personal mobility and freedom for people from every walk of life.

Encourages healthier habits

- More than two-thirds of riders walk to their stop or station.

Sources:

American Public Transportation Association (APTA) Public Transportation Fact Book

Pennsylvania Public Transportation Association (PPTA) Transit Drives Pennsylvania Mobility—Fact Sheet

Pennsylvania Public Transportation Performance Report—FY 2017–2018



People and Transportation Choice

Public transportation is a necessary and desirable mobility option for many Pennsylvanians. Transportation choice is determined by many factors, often influenced by transportation availability, convenience, and affordability.

For some people, who do not own and have access to a vehicle or are unable to drive, using public transportation is their only option. Individuals who rely on public transportation can include people with lower incomes, persons with disabilities, elderly, and youth. For some people, public transportation is a lifeline for their travel to jobs, medical appointments, school, or shopping.

For others, public transportation is an attractive alternative to driving a vehicle and other modes of transportation. People may elect to use public transit because it saves time and money and is safer and more convenient.

Land Use and Design

Public transportation is influenced by many aspects of land use, particularly density. Density of people and density of development drive the effective operation of public transportation. A larger concentration of people travelling on a bus supports the operation of that bus between areas of employment, shopping, services, and home.

Density and development intensity differ throughout Pennsylvania's 2,560 municipalities. In the Commonwealth's urban centers and surrounding first ring communities, more people tend to live and

work in a concentrated area and therefore, transit choice is available and financially viable.

In suburban communities, transit is often available, but the frequency tends to be limited due to a larger geographic area to cover and fewer people to make transit a financially viable transportation alternative. Pennsylvania's rural communities are limited further by lower densities.

While public transportation is traditionally supported in cities with higher population and employment density and their inner suburbs, all municipalities can influence the density of the built environment to encourage the development of transit infrastructure and increase people's use of transit.

Municipalities can also encourage transit agencies to serve their citizens through transit-supportive land use and development decisions. In Pennsylvania, control over how a community develops is provided through the Pennsylvania Municipalities Planning Code (Act 247 of 1968) (MPC). The MPC gives flexibility to municipalities to determine the density and intensity at which land is developed. Through local zoning ordinances, municipalities may permit, prohibit, regulate, restrict, and determine 'Density of population and intensity of use'. Therefore, if a community wishes to develop with a higher number of residential units per acre or greater industrial or commercial square footage per acre, it can do so to achieve, over time, density that could support a financially viable transit service.

Encouraging and facilitating transit in urban,



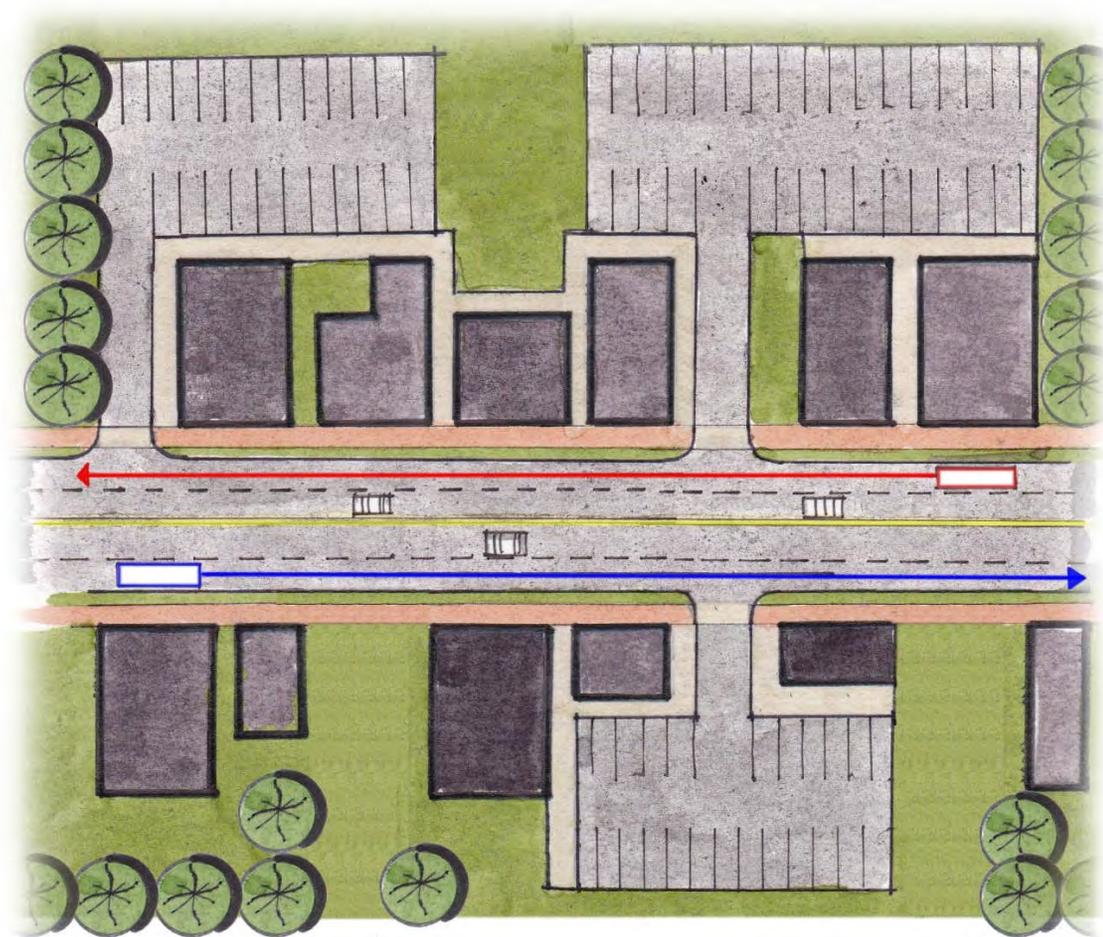
suburban, or rural communities also requires municipalities to consider the design infrastructure required to support transit. Consideration of how motorists, pedestrians, and bicycles interact through roads, sidewalks, and bike facilities is necessary as communities determine where transit connections might be most appropriate. Through comprehensive planning, land use regulations, and other transit-supportive tools, municipalities can encourage development that fosters public transportation to benefit many members of the community.

Building Partnerships

Proactively incorporating transit into municipal planning and design, will strengthen and support transit as an accessible and viable transportation option. Starting this process requires transit supportive partnerships between municipalities, which control land use and community design, and transit agencies, which provide the transit service. Building a robust partnership extends to a community's citizens and the development community. In turn the partnership will result in considering and incorporating transit into local plans and ordinances implemented through investments in private development.

Comprehensive planning enabled through the MPC allows a municipality to assess current transit activity and how it desires to improve upon transit in the future – articulating a vision for transit. A transit agency can provide invaluable assistance to a municipality as it considers transit through development of a comprehensive plan. A

Sample Transit Corridor Rendering



This graphic of a sample corridor with fixed route bus transit service highlights how design of the built environment can impact and support transit. The site layout, building orientation, driveway and parking configurations, and pedestrian infrastructure can provide safe, convenient, and attractive connections between the bus route and destinations. Additionally, with transit-supportive design, buses are able to operate on the desired route without deviating to serve specific land uses. Local land use regulations and design requirements can play a key role in facilitating efficient and quality transit service.

Image Credit: LANTA Transit Supportive Land Use for the Lehigh Valley, September 2013



municipality can assess and plan for locations where people live, where they go to work, and where they travel for shopping, dining, medical services, etc. A transit agency can help a municipality set the foundation to re-evaluate existing and establish future transit routes and plan for transit infrastructure to support future community growth and development. This municipal-transit partnership can set a strong foundation to make locating, waiting for, and riding a bus convenient, safe, and cost-effective.

Developing supportive transit partnerships goes beyond strong municipal-transit agency cooperation. It also requires commitment from the residential, commercial, and industrial development community to make certain that transit is a viable option for people traveling to existing and future developments. Partnering with the development community during community planning to identify why and how transit should be incorporated into existing and future land development will result in the positive transit outcomes articulated through a municipality's comprehensive plan. School districts and non-profit organizations can also help to support and enhance public transportation services and infrastructure in a community.

Finally, citizen participation is a key component in planning for transit. Building community consensus around shared values and aspirations is part of the planning process. Citizens are the users of transit and incorporating transit needs, both current and future, into local planning will ensure community buy in on future transit infrastructure needs.

Incorporating Transit into Municipal Planning

Public transportation is a vital component of the mobility network in many communities across Pennsylvania. Municipal planning should consider how public transportation interfaces with existing and future land uses to maximize transit benefits for riders and the community.

This section provides an overview of key resources and steps for local governments to incorporate transit into various municipal planning processes.

Planning References and Resources

Municipalities Planning Code

The MPC provides municipalities with authority to conduct planning and oversee *how* land is developed, to achieve the type of development and design character they desire. Provisions to incorporate transit into community planning are included in the MPC in key components, discussed below and further in this document.

Comprehensive Plan

As authorized by Article III under the MPC, a comprehensive plan is a long-range policy document to guide the future of a municipality. The plan includes a vision and goals, with specific strategies or actions to achieve the vision. A comprehensive plan typically includes a plan for land use with provisions regarding the amount, intensity, and character of land use development. In particular, Article III, Section 301 of the MPC notes that the land use plan may include “major traffic and transit facilities.” In addition, Section 301 lists a “plan for



the movement of people and goods” as one of the required basic elements of a comprehensive plan and notes that it may include public transit routes and pedestrian systems. To effectively set the stage for transit, a municipality should clearly articulate its transit vision in its comprehensive plan.

Official Map

As authorized by Article IV under the MPC, municipalities have the authority to adopt an official map ordinance to specify locations for future public projects. Through adoption of an official map, a municipality may preserve development rights for land as it becomes available in the future, providing the municipality with ‘first choice’ for purchase. Municipalities can consider public transportation on their official map by identifying locations where additional right of way is needed to construct bus stop infrastructure, intermodal centers, or pedestrian connections.

Zoning Ordinance

In accordance with Article VI of the MPC, a municipality can adopt a zoning ordinance, to establish its community development objectives, giving character to the municipality and citizen needs. Zoning ordinances regulate land use (type), location (where), and density (concentration) of uses, including building coverage and dimensions such as lot size, height, and parking.

Subdivision and Land Development Ordinance (SALDO)

As described in Article V of the MPC, a SALDO regulates how parcels are divided and improved. While a zoning ordinance addresses where and at what intensity land is developed, a SALDO regulates the layout and design of development and infrastructure, such as street layout and construction. A SALDO can set forth the design character a community would like to achieve, including designing for transit.

PennDOT Publications

PennDOT has prepared publications providing guidance on how municipalities can incorporate transit into planning. These publications provide further direction on the MPC’s tools and other PennDOT and Commonwealth transit-supportive resources. Municipalities may consider reviewing these publications as they begin to improve existing and plan for future transit.

[PennDOT PUB 616 - Transportation and Land Use Toolkit](#)

[PennDOT PUB 688 - Integrating Transportation and Land Use in Comprehensive Plans](#)

[PennDOT PUB 703 - The Official Map: A Handbook for Preserving and Providing Public Lands and Facilities](#)



Transit Elements to Include in Municipal Plans

Public transportation can be considered and incorporated into a variety of local government plans and studies, including, but not limited to, the following typical municipal planning documents:

- Comprehensive Plans
- Official Map and Ordinance
- Capital Improvement Plans
- Economic Development/Revitalization Plans
- Open Space/Recreation Plans
- Corridor/Special Area Plans
- Active Transportation Plans

While these types of plans are unique and different, they often have similar elements, such as evaluating existing conditions, identifying future needs, and developing recommendations or actions. Summarized below are ways that public transportation can be considered in each of these steps in the planning process. The public transportation agency should be involved in each step to provide input regarding existing and future service potential.

Evaluate existing conditions

Inventorying existing conditions is a critical first step in any planning process. For most plans, a basic inventory of public transportation should include mapping the location of existing routes, stops or stations, park-n-ride lots, and other transit facilities. The inventory should consider existing and desired

destinations, both within and beyond the planning area boundary. In addition to understanding the geography of the existing transit services, it may be helpful to gather data related to frequency of service, days/hours of service, ridership, fares, and performance measures. Additionally, a demographic analysis should be conducted and include review of data related to commuting patterns, vehicle ownership, and vulnerable populations. This data can be used to evaluate transit needs and identify key issues related to public transportation. The following questions and topics can be explored and evaluated as part of the existing conditions evaluation.

- Where are existing public transportation routes, stops or stations, and facilities, both within and beyond the planning area?
- Are key destinations for transit trips, such as retail hubs, employment centers, medical facilities, and parks/recreational resources accessible via existing routes?
- Are residential areas with vulnerable populations and potential transit riders served by existing routes?
- Does the service frequency of service and days/hours of operation meet the current needs of the community?
- What are the routes and/or stops with the highest or lowest ridership and why? Do stops with high ridership have supportive infrastructure and amenities?

All signalized intersections along the corridor should provide crosswalks. Shoulders along Middletown Road should be wide enough to facilitate bicycle traffic and bus stops.

Middletown Road Corridor Transportation Evaluation, Derry Township, Dauphin County (2016)

Livability Objective 2 - Transportation

Collaborate with transit providers to further improve innovations in transit service.

Positively Altoona, The City of Altoona Comprehensive Plan (2013)

The primary focus of the Alternative Transportation Plan is to reduce single occupancy vehicle (SOV) trips produced by the proposed land development.

Springettsbury Township (York County) Transportation Plan (2019)



- How do people access transit and are there connected bicycle and pedestrian facilities?

Identify future needs

When developing a plan for the future, it is important to consider potential changes in the need or demand for transit. Municipal plans can consider the impact that future land development may have on the public transportation system. Some land use types tend to have a higher demand for bus service than others. For instance, a retail or employment center may have a greater need for transit service than a neighborhood of single-family detached homes. Municipal plans can consider and encourage future growth in areas that are already served by public transit or areas that could be served by public transit in the future.

- Where are future growth areas or areas where there is potential for development/redevelopment? Are these areas within the existing public transportation service area? If not, would anticipated growth warrant consideration of transit in the future?
- Are there other potential land use changes that may influence existing or future transit service?
- Are there opportunities for transit oriented-development along potential transit routes?
- Are there demographic trends that may change the demand for public transportation in the community?

Develop recommendations to support and improve transit

While municipalities are not directly responsible for providing public transportation services, municipal plans can include recommendations or actions to improve public transportation in the planning area. Any recommendations should be developed through close coordination with the public transportation agency. The municipal plan or study can note that any changes to public transit routes, frequency, hours/days of service, fares, etc. will require review and action by the transit provider and will be dependent upon further evaluation and available resources.

Municipalities have jurisdiction over the built environment in their communities and can develop recommendations or actions related to land use and infrastructure to support public transit. Several best practices municipalities may wish to consider to incorporate transit into planning are highlighted on page 1-8.



Best Practices for Transit Supportive Land Use and Design

Land Use

Transit supportive land use refers to encouraging more intense development, a mix of land uses, and infill development or redevelopment near existing public transportation routes and facilities.

- Permit and encourage a mix of land use types, particularly along existing or planned transit routes.
- Permit higher density development near existing transit routes, particularly at identified centers or nodes of development.
- Encourage developments with potential transit ridership, including affordable housing, employment centers, and medical facilities, to be located near existing public transit routes.

Site Design

Site design can promote safe, comfortable, and convenient access to public transportation routes and facilities, particularly for pedestrians and transit riders.

- Minimize walking distances between transit routes and destinations by reducing setback requirements, promoting building entrances that face the roadway, and providing direct pedestrian connections.
- Require comprehensive pedestrian networks that facilitate pedestrian movements into, out of, and throughout the site.
- Encourage parking areas to be located behind buildings and accessed via side streets.

- Require adequate roadway and driveway widths and turning radii to accommodate buses expected to service the site.
- Encourage shared parking, shared driveway accesses, and other access management strategies.

Pedestrian / Bicycle Connections and Amenities

Creating a community that supports public transportation starts by making a walkable and bikable community.

- Require and provide sidewalks on both sides of roadways with existing or planned transit routes, particularly commercial and mixed-use corridors.
- Require and provide marked crosswalks at intersections of roadways with existing or planned transit routes.
- Encourage landscaping and streetscape enhancements to create an attractive environment for walking.
- Provide and promote both on-road and off-road bicycle facilities that connect to transit routes.

Parking

Off-street and on-street parking effect how public transportation service interfaces with residential and commercial land uses. Efficient and thoughtful parking design and management can help to support transit in communities.

- Reduce off-street parking minimums, particularly along transit routes, or set parking maximums.
- Price on-street parking appropriately.
- Require convenient and secure bicycle parking.

Bus Stops

Safe, attractive, and convenient bus stops will promote ridership and best practices for bus stop plans and policies highlighted throughout this Resource Guide.

Sources:

LANTA Transit Supportive Land Use for the Lehigh Valley, September 2013

RRTA Transit-Oriented Development Handbook; September 2010

PennDOT PUB 616: Transportation and Land Use Toolkit, March 2007



Model Municipal Ordinance Language for Bus Stops

The MPC enables municipalities to enact zoning ordinances and SALDOs to protect public health, safety, and welfare and implement the comprehensive plan. Municipalities can incorporate regulations into zoning ordinances and SALDOs to accommodate and support public transportation. This section and Appendix A focus on how municipal zoning ordinances and SALDOs may regulate aspects of the built environment to support fixed route bus service, specifically bus stops.

Model ordinance language to incorporate policies and design guidelines for new or improved bus stops into municipal zoning ordinances and SALDOs is provided in Appendix A.

The intent of the model ordinance language is to:

- Permit and encourage the installation of bus stop infrastructure in appropriate locations as part of the land development process to serve the needs of all members of the community.
- Promote coordination between municipalities, transit agencies, and the development community for the installation of bus stop infrastructure.
- Reference applicable design requirements for bus stop infrastructure.
- Define the roles and responsibilities for the review and approval for new bus stop infrastructure.

The model ordinance language provides basic guidance and design parameters for new or upgraded bus stop infrastructure. The model ordinance language covers items, such as:

- Definitions for common elements of bus stops;
- Guidance related to the location and design of bus stops;
- Requirements for coordination with transit agencies for potential bus stops based on the location and type of proposed development;
- Specific design guidelines and ADA requirements for bus stop infrastructure, including ADA loading pads, bus shelters, benches and other street furniture, and signs; and
- Requirements related to agreements or permits for the installation and maintenance of bus stop infrastructure.

Since each municipality and transit agency is different, the model ordinance language will need to be modified and tailored to the specific needs of the community and transit service. For example, the language could be used to develop a stand alone bus stop ordinance that is referenced in the zoning ordinance and/or SALDO for the municipality. Also, the model language includes several notes, options, and opportunities for customization, which should be reviewed and considered by the municipal governing body, planning commission, and solicitor through coordination with the transit agency prior to adoption. In addition, existing zoning and/or SALDO language may need to be reviewed and revised to

To facilitate the fiscally responsible provision of adequate public highways and streets, vehicle parking and loading, public transportation, water supply, sewage disposal, public and private schools, parks and open spaces and other public requirements, such as public utilities and rights-of-way.

Delaware Township, Juniata County Zoning Ordinance

- Bensalem Township, *Bucks*
- Camp Hill Borough, *Cumberland*
- East Goshen Township, *Chester*
- Ferguson Township, *Centre*
- Lower Providence, *Montgomery*
- Middletown Township, *Bucks*
- Mount Holly Springs Borough, *Cumberland*
- Paxtang Borough, *Dauphin*
- Smithfield Township, *Monroe*
- Upper Chichester, *Delaware*
- Warminster Township, *Bucks*

Several Pennsylvania municipalities, including those listed above, address bus stops or shelters in current ordinances.



incorporate and reference new ordinance sections related to bus stops. The adoption process should comply with the zoning ordinance and SALDO enactment requirements specified respectively by Article VI and Article V in the MPC.

The model ordinance language is specific to requirements associated with new and improved bus stops. As highlighted on the table of Best Practices for Transit Supportive Land Use and Design, there are several other transit supportive policies and designs that can be incorporated into existing ordinances. Because each transit rider is also a pedestrian, requiring ADA compliant sidewalks or pedestrian infrastructure along transit corridors is an important policy to incorporate into municipal ordinances. Additionally, park-and-ride lots and bus maintenance facilities are sometimes necessary to support bus operations and enhance access to transit. Requirements for these primary uses related to bus services can be incorporated into municipal zoning ordinances.

Other Transit-Supportive Tools and Policies

Municipalities may employ several other tools to advance public transportation goals in their communities. Each of these may be used in conjunction with zoning and SALDO to incorporate transit friendly concepts into other aspects of municipal business.

Transit-Supportive Development Overlay District

Implementing a transit overlay district within a municipal zoning ordinance is a good tool for municipalities that seek to guide the design and character of specific areas of their community, particularly transit. Developing a transit-supportive development zoning overlay to include a mix of uses, arranged in such a way to encourage public transit, also supports a sustainable growth pattern by concentrating development and minimizing sprawl patterns. A transit-supportive overlay district will typically include provisions to encourage a mix of land uses and pedestrian friendly environment close to transit.

A transit facility, such as a bus station/hub or train station, is typically at the heart of a transit-oriented development to ensure citizens can walk to public transportation. A transit overlay district could also be developed based on a linear bus route or bus stops, depending upon the type and frequency of service. The boundary of a transit overlay district should be based on a walking distance from existing transit routes, stops, or stations.

An overlay district could include density bonuses or incentives for developments that are located within walking distance of a public transportation service or facility. Additionally, it could include reduced off-street parking requirements given the anticipated use of public transportation.



Transit Revitalization Investment District (TRID)

Within Pennsylvania, the enactment of the Transit Revitalization Investment District Act or TRID, helps municipalities implement transit-oriented development. By creating a TRID, municipalities partner with transit agencies, community and economic development officials, and developers to finance a program of investments for transit-supportive development. Within a specified TRID area, the transit partnership can be leveraged to share incremental tax revenues to implement capital projects that support both transit infrastructure and community facilities. Creating a TRID may be appropriate for stops or stations along a bus corridor with very frequent transit service.

Traditional Neighborhood Development (TND)

The MPC includes provisions for establishing a Traditional Neighborhood Development (TND), which encourages the mix of compact residential and commercial development oriented toward pedestrian activity. The interconnected streets and pedestrian focus of a TND creates better transit connections, making ‘public transit a viable alternative to the automobile’.

Complete Streets Policy

Complete Streets are streets that are designed, operated, and maintained to provide safe access for all users. Complete Streets policies are documents that identify procedural approaches to designing and maintaining roadways that serve the needs of all users, regardless of age, ability, or mode of

transportation. Complete Streets policies de-emphasize automobiles over all other transportation modes. They benefit public transit users in particular by ensuring safe bicycle and pedestrian routes to and from stops, and improving efficiency of public transit service. Municipalities can identify the parties responsible for ensuring that Complete Streets principles are considered in the design process for all transportation projects within a municipal jurisdiction.

Access Management Policy

Access management includes a number of strategies to provide vehicular access to land in a way that preserves the safety and efficiency of the roadway. In addition to the benefits for vehicular safety and operations, access management strategies can improve the safety of pedestrians and transit riders, as well as reduce conflicts between buses and other vehicles. [PennDOT PUB 574: Access Management Handbook](#) provides an overview of various access management strategies and includes a model municipal ordinance for access management. In addition to considering an access management ordinance, municipalities can identify ways to provide adequate driveway spacing and opportunities for joint access as part of the review and approval process for new land developments.

Transportation Impact Study (TIS)

A TIS is sometimes required by a municipality as part of the process for obtaining land development approval. Additionally, when a proposed development meets certain thresholds, PennDOT

Ten Elements of a Complete Streets Policy

1. Vision and intent
2. Diverse users
3. Commitment in all projects and phases
4. Clear, accountable expectations
5. Jurisdiction
6. Design
7. Land use an context sensitivity
8. Performance measures
9. Project selection criteria
10. Implementation steps

Smart Growth America

This transportation system shall be designed and operated in ways that, to the greatest extent possible, ensure the safety, security, comfort, and convenience of pedestrians, bicyclists, public transit/paratransit users, assistive mobility device users, skateboarders, motorists, emergency responders, freight providers, and users of other common modes of transportation.

City of Reading Complete Streets Initiative



requires preparation of a TIS in order to obtain a Highway Occupancy Permit. Generally, TIS requirements focus on how a proposed land development will impact vehicular traffic, and specifically evaluating and mitigating traffic capacity. However, municipalities can require all modes of transportation be evaluated as part of the TIS, including public transportation.

[PennDOT PUB 282—Appendix A: Policies and Procedures for Transportation Impact Studies](#) provides detailed requirements for preparing a TIS related to obtaining a Highway Occupancy Permit and access to a state roadway. PUB 282 includes the following requirements related to public transportation as part of the TIS process.

- Applicants shall identify any existing transit facility that could be affected by the proposed development. At a minimum, this shall include any bus routes within a quarter mile of the development and any rail centers within a half mile of the development.
- Applicants are responsible for notifying local transit authorities of the status of the HOP application as well as inviting them to PennDOT meetings and ensuring they are copied on any correspondence to PennDOT. This includes inviting transit authorities to the scoping meeting.
- Applicants may account for transit access to the site by following ITE’s Trip Generation Handbook as part of the future conditions analysis, depending upon the community context and

proposed development.

- Applicants may develop an Alternative Transportation Plan to mitigate potential traffic impacts. As part of developing an Alternative Transportation Plan, the applicant can evaluate potential increased demand for bus service, the need for modifications to existing or new bus routes, and/or improvements to transit stops.

Municipalities can incorporate similar requirements into existing or new ordinances to promote coordination with public transit providers and consider public transportation as part of a TIS for municipal land development approval.

Coordination with Transit Agencies

Transit agencies and authorities are responsible for planning and evaluating transit services within their service area. Service planning and longer range transit planning processes are opportunities for communities to provide input regarding the local vision and needs for transit.

Service Planning

Many transit agencies complete transit service planning on an annual or semi-annual basis. The purpose of a service planning process is to review, evaluate, gather input, and adjust selected bus routes or schedules to better meet current and future needs and improve performance and reliability. Bus routes are typically selected for review based on performance measures or requests



from counties, municipalities, other governmental entities, or the public. As part of the service planning process, transit agencies typically evaluate the impact on existing ridership, bus operational costs, and projected new ridership associated with the proposed changes to ensure that limited resources are utilized as efficiently and effectively as possible. Additionally, before implementing route or schedule changes, the transit agency may solicit input from the public. The service planning process is an opportunity for municipalities and other partners to suggest and review proposed changes to bus service in their community.

Transit Development Plans

In addition to regular and routine service planning, some transit agencies prepare Transit Development Plans (TDPs), typically every five years. A TDP involves a comprehensive evaluation of the bus network (and other transit services) in order to better serve existing riders, improve overall efficiency, and attract more riders. Development of a TDP often includes surveying riders, conducting focus group meetings, and facilitating public meetings to gather input. Typically, each bus route in the transit agency's system is evaluated, along with analysis of demographic trends and potential growth. There may be an opportunity for comprehensive plans or other local government plans to be considered and reviewed as part of the process.

In addition to transit service recommendations, the TDP can include recommendations related to capital

improvements, fares, and other policies or service enhancements. With a five to ten year planning horizon, TDP recommendations may require identification of funding or other resources for implementation over time.

Land Development Plan Review

Some transit agencies are actively engaged in the review of land development plans for projects near existing bus routes. Transit agency staff review land development plans and coordinate with counties, municipalities, and developers regarding transit related impacts or improvements. Involving transit agencies in the land development review process can lead to implementation of bus stop improvements as part of a private development. Three successful partnerships between transit agencies and municipalities engaged in the local planning and land development review process are highlighted on the following pages.



Success Stories from Transit Agency Partnerships

West Chester Pike Coalition

West Chester Pike is a transit corridor through ten communities in Delaware and Chester counties. After collaborating and completing several feasibility studies to enhance bus service along the West Chester Pike corridor, the coalition was formed in 2016. The coalition, which is facilitated by staff from Delaware and Chester counties, includes representatives from the corridor municipalities, SEPTA, PennDOT, TMAs, and the MPO. The group meets three times a year to collaborate on improving transportation opportunities, operations, and safety along the corridor. As a result of the coalition and the coordination, several municipalities along the corridor have updated ordinances to incorporate bus stop and shelter requirements. Additionally, bus stop improvements have been constructed in conjunction with adjacent land development projects and through partnerships with non-profit organizations.

Source: *SEPTA Bus Stop Design Guidelines, 2019*



West Chester Pike Coalition Meeting

Image Credit: Chester County Planning Commission



Rendering of an enhanced bus stop on West Chester Pike developed by DVRPC

Image Credit: DVRPC's Boosting the Bus: Better Transit Integration Along West Chester Pike, July 2011



Success Stories from Transit Agency Partnerships (continued)

CATA and Centre Regional Planning Agency

The Centre Area Transportation Authority (CATA) and Centre Regional Planning Agency have been working collaboratively on transit planning in the State College area for over 20 years. The two entities share and support a transit planner position. Working with other staff, the transit planner is responsible for reviewing and providing comments on land development plans to incorporate transit.

The partnership between CATA and the Centre Regional Planning Agency has been successful, resulting in construction of good pedestrian access and transit supportive infrastructure as part of numerous private developments. Based on both big and small successes, the partnership has created a transit-supportive culture in the region. Municipalities, planners, and designers that work on land development projects understand why transit is important and beneficial.

In addition to the shared and dedicated staff position, lessons learned and key factors for this successful partnership include:

- Cultivating relationships, especially with municipal elected officials and staff through regular coordination.
- Building credibility by asking for transit related improvements that are reasonable, feasible, and what is truly needed.
- Basing requests for transit related improvements on current and future ridership and what has worked in the past.



Bus stop infrastructure and pedestrian connections implemented as part of the land development process due to coordination with CATA.

Image Credit: Hugh Mose

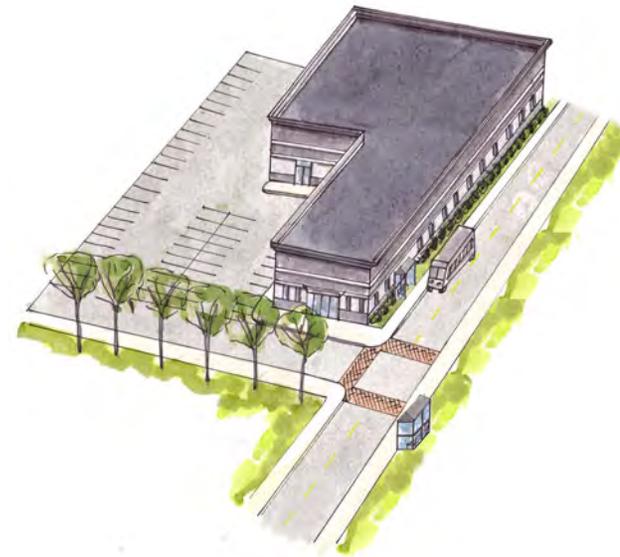


Success Stories from Transit Agency Partnerships (continued)

LANTA and LVPC

Lehigh and Northampton Transportation Authority (LANTA) and the Lehigh Valley Planning Commission (LVPC) entered into a Memorandum of Understanding (MOU) in 2009 whereby LVPC forwards and shares municipal plans, as well as subdivision and land development plans, with LANTA for their review. The two entities work together to “achieve urban design configurations that recognize and accommodate the needs of public transit operations.”

Transit Supportive Land Use for the Lehigh Valley is a document prepared by LANTA that serves as a guide for regional entities, municipalities, and developers to help facilitate the provision and use of transit. Additionally, LANTA has a staff member dedicated to coordinating with LVPC, municipalities, engineers, and developers to ensure transit and pedestrian amenities are considered during the design of land development and improvement projects. LANTA has found success by coordinating early with developers and their design teams to incorporate bus stop improvements into land developments that would directly affect existing and future bus routes and bus stop locations. LANTA has arranged and encouraged developers to incorporate shelters into their own design vision of their projects to directly benefit the users of their facilities.



Renderings of transit supportive site plans for industrial/office and commercial buildings. The renderings depict sidewalks, crosswalks, and overall site design to provide a safe and convenient connections for transit riders.

Image Credit: LANTA Transit Supportive Land Use for the Lehigh Valley, September 2013



Bus stop infrastructure and pedestrian connections implemented as part of the land development process due to coordination with LANTA.

Image Credit: LANTA



Implementation Resources

Implementation of bus stop improvements is not the sole responsibility of one entity. Rather, enhancements to the built environment, including those that support public transportation, are made over time through public and private investment in the community. Improvements can be implemented as part of a related project in the vicinity of the bus stop, such as a transportation improvement project or land development project. Or a transit agency, local government, non-profit organization, or other partner can implement improvements as a stand alone project. Additionally, improvements can be implemented in a phased approach over time, depending upon available resources and other constraints. For example, if an ADA loading pad and connecting sidewalk are constructed, a bench or shelter can be installed at a later date. Whether identifying funding or completing design, partnerships are key to implementing bus stop improvements.

Transit agencies play a key role in the planning and design of all bus stops. Any partners interested in providing a new bus stop or enhancing an existing stop should coordinate with the transit agency in their community at the outset of the planning or design process.

A Plan Review Checklist is provided in Appendix B and can be used as a resource to evaluate whether a design plan includes appropriate bus stop infrastructure.

Transportation Improvement Projects

Transportation improvement projects are completed to address a broad range of transportation needs. There are a variety of improvement types, including intersection improvements, bridge rehabilitations or replacements, roadway reconstruction, streetscape enhancements, and bicycle or pedestrian infrastructure. Transportation improvement projects can be led by PennDOT, counties, municipalities, or a partnership between various governmental entities. If a bus stop is located within the limits of a transportation improvement project, bus stop improvements can be incorporated into the design and construction of the project. Often, the bus stop infrastructure can be designed and constructed in a cost effective manner when it is part of a broader transportation improvement project.

It is beneficial to identify existing or planned bus stops during the conceptual design or preliminary engineering phase of a project and initiate early coordination between PennDOT, the municipality, and transit agency regarding the potential need and scope of bus stop improvements.

Land Development Projects

Bus stop improvements can be implemented as part of private land development or redevelopment projects. A private developer can design and construct the bus stop improvements as part of the adjacent land development project in accordance with municipal and PennDOT requirements.

PennDOT Connects

PennDOT Connects promotes collaboration between PennDOT and MPOs, RPOs, and local governments prior to developing scopes and cost estimates for transportation improvement projects. Early in the project development process, PennDOT considers community needs in an effort to make planning processes more efficient and cost-effective. PennDOT Connects meetings are held at the beginning of a project with local government officials and other partners. The meetings include discussion of incorporating all transportation modes, including transit, into transportation improvement projects. PennDOT Connects meetings are a great opportunity to discuss potential bus stop improvements as part of a broader transportation improvement project.



Incorporating bus stop requirements into zoning ordinances and SALDOs is one of the most effective ways to facilitate implementation of bus stop improvements as part of the land development process because it clearly outlines the municipality's expectations and vision. Additionally, the design of bus stop improvements should be developed through close coordination between the developer, municipality, transit agency, and PennDOT (for improvements within state-owned right-of-way). Also, there may be opportunities for the developer and transit agency to partner for installation or maintenance of improvements. For example, a private developer could install and maintain an ADA loading pad, foundation for a shelter, and connecting sidewalk and the transit agency could provide the shelter. As another option, the private developer could construct all of the improvements, but the transit agency could assume responsibility for long term maintenance of shelters or benches.

In some situations, bus stop infrastructure may not be necessary given current conditions, but could be needed in the future. Municipalities can work with developers and transit agencies to plan for future bus stops during the land development review and approval process. This could include the dedication of an easement to reserve space for a future bus stop or the collection of a fee-in-lieu of providing bus stop infrastructure or connecting sidewalks. Additionally, the official map is a tool that municipalities can use to identify area needed for future bus stops and connecting sidewalks.

Public-Private Partnerships

Some transit agencies and municipalities have agreements with vendors or concessionaires to provide bus stop infrastructure through public-private partnerships. The most common type of agreement is with an advertising company for the provision of bus shelters. For example, the advertising company will install and maintain bus shelters using revenue generated by controlled advertisements within the shelters. This type of agreement can also generate revenue for the transit agency. Key considerations for this type of agreement include ensuring that advertisements comply with local ordinances, ensuring necessary agreements are in place for shelter installation within the public right-of-way, and providing shelters in locations with lower traffic and ridership.

Potential Funding Sources

Identifying funding is a critical step for implementing bus stop improvements, particularly those that cannot be completed as part of another project or through a public-private partnership. Transit agencies, counties, or municipalities can identify and allocate funding in their annual budgets. However, these organizations have limited resources and may not have funding available through typical funding streams, such as general tax revenues or Federal Transit Administration (FTA) formula grants. Competitive grant funding programs can be a resource to fund bus stop improvement projects.



Example of bus stop infrastructure designed and constructed as part of an adjacent land development project in Phoenixville Borough, Chester County.



Example of a bus shelter donated and installed by the Broomall Chapter of Rotary International and maintained by Marple Township, Delaware County.

Source: DVRPC Enhanced Bus Service on West Chester Pike, February 2016



Federal

- FTA Grants for Buses and Bus Facilities Program
- Community Development Block Grant (CDBG)
- Transportation Alternatives Set-Aside Program

State

- PennDOT Multimodal Transportation Fund (MTF) Competitive Grant Program
- DCED Multimodal Transportation Fund (MTF) Competitive Grant Program

Private or Foundation Funding

Foundation resources have been used to fund bus stop improvements. For example, AARP’s Community Challenge Grant program has provided funding to local governments, transit agencies, and non-profits to install bus stop improvements in various communities across the country.

Additionally, there may be opportunities to work with local non-profit organizations to identify funding and implement creative design solutions. For example, a bench or bus shelter could be a public art installation developed in collaboration with a non-profit organization or local artist.





[2] Design Resources

Introduction

Bus stops are gateways to public transportation services and a key element of a multimodal transportation system. The design of bus stops directly impacts public transportation riders in terms of accessibility, safety, comfort, and convenience. Additionally, the design of bus stops can impact the quality, efficiency, and cost-effectiveness of public transportation operations. Since buses typically operate in mixed traffic on open roadways, bus stop design can also influence traffic safety and operations. Bus stops are part of the built environment and the design should reflect the unique context of the community and surrounding land use. Bus stops can be a focal point, hub, and public gathering place for the community. Bus stops should be more than a sign on a post; they are a community asset that can improve safety, accessibility, and mobility.

This chapter provides design guidance that can improve passenger experiences, bus operations, and community connections at bus stops. It is focused on the design of typical bus stops given that transit hubs or busway stops often require more extensive design and coordination between project partners. This section includes guidance related to bus stop siting and spacing, placement, configuration, bus stop elements, and amenities. Each bus stop is unique and the design must consider the site specific context, potential users, roadway and roadside features, and land use context. This resource guide highlights required and desirable bus stop design elements, as well as key

factors to consider during the design process. Planners, engineers, landscape architects, and others can use these resources to create bus stops that improve public transportation and serve as a community asset.

The graphic on page 2-2 provides an high level overview of the key steps for planning and designing a new bus stop. The specific steps will vary based on each transit agency policies and practices, as well as community needs. See Part 1: Planning and Policy Resources and this chapter for additional details regarding each step.

Locating Bus Stops

A bus stop location contributes to the safety of people riding the bus, walking, driving, and the bus operator. It facilitates a safe transit user and pedestrian experience, reliable service, and limits disruption to traffic operations. Public transportation service offers numerous community benefits, and the location of bus stops is a key factor in how well it serves the community.

Designing a bus stop starts by determining demand for the stop and selecting a proper location, which requires consideration of a number of factors. Many transit agencies have specific policies for identifying, evaluating, and establishing bus routes and stops. Coordination with public transit agencies is important because each agency handles this process differently. Page 2-3 lists key questions and factors that transit agencies, municipalities, PennDOT and property owners may consider when evaluating the location of a bus stop.

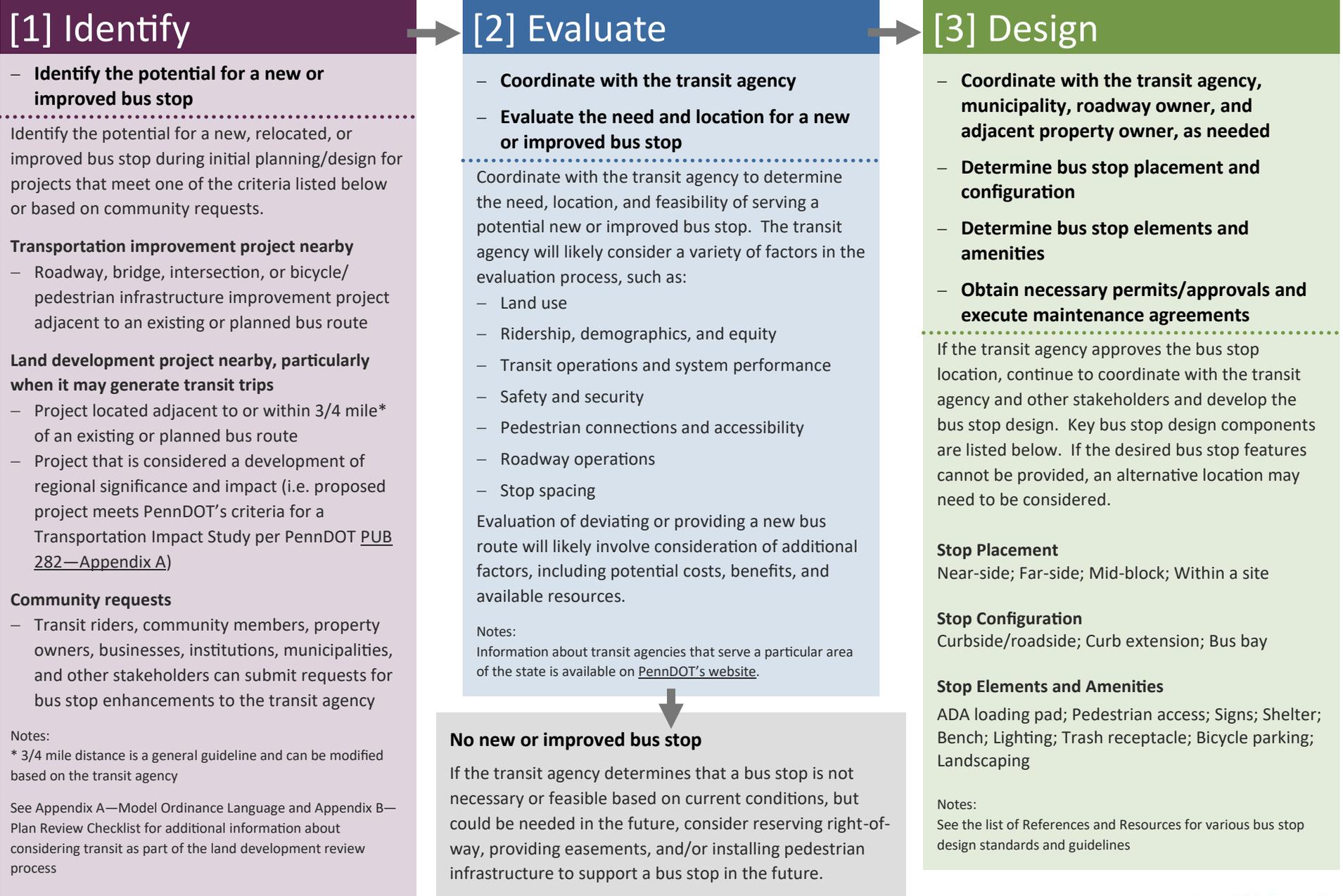
Basic Bus Stop Design Principles

- Accessible to everyone
- Safe, convenient, and comfortable location
- Visible and easily identifiable
- Good pedestrian access and connections
- Well integrated with surroundings
- Includes amenities to make the wait comfortable
- Supports efficient and effective bus operations

Source: Adapted from Memphis Area Transit Authority (MATA) Bus Stop and Accessibility Guidelines, 2017



Steps for Planning and Designing a Bus Stop



Key Factors for Evaluating Bus Stop Locations

Land Use

- What is the land use context and character for the proposed bus stop?
- What major transit generators or activity centers are within walking distance of the bus stop? (Major transit generators include employment centers, shopping centers, schools, civic buildings, medical facilities, senior housing, and multi-family residential complexes.)

Ridership, Demographics, and Equity

- What is the population and employment density, particularly in the area within walking distance to the bus stop?
- What is the potential ridership at the bus stop?
- How will the bus stop impact minority and low-income populations following requirements and guidelines associated with Title VI of the 1964 Civil Rights Act?
- How will the bus stop serve populations that rely on public transportation, including youth, aging adults, persons with disabilities, and individuals without access to a car?

Transit Operations and System Performance

- What is the stop spacing or the distance to the last and next stop?
- Is there a companion bus stop for service in the opposite direction?

- Will the bus stop facilitate connections to other bus routes or public transportation services?
- How will the bus stop impact the bus schedule and overall travel time?
- What is the estimated operational and capital cost of serving the bus stop?

Safety and Security

- Is adequate space available for ADA compliant boarding and alighting areas?
- Is the bus stop in a visible location with adequate lighting?
- Is adequate sight distance available for pedestrians waiting at the stop, for transit operators, and for other drivers?
- Is the bus stop located over the crest of a hill or on a curve in the roadway?
- Are there any walls, landscaping, or other structures that obstruct sight lines and impact passenger safety or security?

Pedestrian Connections and Accessibility

- How far will passengers have to travel to access the bus stop or their destination?
- What pedestrian infrastructure (i.e. sidewalks, paths, trails, curb ramps, crosswalks, pedestrian signals, etc.) is provided to connect the bus stop and destinations?

- What is the width and condition of pedestrian infrastructure near the bus stop and is the infrastructure ADA compliant?
- Is there a crosswalk or connection to the companion bus stop?

Roadway Operations

- What are the traffic volumes and travel speeds at the bus stop?
- What are the number and width of travel lanes?
- Will the bus stop block or impact driveways or turning lanes at intersections?
- Will the bus stop impact on-street parking or loading zones?

Amenities

- What amenities are necessary and appropriate to serve the needs of transit riders and the community?
- Is adequate space available to provide the needed bus stop amenities?



Bus Stop Spacing

Stop spacing is the distance between bus stops on a route. Determining stop spacing involves striking a balance between transit accessibility and operating efficiency. When stops are located close together, passengers have shorter distances to walk and it is more convenient to access the bus service. However, providing more stops can reduce speeds and increase trip times for all bus passengers. Overall, having appropriate stop spacing can improve transit efficiency, cost effectiveness, and attractiveness of the service.

Selecting suitable stop spacing should be based on several factors, including the land use context, pedestrian infrastructure, and the type of transit service. Typical bus stop spacing is listed in the table below. Stops can be placed further apart for express or rapid bus services or in suburban/rural areas where pedestrian infrastructure is well connected.

For reference, SEPTA's minimum stop spacing is 500' and the Port Authority of Allegheny County's minimum stop spacing is 650'.

	Typical Spacing
Urban—Core	600'
Urban	750'
Suburban	1,000'
Rural	1,300'

Source: Adapted from TCRP Report 19, 1996

Title VI Requirements

Title VI, part of the Civil Rights Act of 1964, prohibits exclusion from participating in, denial of benefits of, and discrimination under federally assisted programs on grounds of race, color, or national origin. In Pennsylvania, through PennDOT's Title VI Compliance and Implementation Plan, the grounds for discrimination also extend to persons based on sex, creed, age, disability, low-income, or limited English proficiency (LEP).

As FTA recipients, Pennsylvania MPOs, RPOs, and transit agencies address Title VI compliance by preparing a Title VI Program document per FTA Circular 4702.1B.

All fixed route transit providers include system-wide service standards and policies in their Title VI Program as outlined in Chapter IV of FTA Circular 4702.1B to ensure equitable distribution of transit stops and amenities.

Fixed route transit providers operating 50 or more fixed route vehicles in peak service and located in an urbanized area of 200,000 people or more are also required to address data collection, transit service monitoring, and fare evaluation in their Title VI Program.



Stop Placement

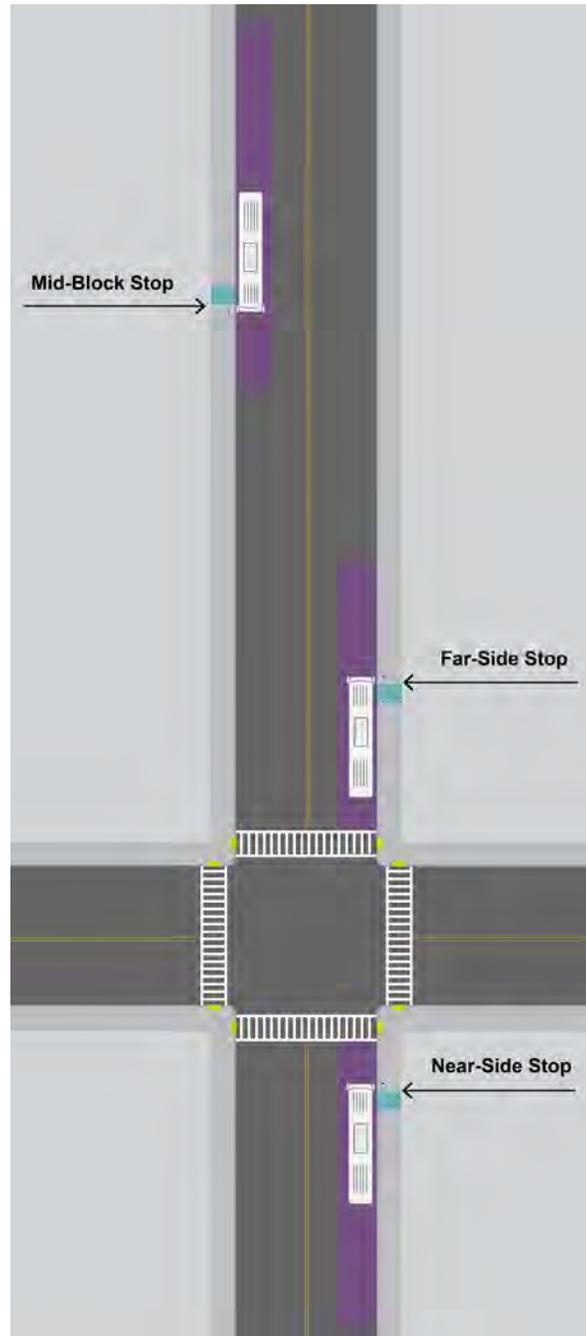
There are three basic locations along a roadway where a bus stop can be placed.

- Far-side: After proceeding through an intersection
- Near-side: Before an intersection
- Mid-block: In between intersections

Bus stops can also be placed off of a public roadway and within a site of a transit center or generator.

This section provides a description for each of these bus stop placements and the associated advantages and disadvantages. The following figures, depicting the bus stop placement, include desirable dimensions for bus stop zones. A bus stop zone is the general area within the roadway that is used by the bus to pull to the curb or roadway edge and allow passengers to board or alight. The dimensions provided in the following figures and throughout this guide are based on accommodating typical 40' buses. If 60' articulated buses serve the stop, the zone length should be extended by at least 20'. Additionally, the length should be increased if more than one bus is expected to use the stop at one time. Bus stop zones should be at least 10' from a crosswalk. Shorter bus stop zones may be appropriate in certain situations and should be designed through coordination with the public transit agency and municipality.

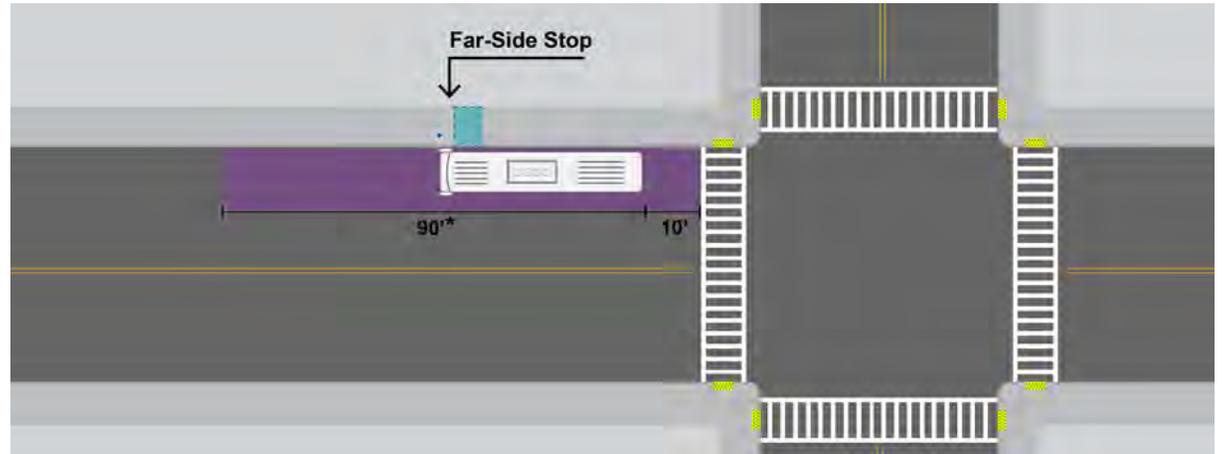
See Part 3: Bus Stop Typologies for additional illustrations of typical bus stop placements and configurations.



Far-side Stops

Far-side bus stops are located after an adjacent intersection. Far-side stops are preferred by many transit agencies. Compared to other stop placements, far-side stops can potentially decrease conflicts between the bus and other vehicles, provide the opportunity for some separation between passengers and other pedestrians, and minimize impact to on-street parking. Additionally, far-side stops present a lower risk for obstructed views and are a preferred location for pedestrian safety. Since crosswalks are located behind the bus, pedestrians do not cross in front of the bus. Far-side stops are typically more appropriate for signalized intersections where the bus can stop out of the travel lane and intersections with high volumes of right-turns. However, far-side stops may not be appropriate in areas where the stopped bus may interfere with traffic operations.

See Part 3: Bus Stop Typologies, numbers 3 and 6 for examples of far-side stops and additional design considerations. Numbers 1 and 2 could also be used for far-side stops.



* 90' is the preferred length for a far-side bus stop zone, but a shorter zone may be acceptable based on coordination with the transit agency and roadway owner. 60' is the recommended minimum length for a far-side bus stop zone. A longer zone may be required if a bus approaches the stop from an immediate left or right turn.

Advantages

- Minimizes conflicts between right turning vehicles and buses
- Allows for additional turning capacity at intersection
- Minimizes line-of-sight conflicts between pedestrians and motorists
- Encourages pedestrians to cross safely behind buses
- Allows for a shorter deceleration zone for the bus (buses may use the intersection to decelerate)
- Buses may use the gap in traffic created by the signal to re-enter the travel lane
- Minimizes area needed for curbside bus stop
- If a bus bay is provided, vehicle capacity through intersection is unaffected
- Appropriate after the route has made a turn

Disadvantages

- Stopped buses may block the intersection
- Stopped buses may block sight lines for pedestrians and vehicles
- Can cause an inefficient “double stop” where the bus stops once for the traffic signal and again for the bus stop
- Potential for rear-end crashes if drivers do not realize the bus is stopping
- May interfere with right turns from the cross street
- May restrict travel lanes on far-side of the intersection

Sources:

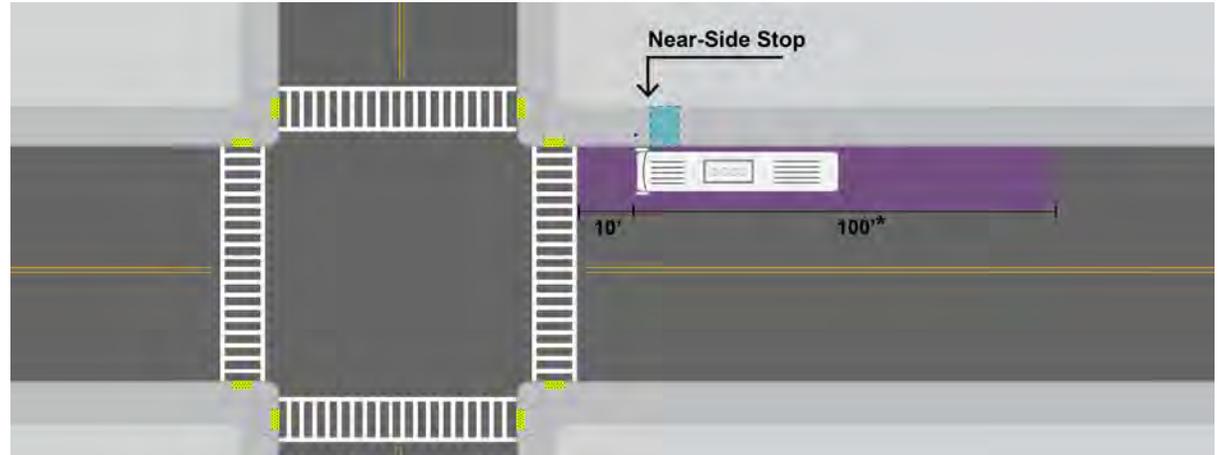
SEPTA Bus Stop Design Guidelines, 2019
Rhode Island Bus Stop Design Guide, 2017



Near-side Stops

Near-side bus stops are located before an adjacent intersection. Near-side stops may be appropriate to serve a key transit trip generator or where a bus may be making a right-turn. Additionally, near-side stops may be more appropriate at stop-controlled (non-signalized) intersections to reduce the number of times the bus needs to stop.

Generally, near-side stops are not preferred over far-side stops because of concerns with pedestrian safety. In particular, pedestrians are less visible to bus operators and the bus may obstruct the view of pedestrians crossing the street. Additionally, more space is required for the bus to pull into a near-side stop, which impacts on-street parking.



* 100' is preferred length for a near-side bus stop zone, but a shorter zone may be acceptable based on coordination with the transit agency and roadway owner. 90' is the recommended minimum length for a near-side bus stop zone.

Advantages

- Minimizes interference when traffic is heavy on the far-side of an intersection
- Allows passengers to access the bus closest to the intersection
- Eliminates the potential of a “double stop”, because the bus stops once at a traffic signal
- Less potential conflict with traffic turning from the side street
- The bus can use the intersection as acceleration space
- The bus driver has full view of intersection
- Can be coordinated with a far-side stop on the side street to facilitate transfers without the need for passengers to cross the roadway

Disadvantages

- Conflicts between the bus and right-turning vehicles may arise
- The bus may obscure sight lines for pedestrians and motorists at the intersection for both main and side streets
- May present a conflict between pedestrians crossing the intersection and passengers waiting to board
- Buses may sit through multiple signal cycles to allow passengers to board or alight
- Reduces intersection capacity if a bus is stopped during signal green time
- Traffic queue may make it difficult for buses to re-enter travel lane

Sources:

SEPTA Bus Stop Design Guidelines, 2019

Rhode Island Bus Stop Design Guide, 2017

See Part 3: Bus Stop Typologies numbers 4 and 7 for examples of near-side stops and additional design considerations. Numbers 1 and 2 could also be used for near-side stops.

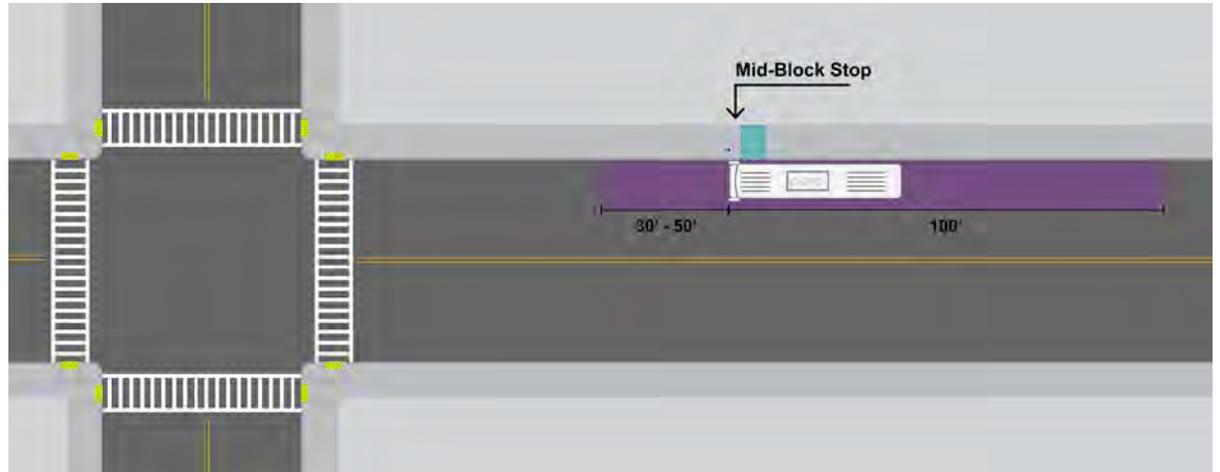


Mid-block Stops

A mid-block bus stop is located between adjacent intersections. Their implementation should only be encouraged where other stop types would not sufficiently serve the needs of transit users.

Mid-block stops may be appropriate in areas where there is insufficient curbside space or vehicle travel lane capacity at adjacent intersections. Mid-block stops can also be used to serve a key origin or destination for transit trips. In particular, mid-block stops may be appropriate in more suburban or rural environments with limited pedestrian infrastructure. However, there are safety concerns when mid-block stops do not have pedestrian crossings to provide access to companion bus stops for a return trip.

Mid-block pedestrian crosswalks require special engineering analysis to determine the appropriateness and effectiveness. [PennDOT PUB 46—Traffic Engineering Manual](#) provides criteria for establishing mid-block crossings. Additionally, PennDOT requires an engineering and traffic study for mid-block crosswalks on state owned roadways, known as a [TE-113 form](#). The evaluation and design of a mid-block crosswalk associated with bus stops should be developed through coordination with the municipality and PennDOT (for state owned roadway crossings).



Advantages

- Can minimize sight distance issues for vehicles and pedestrians and be an alternative to near-side and far-side stop types
- May be closer to origins or destinations for passengers
- May result in less interference with traffic flow
- Less conflicts between passengers and walking pedestrians

Disadvantages

- May be a safety concern if no pedestrian infrastructure or no mid-block crossing is provided
- Requires more physical space for the bus to decelerate and accelerate
- Reduces available space for on-street parking

Sources:

SEPTA Bus Stop Design Guidelines, 2019
Rhode Island Bus Stop Design Guide, 2017

See Part 3: Bus Stop Typologies, numbers 1, 2, and 5 for examples of mid-block stops and additional design considerations.



Within a Site

Bus stops within a site should be placed at a location that is safe for pedestrians and for the operation of transit vehicles. This stop placement may be dedicated transit centers or within a major transit generator such as an employment center, entertainment center, retail center, medical facility, or school campus. A bus stop within a site typically requires deviation of the bus route, which adds to the travel time and reduces efficiency.

Bus stops within a site are often located in a parking lot where the interaction between pedestrians, buses, and other vehicles is a safety concern. It is important for the bus stop to be visible and clearly marked. The location should be convenient, but not in an area that conflicts with high pedestrian or vehicle activity areas. In particular, access to fire lanes in front of a building entrance should be maintained. Additionally, pedestrian infrastructure, including sidewalks and clearly marked crosswalks, should be provided to connect the bus stop with the building entrances.

Care must also be taken to design travel lane widths and turning radii within the site to accommodate buses. Locating the bus stop along the main service corridors or the perimeter route within a parking lot may be preferred, since they may already be designed to accommodate delivery trucks or other

See Part 3: Bus Stop Typologies, numbers 8A and 8B for examples of stops within a site and additional design considerations.

large vehicles. Bus stops within a site may serve as a bus turnaround, transfer center, or layover location, particularly if at the start/end of a route. If this is the case, bus stops within sites should be configured to accommodate the intended purpose of the stop. Stops may include bus bays so that idle buses do not interfere with the traffic circulation within the site, and may include stop amenities such as shelters or benches for waiting passengers.

For stops near a building entrance, it is important that the stop is located either before or past the main entrance doors and in a location that is clearly identified with signs, pavement markings, or other design treatments. Care must be taken to avoid conflicts areas critical for emergency access and other high activity areas.

Finally, property access agreements between the transit agency and the property owner may be needed for this type of stop.

Advantages

- Reduces conflict with other vehicles because the bus stop has a dedicated space
- Bus does not interfere with traffic operations
- Opportunity for the bus stop to be located closer to origins or destinations
- Potential space for amenities at the bus stop
- Bus does not interfere with sight distances for pedestrians or vehicles



Bus stop within shopping centers

Source: LANTA (top); Hugh Mose (bottom)

Disadvantages

- Buses have to deviate from the route, which increases travel time for all passengers
- Buses may need to navigate tight turns in a parking lot environment
- Passengers may have to negotiate parked cars to access the stop or destinations
- The bus stop may be located in an inconvenient location within the site



Stop Configuration

In addition to the stop placement, there are several different bus stop configuration options. The physical configuration of a stop impacts how riders interact with buses and how stops integrate with roadway, streetscape, and the surrounding environment. This section details possible configurations for five stop types: roadside or curbside stops, curb extensions, bus bays, and special types of stops.

Roadside or Curbside Stops

Roadside or curbside stops are located along the side of a roadway with no modification to the edge of the roadway or curb. Roadside stops are the most common type of bus stop configuration. Roadside stops may be placed within the travel lane, on-street parking lane, or shoulder.

Key considerations for roadside stops include:

- Available curb length or area for the bus stop without physical obstructions
- Available space for waiting areas, ADA access, and pedestrian travel
- Traffic volume, speed, and operations

Travel Lane Configuration

When buses stop in a travel lane, the need for the bus to merge in and out of traffic is eliminated. This improves service reliability and travel time. This stop configuration benefits transit operations, because buses do not have to contend with merging back into the travel lane. However, it may be a hindrance

to traffic operations, because the bus blocks the vehicular travel lane. Other vehicles may be permitted to pass the stopped bus, depending upon the roadway width and lane configuration.

Travel lane stops may be located in a right-turn lane. This configuration should be discouraged in most cases because it is difficult for buses to re-enter the travel lane. Additionally, buses may have to contend with turning vehicles and bicyclists when re-entering the travel lane. However, if the bus route turns at the immediate intersection, this stop configuration may be beneficial to transit operations.

Parking Lane Configuration

In areas where on-street parking is permitted, a roadside stop will generally fall within the parking lane. It may be necessary to remove a certain number of parking spaces to facilitate this stop type. Impacts to on-street parking can be minimized if stops are located near areas where parking is already prohibited; such as near fire hydrants, intersections, or driveways.

Shoulder Configuration

Depending on the shoulder width, shoulder stops require buses to fully or partially exit the travel lane. This presents similar benefits and limitations as those referenced with travel lane and parking lane configurations. If there is sufficient width for buses to fully exit the travel lane, buses will need to perform a merge to re-enter the traffic flow. However, if the shoulders are narrow, buses may still impede the regular flow of traffic. Thus, it may be safer for buses to stop fully within the travel lane.



Curb Extensions

Stops with a curb extension or bus bulb have a physical extension of the curb line and sidewalk area into the parking lane or shoulder. This configuration creates additional space for the bus stop and allows the bus to stop in the travel lane. A wider sidewalk improves pedestrian circulation by creating a wider area for pedestrians behind the bus stop zone. It also creates additional space for bus stop features, such as shelters, benches, waste receptacles, and bicycle racks. By stopping in the travel lane, rather than waiting for gaps in traffic to re-enter the travel lane, buses may continue in-lane directly after stopping, thereby, increasing transit efficiencies. Additionally, a curb extension requires less curbside area than a roadside stop, which can reduce impacts for on-street parking.

Curb extensions for bus stops at intersections can also reduce pedestrian crossing distances and help to calm traffic. However, the turning radii should be considered to accommodate the appropriate vehicles utilizing the intersection. Specifically, a curb extension located at a near-side bus stop should consider the turning radii of the bus if the bus is to make a right turn to continue its route.

Curb extensions are typically used on roadways for near-side stops in an urban or small town context where on-street parking is provided. Additionally, curb extensions are most appropriate on roadways

See Part 3: Bus Stop Typologies, number 7 for an example of a stop with a curb extension and additional design considerations.

with lower speeds. Curb extensions are often installed in locations with frequent transit service, higher bus ridership, and more pedestrian activity.

Curb extensions have the potential to cause vehicle queues behind a stopped bus, similar to a roadside stop in a travel lane. Curb extensions also have a higher capital cost and require drainage modifications or new structures, or the relocation of utilities.

[PennDOT PUB 383 - Pennsylvania's Traffic Calming Handbook](#) and [NACTO's Urban Street Design Guide](#) provide additional information regarding the use, effectiveness, and design of curb extensions.

Advantages

- Provides easy access to the bus stop for the driver
- Reduces delay caused by the bus re-entering traffic
- Provides additional sidewalk area for pedestrians and waiting passengers
- Provides additional space for bus stop features
- Reduces pedestrian crossing distance
- Uses the least amount of curb space and removes fewer parking spaces compared to a roadside stop



Curb extension bus stop with a shelter
Source: Port Authority of Allegheny County, Google Street View

Disadvantages

- Can cause traffic to queue behind a stopped bus
- Boarding and alighting occurs with the bus in the travel lane
- More expensive than a roadside stop, particularly with potential drainage improvements
- Difficult to relocate due to infrastructure costs
- May cause stormwater ponding and drainage issues
- May impact on-street parking, bicycle lanes, and snow removal

Sources:

[SEPTA Bus Stop Design Guidelines, 2019](#)
[Rhode Island Bus Stop Design Guide, 2017](#)



Bus Bays

A bus bay, which can also be referred to as a pull out or turn out, includes a designated area for buses to stop that does not block a travel lane while loading and unloading passengers. A bus bay may typically consist of an entrance taper, stopping zone, and exit taper, but can include additional space for accelerating or decelerating outside of the travel lane. Bus bays require the curb to be setback away from the travel lane. This stop configuration type allows traffic to pass around the stopped bus.

Bus bays are often appropriate for roadways with higher traffic volumes and speeds, typically in rural or suburban contexts. In these situations, removing the bus from the travel lane provides a distinct safety benefit. Additionally, a bus bay can be used for locations with a layover, where the bus dwells for a longer period of time to maintain the schedule or provide a break for the driver. Also, bus bays may be beneficial for stops where boarding and alighting times may be longer, due to high ridership or passengers carrying packages.

Bus bays do require more space than roadside stops. In particular, bus bays can reduce sidewalk space at the stop. As a result, bus bays are often constructed as part of an adjacent land development project. Additionally, bus bays can delay bus service due to the time to re-enter traffic.

See Part 3: Bus Stop Typologies, number 5 for an example of a stop with a bus bay and additional design considerations.

Bus bay designs are typically considered either open or closed. As described above, a closed bus bay has a taper on both ends. An open bus bay is a variation with a taper at only one end. An open bus bay can be placed at the near-side or far-side of an intersection and is open to traffic on its end closest to the intersection. The design enables the bus to use space within an intersection to pull in or out of traffic.

The design of a bus bay should be closely coordinated with the transit agency and the municipality. Additional design guidance for bus bays is available in the following references:

- APA Urban Design Standards
- AASHTO Guide for the Geometric Design of Transit Facilities on Highways and Streets, 2014
- TCRP Report 19 – Guidelines for the Location and Design of Bus Stops, 1996

Advantages

- Provides protected area for a stopped bus, particularly for a longer dwell time or layover
- Allows buses to drop off and pick up passengers outside the travel lane
- Minimizes traffic delays due to bus operations
- Improves safety for passengers by increasing the distance between passengers and moving traffic



Bus bays along Fourth Street (SR 412) in Bethlehem, Northampton County

Source: LANTA

Disadvantages

- May be difficult for the bus to re-enter traffic, especially on high speed or high volume roadways
- May reduce on-street parking
- May reduce sidewalk space
- More expensive than a roadside stop
- Difficult to relocate due to infrastructure costs

Sources:

SEPTA Bus Stop Design Guidelines, 2019
Rhode Island Bus Stop Design Guide, 2017



Special Stops

Special stop configurations may be warranted in areas where there is high ridership, transfers, or special safety considerations.

Transfer Center

Transfer centers are stops that allow passengers to switch between routes. Frequently, passengers must wait at a stop for several minutes until their next bus arrives. A comfortable stop area that provides amenities such as a shelter, benches, etc. can improve the passenger experience. Bus stop signage and information are important features of transfer centers, possibly including real-time bus arrival or departure information.

Super Stop or Mobility Hub

Super stops, also known as mobility hubs, provide numerous amenities and connections to make the bus stop a hub for the community. These stops may integrate multiple transportation modes, including public transportation, bicycle share, bicycle parking, ride-share, or park-and-rides. Additionally, super stops or mobility hubs may serve as transfer centers or layover areas for buses. These type of stops typically include amenities for both transit riders and community members, such as shelters, benches, picnic table, or other public gathering spaces. These stops may have enhanced signage, public art, or other features to increase the visibility. Super stops can be small scale to serve a neighborhood or larger scale to support regional mobility. Pedestrian infrastructure and wayfinding signs are important to

provide connections between transportation modes and destinations in the surrounding area.

Boarding Island

Boarding islands are separated from the sidewalk by a bike lane or travel lane. This configuration provides the opportunity for bicycles or other vehicles to pass to the right of the passenger waiting area, thus improving safety. This type of stop is more appropriate in an urban environment with high transit frequency and ridership.

Transit Vehicles

The design of a bus stop must be based on the transit vehicles that will be servicing the stop. In particular, it is important to consider the vehicle specifications (length and door locations), as well as turning radii and vertical and horizontal clearances.

Length

The length of the transit vehicle is one of the key dimensions used to determine the space needed for a bus stop. The design dimensions provided in this guide are based on a 40' long bus, which is one of the more common bus sizes in the United States. The most common sizes of buses operating in Pennsylvania are 35' and 40'. Transit vehicle fleets however, differ from agency to agency. For example, some agencies operate articulated buses, which are typically 60' long and would require different design dimensions for bus stops.



Super Stop located in a shopping center in Robinson Township, Allegheny County

Source: Airport Corridor Transportation Association (ACTA), actapgh.org



In general, design guidelines based on 40' transit vehicle should be increased by 20' to accommodate articulated buses or reduced by 5' to accommodate 35' buses.

Even though these are standard and common sizes, there are differences in specific dimensions and operational characteristics based on the make and model of the bus. In particular, the distance between the front and rear doors will depend on the make and model of the bus. Additionally, bus features can impact the length needed for a bus stop. For example, accommodating loading and unloading bicycles from racks on the front of a bus typically requires an additional six feet for the loading zone. Therefore, it is important for transit agencies to be involved in the design of any bus stop to ensure that specific transit vehicles serving the stop will be accommodated.

Width and Clearances

A standard 40' bus is typically 8.5' wide without mirrors and 10.5' wide with mirrors. Both horizontal and vertical clearances should be considered in the design of bus routes and stops.

- Per [PennDOT PUB 13: Design Manual, Part 2](#), the preferred travel lane width for regular transit routes is 12'.
- Obstructions, such as signs and vegetation, should not be located within 2' of the curb or edge of the travel lane.
- Overhead obstructions should be at least 12' above the roadway.

Turning Radii

Turning radii of buses must be considered, particularly when the bus makes a turn or deviates from the primary route. In general for a 40' bus, the minimum outer radius is 50' and the minimum inner radius is 30'.

Other Siting and Design Considerations

This section summarizes some additional siting and design considerations that are important for bus stops with various placement or configuration options.

Driveways and Access Management

Bus stops located adjacent to driveways may pose safety concerns, particularly due to conflicts between buses, vehicles entering or exiting the driveway, and waiting passengers. It is preferable that bus stops are not located near a driveway. But, in some situations, locating a bus stop near a driveway is the only option or is preferred due to other constraints.

Listed below are several guidelines that should be followed when bus stops are located near a driveway.

- Place bus stops where driveways are behind the stopped bus to provide visibility for vehicles accessing the driveway and minimize conflicts between buses and vehicles
- Fully block a driveway rather than partially block a driveway to prevent vehicles from making unsafe maneuvers around the stopped bus



- If there are multiple driveways, keep one driveway open while the bus is stopped for passenger loading/unloading
- Provide space adjacent and separate from the driveway for boarding, alighting, and waiting passengers. The boarding and alighting areas must meet ADA requirements.
- Ensure that bus stop infrastructure, including shelters and benches, does not block the view of vehicles entering or exiting the driveway

Additionally, access management strategies, such as reducing the number of driveways and increasing spacing between driveways, can reduce conflicts between buses, vehicles, and pedestrians.

Sight Lines and Sight Distance

Proper sight lines and sight distances at bus stops are important for waiting passengers, pedestrians, bus operators, and other motorists. The roadway geometry, topography, and other obstructions must be considered as part of the bus stop placement and design. Parked vehicles, signs, trees, and landscaping can obstruct the views, particularly of a driver or waiting passenger.

For optimal sight distance, a bus stop should not be located over the crest of a hill or immediately after a curve in the roadway. Vehicles following a bus need to have good visibility of stopped buses, particularly when bus stops are located in the travel lane. Similarly, bus drivers need to be able to see vehicles approaching from behind when exiting a stop. Additionally, sight lines and distances must be

considered when a stop is located at an intersection or driveway, particularly for vehicular access and turning movements when a bus is stopped. A bus stop should be sited to meet minimum stopping sight distance provided by AASHTO and additional guidance is included in the most recent version of the AASHTO Geometric Design Guide for Transit Facilities on Highways and Streets.

Curb Management and Parking Restrictions

When bus stops are located in areas where on-street parking or loading is permitted, the interaction of buses with parked vehicles should be considered. On-street parking should be prohibited or restricted at the bus stop to provide sufficient space for buses to decelerate, stop, and accelerate. Parking restrictions can be implemented with pavement markings, signs, and/or painted curbs. These treatments should be applied to the limits of the bus stop zone to clearly define the no parking zone. There may be situations where a shared bus stop and loading zone can be provided, particularly if they are used at different times of the day. Also, any restrictions related to on-street parking or loading may require targeted enforcement to ensure that bus stop areas are clear. The transit agency and local jurisdiction should coordinate closely on all strategies for curbside management at bus stops.

Bicycle Lanes

When a bicycle lane is located in an area with a bus stop, special pavement markings or infrastructure improvements should be considered to ensure the safety of all road users. Sufficient sight distance for



No parking signs for bus stops

Source: MUTCD, 2009



bicyclists to see stopped transit vehicles and for transit operators to see cyclists is needed.

In urban areas with a high number of transit riders and bicyclists, it may be appropriate to physically separate or relocate the bicycle lane. A floating bus stop, is a bus island for passengers where the bicycle lane is shifted to run behind the island, rather than through or alongside the bus stop.

For more rural or suburban contexts with lower volume of transit riders and bicyclists, pavement markings and signage can be used to designate a transition area where the bus can cross over or pull into the bicycle lane and allow riders to pick-up or drop-off at the curb. This could include providing a dashed line and bike lane symbol markings prior to and along the bus stop and consistent with Manual on Uniform Traffic Control Devices (MUTCD) to make both the cyclists and bus drivers aware of the potential conflicts in these areas. Other options could include green colored bicycle lane markings at the bus stop to identify the conflict area, shared “BUS BIKE ONLY” pavement markings, or discontinuing the bicycle lane at the transit stop.

Pavement Markings and Signage

All bus stops should include appropriate pavement markings and signs that indicate the area is designated for the explicit use of buses. Such pavement markings and signs must conform with the most recent edition of the MUTCD. The MUTCD includes guidelines for regulatory signs for no parking at bus stops, as well as “BUS ONLY” legend markings for preferential lane use.

Pavement Material

Buses are heavy vehicles and the acceleration, deceleration, and stopping at bus stops can accelerate degradation of the pavement material. Asphalt, in particular, can warp and rut due to force and heat generated by buses. It may be appropriate to consider concrete for the roadway surface, particularly in areas with frequent transit service, where buses are expected to stop for extended periods, or where rutting or other maintenance issues have occurred. Compared to asphalt, concrete is more durable and less prone to rutting or warping. However, providing a concrete pad at the bus stop can create additional maintenance concerns due to the interface between different materials. Pavement materials for bus stops should be designed and coordinated with the entity that owns and maintains the roadway according to their pavement material standards and specifications.

Traffic Signals

When bus stops are located near signalized intersections, the traffic signal equipment and timing can help provide a safe pedestrian crossing and connection for transit riders. The signal should include an ADA accessible pedestrian signal and pedestrian push button. Additionally, the traffic signal timing should include adequate time for pedestrian crossings, with consideration for the population that may be crossing at the location. In some locations with heavy right or left turning volumes, providing a leading pedestrian interval may be appropriate. A leading pedestrian interval



Conceptual plan for pavement markings for bicycle lanes at bus stops in a suburban context

Source: *Route 30 Corridor Study, East Whiteland Township, 2018*



gives pedestrians a 3 to 7 second head start prior to the green signal for the same direction of travel.

Transit Signal Priority (TSP)

Most buses operate in mixed traffic and experience delay due to traffic signals. Transit Signal Priority (TSP) involves providing preferential signal timing and phasing to buses, which can reduce travel times and make transit service more efficient, reliable, and boost ridership. TSP is most appropriate for corridors with traffic congestion and high transit ridership, where improved signal timing and phasing can significantly enhance the bus service. TSP involves a number of strategies that provide priority signal operations to the bus. Typically, TSP includes automatic detection of a bus that is approaching a traffic signal and modification of the signal operations to give preferential treatment to the bus. This can include an early green phase, extended green phase, or special or modified signal phasing. TSP is typically implemented at multiple signalized intersections along a bus route, which provides cumulative travel time savings. There are different types of TSP technologies that can be deployed, depending upon the transit system, transit service, traffic signals, and traffic conditions.

Most traffic signals in Pennsylvania are owned and maintained by municipalities. PennDOT reviews and approves traffic signal permit plans. Therefore, implementation of any TSP measure requires close coordination between the public transit agency, one or more municipalities along a bus route, and PennDOT.

Queue Jump and Bypass Lanes

Queue jump and bypass lanes provide restricted lanes for buses to use to bypass queued vehicles at a signalized intersection. Both types of lanes are relatively short lanes adjacent to the travel lanes where buses can travel around traffic congestion. Queue jump and bypass lanes can reduce travel time and improve reliability, particularly when implemented in conjunction with TSP. These lanes are most appropriate for urban environments and corridors with frequent transit service, high traffic volumes and congestion, and where land or space is available to construct the infrastructure.

A queue jump lane can have a leading bus interval or active signal priority that provides an early green light. Queue jump lanes can be combined with right turn lanes, if the right turn volume is low.

A bypass lane or short transit lane may not have leading or priority signalization, but typically continues through an intersection to a far-side stop. A bypass lane is not combined with a right-turn lane and allows the bus to bypass queues in through lanes and right-turn lanes.

Roundabouts

The location and design of a bus stop at a roundabout should be placed to avoid a stopped bus from blocking traffic and creating a queue that interferes with circulation in the roundabout. Sometimes, it is beneficial to locate the stop further away from the roundabout or provide a bus bay. Pedestrian access and safety to the stop is also an important consideration for the bus stop design.



SEPTA near-side bus stop at a roundabout in Swarthmore Borough, Delaware County



Bus Stop Elements

Bus stop elements are curbside facilities located at a bus stop that are designed and intended to provide safe access to the bus service, make the stop visible, and enhance the comfort of waiting passengers. Since all transit riders are pedestrians before and after they ride the bus, pedestrian access and connectivity is an essential component of transit services and a key consideration for the design of all bus stop elements.

A fundamental and universal element is a bus stop location sign that indicates the transit agency and routes that serve the stop. All new, altered, or relocated bus stops shall comply with regulations of the Americans with Disabilities Act of 1990 (ADA). At a minimum, an ADA accessible bus stop shall include an ADA loading pad and pedestrian accessible route to the adjacent sidewalk, path, or public right-of-way. Beyond the minimum requirements, there are several desirable elements, including a clear zone for rear door access and parking restrictions, if applicable. Bus shelters, benches, and other amenities are optional, but can significantly improve the passenger waiting experience and help increase the visibility of bus stops. Having an accessible and well designed bus stop with appropriate amenities can also help to promote the use of public transportation. This section highlights the purpose and basic design guidance for various bus stop elements. The bus stop elements are the building blocks to make bus stops safe, accessible, convenient, comfortable, and attractive.

The graphics on the following page provide general illustrations of key bus stop elements for a typical stop and summarize general design guidelines. Part 3: Bus Stop Typologies provides additional examples of bus stop configurations and the potential placement of bus stop elements.



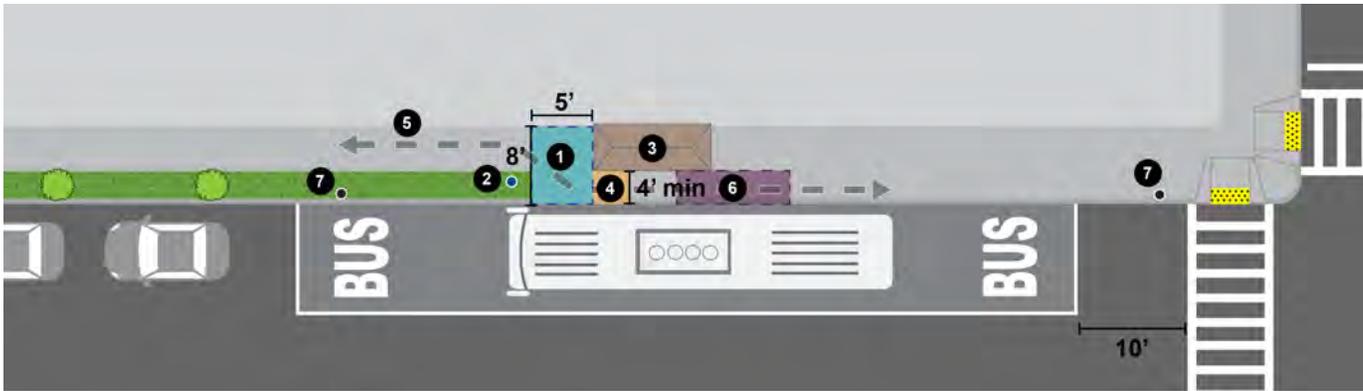
Bus stop with a shelter and lighting for LANTA serving commercial developments in Lower Macungie Township, Lehigh County

Source: Google Earth

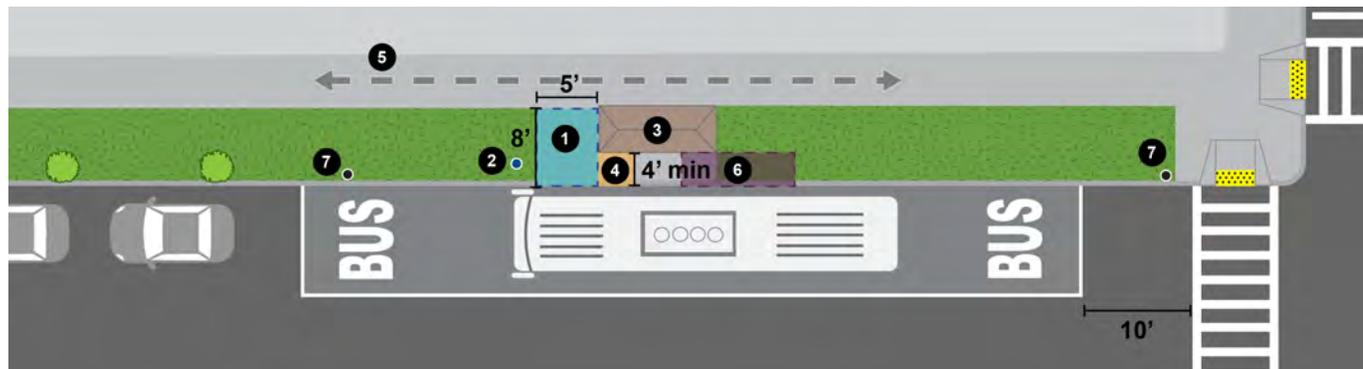


Basic Bus Stop Elements

Sidewalk separated from the curb with a narrow verge



Sidewalk separated from the curb with a wide verge



Plan View

Not to Scale

7 No parking signs or designation (if applicable)

6 Clear zone for rear door and waiting area



5 Accessible route (through the stop and to destinations)



1 ADA loading pad



2 Bus stop sign



3 Shelter, bench or other street furniture (optional)



4 Accessible route (to the shelter)



Image credits: Google Earth, LANTA, DVRPC



Basic Bus Stop Elements (continued)

1 ADA loading pad

- Firm and stable surface, typically concrete
- Minimum clear length of 8' measured perpendicular to the roadway.
- Minimum clear width of 5' measured parallel to the roadway. Wider pad is desirable.
- Maximum cross slope is 1:48

2 Bus stop location sign

- Minimum 2' between the sign support structure and the curb/edge of the roadway
- Minimum 2' from ADA loading pad
- Vertical clearance from the ground to the bottom of the sign between 7' and 8'
- Not obstructing pedestrian accessible route
- Mounted on a post (or a shelter) that does not include any traffic control devices

3 Shelter, bench, bicycle parking, lighting trash receptacle and other amenities (optional)

Shelters

- Minimum clearance of 4' from the curb and not obstructing the clear area for the ADA loading pad or the pedestrian accessible route
- Minimum clearance of 4' around the shelter, which may be reduced to 2' for the distance between the back of the shelter and a building face or wall
- Installation in PennDOT's right-of-way requires a Transit Shelter Right-of-Way Placement Agreement. Installation on other public right-of-way or private property may require an easement and/or maintenance agreement.

4 Accessible route (between the ADA loading pad and the shelter)

- Desirable minimum width of 4' with a required minimum clear width of 3'
- Maximum running slope is 1:20
- Maximum cross slope is 1:48

5 Accessible route (through the stop and to destinations)

- Firm, stable, and slip resistant surface
- Desirable minimum width of 5' with a required minimum clear width of 4'
- Maximum cross slope is 1:48
- Note: There may be limitations to providing ADA compliant accessible routes to bus stops. Providing sidewalks, crosswalks and other pedestrian infrastructure for accessible routes may involve coordination between municipalities, PennDOT, transit agencies, and/or property owners.

6 Clear zone for rear door access and waiting area

- Level area free of obstructions to wait for the bus and access the bus via the rear door
- The size of the waiting area should be based on ridership at the bus stop
- For rear door access, the desirable minimum length is 4' measured perpendicular to the roadway and the desirable minimum width is 10' measured parallel to the roadway
- Desirable paved surface, but can be grass

7 No parking signs or designation (if applicable)

- No parking may be designated with signs, painted curbs, and/or pavement markings
- Municipalities are responsible for no parking designations, as well as pavement markings for the bus stop



ADA Accessibility and Pedestrian Access

ADA regulations grant persons with disabilities the same rights and responsibilities available to all individuals. Transit agencies and other entities follow specific requirements to ensure that services, vehicles, and public transportation facilities are accessible and usable by persons with disabilities. Requirements for ADA regulations applicable to bus stops can be found in the U.S. Department of Transportation's ADA Standards for Transportation Facilities - Sections 402 and 810.2—810.4. FTA Circular 4710.1 is also a helpful resource that provides transit agency requirements related to ADA accessible bus stops and ADA accessible routes to bus stops. Transit agencies should be consulted and involved in the design process for all bus stops.

ADA Loading Pad

An ADA loading pad is level area with a firm, stable surface where the front (or the accessible) door of the bus opens to receive and discharge passengers. The basic and minimum requirements for ADA loading pads are summarized below.

- Firm and stable surface
- Minimum clear length of 8' measured perpendicular to the roadway
- Minimum clear width of 5' measured parallel to the roadway
- Connected to sidewalks, pedestrian paths, streets, or the public right-of-way by a pedestrian accessible route

- Maximum cross slope is 1:48
- Longitudinal slope following the roadway

Existing conditions, ridership numbers and demographics, specifications and features for transit vehicles servicing the stop, and other factors should be considered when designing an ADA compliant loading pad. The dimensions required for ADA accessibility should be considered the minimum size for a loading pad. It is preferable to provide a larger ADA loading pad with sufficient space for boarding and alighting. A wider loading pad can also provide additional space for passengers to wait for the bus and reduce conflicts with other pedestrians using the sidewalk. Additionally, a wider loading pad eases bus operations and gives the bus operator more space to properly pull the bus to the curb at the stop.

The ADA loading pad is typically integrated with the adjacent sidewalk, but may be a stand-alone facility in locations where a sidewalk connection is not feasible. There are various options for providing the ADA loading area, depending upon the width and design of the sidewalk. The graphic on the following page shows two typical configurations for ADA loading pads that are integrated with an adjacent sidewalk. The ADA loading pad is typically concrete to provide a firm and stable surface. Providing the ADA loading pad at curb height is preferred to ensure that a ramp deployed from the bus does not exceed the maximum slope of 1:6 to meet ADA requirements.

When a Bus Stop is Not Accessible

If a bus stop or route to a bus stop is not accessible for a passenger, they may request a reasonable modification from the operator to slightly adjust the boarding/alighting location to an accessible location. The individual with disabilities may also be eligible for complementary paratransit, at least on a conditional basis. See FTA Circular 4710.1 for additional information.

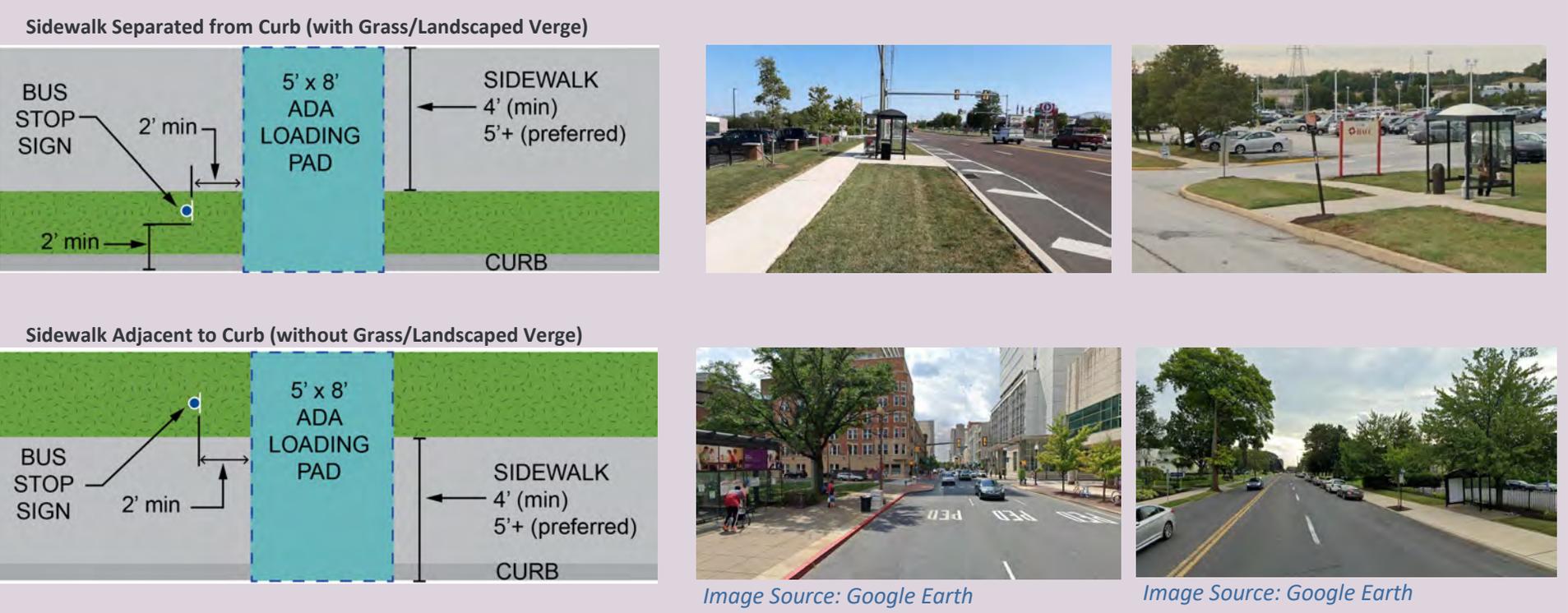


ADA loading pads

Source: Google Earth, Skills Connolly, Inc.



Typical ADA Loading Pad Configurations



Clear Zone for Rear Door Access and Waiting Areas

In addition to the ADA loading pad, bus stops should have an adequate waiting area for passengers and clear zone for rear door access to/from the bus. Although there are no ADA requirements for waiting areas or clear zones, it is desirable to provide a level area that is free of obstructions. In particular, driveways, utility poles, hydrants, bus stop amenities, and other street furniture should not be placed within the clear zone. It is desirable for the clear zone to be paved, but it can be grass. Additionally, it is preferred to have the clear zone

integrated with or connected to an adjacent sidewalk or pedestrian path. While there are no specific ADA requirements for the dimensions of the clear zone, it is desirable to provide a clear area that is at least 4' long measured perpendicular to the roadway and 10' wide measured parallel to the roadway. The location and width of the clear zone should be based on the buses that will serve the bus stop and is dependent upon the distance between the center line of the front door and the center line of a rear door. For 40' standard buses, this distance is typically 19' to 20'.



Pedestrian Accessible Connections

Pedestrian connectivity is a critical element of bus stop design. An ADA compliant bus stop must include the following connections via a pedestrian accessible route:

- ADA loading pads to bus shelters
- ADA loading pads to sidewalks, pedestrian paths, or streets

This means a clear, unobstructed, and ADA compliant path of travel is provided between these bus stop elements. The accessible route should be at least 4' wide, but can be reduced to 3' and still comply with ADA requirements. ADA requirements for accessible routes are provided in U.S. Department of Transportation's ADA Standards for Transportation Facilities - Section 402.

Pedestrian accessible routes should also be provided to other bus stop elements and amenities, such as information signs, benches, and trash receptacles. It is also important to maintain pedestrian accessible routes through a bus stop, particularly when bus stop elements are integrated with the sidewalk or other streetscape features. Pedestrian accessible connections via sidewalks, paths, or trails should also be provided to nearby intersections, crosswalks, and also directly to key transit generators.

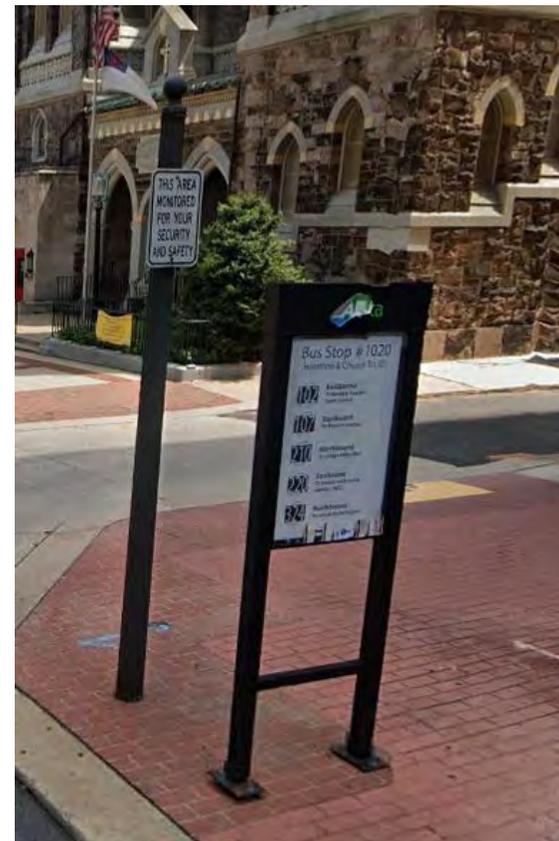
While the overall goal is to provide ADA compliant pedestrian connections to bus stops, the ability to provide an accessible route may be limited. For example, transit agencies may not have the authority or ability to provide sidewalks or

pedestrian connections to bus stops. Sidewalks and pedestrian infrastructure is typically owned and maintained by a municipality or private property owner. The ability to provide pedestrian connections may be limited by access to private property and may require approval from property owners. In addition, crosswalk treatments, including pavement markings or pedestrian signals, are typically owned and maintained by municipalities. The design and implementation of crosswalk treatments for an accessible route will require coordination with the governmental entity responsible for the roadway.

Signs and Information

Bus Stop Location Signs

All bus stops should include at least one sign that identifies the location of the bus stop. Bus stop location signs can also help to promote available transit services and convey the operator. Clear signage helps passengers confirm that they are at the right location to board a bus. Bus stop location signs are not traffic control devices. The bus stop location sign typically includes the name or logo of the transit agency and a listing of the bus routes serving the stop. In addition, some bus stop location signs include a bus stop ID number, a phone number for customer service, or information regarding online applications for bus location and schedule information. Bus stop location signs are typically designed, installed, and maintained by transit agencies. All sign content, including font and letter sizing, should be ADA-compliant.



Bus stop pillar sign for LANTA in Allentown, Lehigh County

Source: Google Earth



Key guidelines for the placing of bus stop signs are summarized below.

- Bus stop location signs shall be placed to clearly identify the location where passengers access the bus service.
- The bus stop sign shall be located in close proximity, but not within the ADA loading pad.
- The bus stop location sign should not obstruct pedestrian accessible connections at the stop.
- The sign post shall be located a minimum 2' from the curb or roadway edge, as well as driveways.
- The vertical clearance from the ground to the bottom of the sign shall be between 7' and 8'.
- The sign shall be visible to approaching buses and other traffic, as well as pedestrians on the sidewalk. It shall not be blocked by trees, signs, or other obstacles.
- To minimize clutter or conflicts, bus stop signs shall be mounted on either their own post or on another existing pole or bus shelter. Bus stop location signs shall not be mounted on the same pole as a traffic control device.
- Bus stop signs should be retroreflective to increase visibility for bus operators and other drivers.
- Consider a unique pole design, incorporating tactile features, or using technology to help people with visual impairments identify the bus stop.

Bus Stop Passenger Information Signs

At some stops, especially stops with higher ridership or multiple bus routes, it may be beneficial to provide additional passenger information. This may include schedules or timetables, fares and fare zones, route maps, system maps, or neighborhood wayfinding maps. Passenger information signs could also include electronic displays with real-time information for the arrival of the next bus. Electronic displays require power and additional provisions for maintenance.

Shelters

Bus shelters provide a comfortable area protected from the rain, sun, snow, and wind for passengers to stand or sit while waiting for a bus. Shelters can provide other benefits, including providing protected seating; increasing visibility of a bus stop; and incorporating passenger information, lighting, or other features. Though bus shelters provide many benefits to transit users, they are optional and may not be necessary, feasible, or appropriate for some bus stops.

Some transit agencies utilize criteria to determine when a shelter is warranted, such as the number of boardings, transfers, transit dependent population, and nearby land uses or facilities. Other factors to consider include frequency, bus layovers, and operator relief points.

Ridership: The number of passengers utilizing a bus stop is an important factor in determining if a



Bus shelters in Monroe County

Source: Monroe County Transit Authority



shelter is warranted. Shelters are often considered at bus stops with a higher number of boardings.

Transfers: Stops that are designated transfer locations have an increased likelihood that passengers will be waiting for a bus at that location.

Demographics: Demographics may also have an impact on the decision to locate a shelter at a given stop location. Persons living with a disability or aging adults may benefit greatly from the increased protection and security provided by a bus shelter. Additional consideration should also be given to areas where low income or minority individuals live or work.

Land Use: Bus stops near vital services such as assisted living facilities, dialysis centers, hospitals, pharmacies, clinics, public libraries, recreation centers, schools, supermarkets or other shopping centers are also candidates for shelters. Shelters can sometime have multiple uses. For example, shelters located near residential communities may be used by school students.

Location

Bus shelters may be located either in the public right-of-way or on private property. There are different requirements given the ownership of the property that shelters are located on.

Public Right-of-Way: Shelters located within the public right-of-way are subject to the requirements of the entity that owns the right-of-way, typically the state under the jurisdiction of PennDOT or the local municipality. For any shelter in state owned right-of-

-way, PennDOT requires a Transit Shelter Right-of-Way Placement Agreement. The location and design of the shelter and execution of the agreement must be coordinated with the transit agency, PennDOT District, and PennDOT Central Office. For shelters within municipally owned right-of-way, the municipality may have special requirements for shelter installation and maintenance. The location and design of the shelter should be coordinated with the transit agency and municipality.

Private Property: New shelters on private property would likely be subject to the applicable zoning and/or subdivision and land development ordinance of the local municipality and also subject to approval by the public transit agency and/or private property owner. The transit agency may require an agreement to specify that the shelter will be open and accessible and address installation and maintenance responsibilities. The private property owner may require an agreement to, among other requirements, grant the transit agency access to the property, waive property owner from certain liabilities, and specify shelter maintenance responsibilities.

Ownership and Maintenance

Shelters may be provided and installed by transit agencies, local municipalities, advertising agencies, property owners, non-profit organizations, or through some type of partnership between multiple entities. Advertising panels may be installed to help offset some of the capital and maintenance costs of shelters.



Shelters should be regularly maintained to uphold a standard and inviting appearance for transit users. Maintenance includes replacement of panels, cleaning, painting, and removal of trash. To maintain access for riders, an entity should be responsible for removing snow around bus shelters.

Placement and Design

The design of shelters shall meet ADA standards and be simple, functional, and easily to maintain. The minimum ADA requirements for bus shelters are included in the U.S. Department of Transportation's ADA Standards for Transportation Facilities - Section 810.3 and summarized below.

- The bus shelter shall be connected to the ADA loading pad by a pedestrian accessible route.
- The bus shelter shall not obstruct the minimum clear area of the ADA loading pad for boarding and alighting, which is 5' measured parallel to the roadway and 8' measured perpendicular to the roadway.
- The interior of the bus shelter should comply with ADA requirements including access points between panels, circulation space within the shelter, and seating. For example, the shelter shall have a minimum clear floor area of 30" by 48". Openings between panels shall have a minimum clear width of 3'. The slope of the foundation for the shelter shall not be greater than 1:48.

Beyond these minimum requirements to comply with ADA standards, bus shelters should be placed

appropriately to ensure safety of passengers, buses, pedestrians, and other road users.

- A shelter shall be located near the front end of the bus stop zone and preferably close to the ADA loading pad. A bus shelter can be integrated with the ADA loading pad, but shall not obstruct the minimum clear area of 5' by 8'.
- Shelters shall be placed in such a manner to not interfere with the accessibility of passengers or of passing pedestrians. A minimum clearance of 4' shall be maintained around the shelter, but may be reduced to 2' for the distance behind the back of the shelter and a building face, wall, or similar vertical barrier.
- A bus shelter shall be connected via a pedestrian accessible route to the ADA loading pad and to an adjacent sidewalk, path, or trail that is a minimum of 4' wide (and preferably 5' wide).
- A shelter shall not block the clear zone for rear door boarding or alighting.
- A shelter shall be at least 4' from the curb or roadway edge.
- A shelter should have good visibility for approaching buses to maintain safety for passengers.
- A shelter should not obstruct sight lines. Special consideration should be given for shelters placed near intersections or driveways.
- The design of the shelter should consider potential weather conditions. For example, the



shelter may be enclosed on up to three sides with partial enclosure of a fourth side for protection against wind or other weather elements.

- Any advertising on side panels shall generally be placed farthest from oncoming traffic and perpendicular to the road. Advertising panels shall not obstruct sight lines for pedestrians, transit vehicles, or other road users.
- Lighting, which can be solar powered and integrated with the shelter, is important for visibility, safety, and security.
- Any lighting shall not conflict with nearby traffic control devices and shall be shielded from abutting residential properties.
- Potential shared uses, such as use of the shelter by school students, should be considered during the design process.

Bus shelters can vary greatly in terms of style, size, shape, and functionality. The size and design of the shelter is often dependent upon the space available, ridership, and context at a given location. Typically, a shelter includes a roof, rear panel, and two side panels. However, the number and location of panels surrounding the shelter may vary. In particular, some narrow shelters have a rear panel only or side panels only. For security and safety purposes, the majority of the side and rear panels of the shelter shall be constructed of a clear, shatter resistant material. Shelters may incorporate other features or amenities, such as integrated benches, trash receptacles, interior/exterior lighting, printed or

electronic informational signs, heating systems, Wifi connections, and solar panels.

Some transit agencies have standard bus shelter designs and a variety of prefabricated shelters are available. Generally, prefabricated shelters are available in standard sizes, styles, or modular designs. For example, a typical shelter is 5' wide, but the length can vary between 9' and 20'. There are also narrower shelter designs for constrained locations. The use of prefabricated shelters may be beneficial to ensure that replacement parts are readily available in the case that shelters are damaged. All prefabricated shelters shall meet ADA standards and be installed according to the manufacturer's specification, which typically require a concrete foundation.

Signage and Displays

Bus shelters may include signage that serves two very distinct purposes. Informational signage serves the needs of passengers, while advertising signage may offset the cost of construction and maintenance of the shelter.

Informational Signs: A bus stop location sign that identifies the stop can be integrated with the shelter or the shelter may include additional information displays, such as route maps or schedules. Electronic signs that indicate when the next bus will arrive may also be incorporated, but require additional capital and operational investment.

Advertising: Advertising displays are often incorporated into the side panels of bus shelters. Revenue from this advertising can be used to offset



the cost of installing and maintaining the shelter. In some cases, advertising agencies may install and maintain shelters, typically as part of an agreement with a municipality or transit agency. Care must be taken with the placement of advertisements to maintain clear sight lines for waiting passengers and transit vehicle operators.

Other Bus Stop Amenities

There are a number of amenities or street furniture that can be provided at bus stops to increase the comfort and convenience for waiting passengers. Additionally, these elements can make the bus stop more attractive and help integrate the bus stop with the surrounding land uses. The amenities will likely be used by both transit riders and non-transit riders.

The siting and design of these types of amenities should be coordinated with the municipality and transit agency. The amenities shall be sited in locations close to the bus stop, but not obstruct the ADA loading pad, clear zone for rear door boarding, shelter access, or pedestrian access through the bus stop. Ideally, amenities for bus stops should look consistent with other streetscape features in the area. Additionally, provisions and agreements for ongoing maintenance should be identified prior to installation. Installing and maintaining these types of amenities can be accomplished through partnerships. For example, if an entity already owns and maintains street furniture along a bus route, it may be cost-effective for that entity to maintain amenities provided at a bus stop.

Benches

Stand alone benches can be installed at a bus stop and can provide a safe and comfortable place to wait for a bus. Benches are often installed at stops with higher ridership and in locations where a shelter is not feasible or desirable. Compared with shelters, benches are generally lower cost, easier to install, and require less space; therefore, they can be located in constrained locations. The Revised Draft Guidelines for Accessible Public Rights-of-Way notes that outdoor benches should have back support, armrests, and a seat height of 17" to 19" above the ground. The National Association of City Transportation Officials (NACTO) Transit Street Design Guide recommends benches for bus stops be at least 43" long and 20" to 24" wide.

In general, the back of a sidewalk provides the safest, driest, and best view of passengers waiting for a bus. Benches shall be placed in a location with a clear view of the approaching bus. Additionally, benches shall not obstruct the boarding and alighting areas and pedestrian routes. For example, in addition to a 4' wide pedestrian access route through the bus stop, an additional 1' clearance should be provided in front of the bench to account for knee and toe clearance.

Stools can be an alternative to benches in locations with constrained space and low to moderate ridership. Leaning rails are another alternative that can be located within shelters, mounted on walls, or freestanding. Leaning rails improve comfort for passengers waiting for a bus and can be relatively



Play bus stop with a bench on West Market Street in the City of York

Source: *rabbittransit*



low cost and easy to install, particularly compared to a bench or shelter. The design and placement of leaning rails shall comply with ADA standards.

Bicycle Parking

Bicycle parking at bus stops can expand connections between transit and key origins and destinations. Bike parking can help provide first-mile and last-mile connections for transit services. Bicycle parking at a bus stop could include a single bicycle rack, larger rack for multiple bikes, bicycle lockers, or even a bike share station. Care should be given in the siting of bicycle parking to ensure that parked bicycles do not obstruct access to the bus stop or access along the pedestrian route through the stop. Additionally, in terms of safety and security, bicycle parking should be visible and preferable in locations that are well lit. Municipal subdivision and land development ordinances may include specific requirements for bicycle parking.

Trash Receptacles

Trash and recycling receptacles can help to keep bus stops clean and attractive. Trash receptacles are often considered for bus stops with high ridership and bus stops with shelters because wind-blown debris can accumulate at shelters. Trash receptacles come in a wide variety of shapes, sizes, and styles. For ease of collection, trash containers should be located 1' to 2' from the back of the curb.

Lighting

Bus stops should be appropriately illuminated for rider comfort and safety. Proper lighting ensures a bus operator can see the bus stop and waiting passengers and can also deter criminal activities. Lighting can be integrated with other bus stop infrastructure, such as shelters and signs. Solar and LED lighting are more sustainable lighting options that are available for bus stop infrastructure. Care must be given to avoid conflicts with traffic control devices.

The American Public Transit Association (APTA) provides the following recommendations for proper lighting levels at bus stops:

- Use multiple lights rather than single fittings to provide consistent lighting levels and to reduce contrast between shadow and light
- Place lighting where it will not be blocked by mature vegetation
- Avoid placement of unshielded lighting at eye level
- If possible, install lighting at height levels that resist vandalism
- Use downward lighting
- Maximize use of existing lighting when possible.

Source: APTA Bus Stop Design and Placement Security Considerations, 2010



Landscaping and Stormwater Management

Trees and landscaping can make a bus stop more inviting and attractive and can often be placed to provide natural shelter from the sun, wind, or rain. However, landscaping should not obstruct boarding and alighting areas; visibility of signage; or clear views for the bus operator and passengers. For example, a planting area or green infrastructure should not be placed within the clear zone for the rear door. Municipal subdivision and land development ordinances often include requirements for landscaping, including specific requirements and species for street trees. Maintenance should also be considered during the selection of plants or trees and the design of any landscaped areas.

Maintenance

Bus stop infrastructure requires routine and ongoing maintenance, as well as repairs and sometimes full replacement. Routine maintenance can include emptying trash receptacles, clearing trash from shelters, replacing signs, shelter cleaning, or removing graffiti. Additionally, some maintenance activities may be related to seasonal conditions, such as clearing snow and ice from ADA loading pads, sidewalks, and shelters. More significant repairs could include replacing broken panels on a shelter or completely replacing a bench or shelter.

When bus stop infrastructure is designed and installed, there should be a written agreement between responsible entities to properly maintain a

stand-alone ADA loading pad, bench, trash receptacle, or bus shelter. There are a number of entities that could take responsibility for maintenance, including transit agencies, municipalities, advertising agencies, private developers or property owners, and non-profit organizations. Additionally, maintenance can be provided as a partnership between different entities. Entities should have a general maintenance or inspection plan that identifies the schedule for checking on the condition of the bus stop infrastructure or performing routine maintenance, such as emptying a trash receptacle. Entities should consider and provide a way for passengers or the public to report damage or unsanitary conditions. Additionally, entities should plan and budget for more significant repairs and upgrades and potentially lifecycle replacement.





[3] Bus Stop Typologies

Introduction

While each bus stop is unique, there are basic elements that should be present in most common bus stop configurations. The following bus stop typologies provide guidance for the typical layouts and configurations based on the local environment and context. Each typology reflects a standard 40' bus and could be modified for other sizes of transit vehicles or if multiple buses will use the stop.

These samples are provided for guidance only. They do not cover every type of bus stop and all aspects of design for a bus stop. Rather, the graphics and summary notes identify key elements of typical bus stop designs based on resources provided in this guide, best practices, and current requirements. Specific site conditions at the bus stop location must be considered to determine the preferred layout, design, and amenities. Also, bus stop designs should be developed through coordination with the public transit agency, owner of the roadway, and the adjacent property owner, if applicable. Bus stops can be a community asset, focal point of the streetscape, and public gathering space. Creative design solutions, such as integration of public art, can improve visibility of the bus stop and help to create a sense of place for the community.

Community Context

The bus stop typologies reflect different environments or contexts where fixed route public transportation may operate. The community context influences the bus stop design, configuration, and key elements.

Rural: The rural context includes predominately agricultural uses or natural landscapes interspersed with small-scale and low-density residential or commercial development set back from the roadway. Transit may be provided along key corridors in a rural community to serve specific trip origins/destinations, such as a commercial area, medical center, institution or civic use. In the rural context, roadways typically have limited shoulders and no sidewalks. Additionally, traffic volumes and speeds may be higher on key transit corridors.

Suburban: The suburban context includes predominately residential, commercial, or industrial land uses that are separated and buildings are set back from the roadway. Most suburban communities were designed and built to be accessible by car, so roadways are wider, surface parking is prevalent, and sidewalks are limited. Transit may be provided along key corridors and bus routes may divert off of the primary route to serve a specific origin/destination.

Urban: The urban context can include cities, boroughs, towns, or village centers that have a mix of land uses, higher densities, and buildings closer to the roadway. From a transportation perspective, sidewalks are prevalent and on-street parking is often provided. Bus stop infrastructure is typically integrated with the sidewalk and pedestrian realm.



Bus Stop Categories

The bus stop typologies are presented in three categories that reflect the different features that may be appropriate given community contexts, transit levels of service, and ridership.

Limited: Limited stops include an ADA loading pad and bus stop sign. These stops meet the minimum requirements for an ADA accessible stop with access to the public right-of-way. Limited stops may be appropriate for areas where a sidewalk is not feasible or desirable.

Basic: Basic stops include an ADA loading pad, bus stop sign, and connecting sidewalks or other pedestrian infrastructure. These stops meet minimum requirements for an ADA accessible stop and connected pedestrian route.

Enhanced: Enhanced bus stops include an ADA loading pad, bus stop sign, connecting pedestrian infrastructure. Optional amenities for the transit riders may also include a bench, shelter, lighting, and bicycle rack.

Bus Stop Accessibility

FTA Circular 4710.1 is a helpful resource that provides transit agency requirements related to ADA accessible bus stops and ADA accessible routes to bus stops. For example, if a bus stop or route to a bus stop is not accessible for a passenger, they may request a reasonable modification from the operator to slightly adjust the boarding/alighting location to an accessible location. The individual with disabilities may also be eligible for complementary paratransit, at least on a conditional basis. See FTA Circular 4710.1 for more information.



Notes on Key Bus Stop Elements—Applicable to all Bus Stop Typologies

The following notes on key bus stop elements are generally applicable for all of the bus stop typologies. Additionally, each bus stop typology includes elements and notes that are specific to the layout, configuration, and context.

While providing an ADA compliant pedestrian connection to the paired bus stop for the opposite direction is preferred, this is not shown on the typologies.

ADA loading pads

- Firm and stable surface, typically concrete
- Minimum clear length of 8’ measured perpendicular to the roadway
- Minimum clear width of 5’ measured parallel to the roadway. Wider pad is desirable.
- Maximum cross slope is 1:48

Bus stop location signs

- Minimum 2’ between the sign support structure and the curb/edge of the roadway
- Minimum 2’ from ADA loading pad
- Vertical clearance from the ground to the bottom of the sign between 7’ and 8’
- Not obstructing pedestrian accessible route
- Mounted on a post (or a shelter) that does not include any traffic control devices

Shelters

- Minimum clearance of 4’ from the curb and not obstructing the clear area for the ADA loading

- pad or the pedestrian accessible route
- Minimum clearance of 4’ around the shelter, which may be reduced to 2’ for the distance between the back of the shelter and a building face or wall
- Installation in PennDOT’s right-of-way requires a Transit Shelter Right-of-Way Placement Agreement. Installation on other public right-of-way or private property may require a maintenance agreement.
- Accessible route with a desirable minimum width of 4’ (and minimum clear width of 3’) between the shelter and the ADA loading pad

Amenities

- Benches, bicycle parking, trash receptacles, lighting, landscaping, and other amenities can be provided at bus stops. While optional, these features can increase the visibility, comfort, convenience, safety, and attractiveness of a bus stop. Amenities can also serve the needs of transit riders and the community.
- Locate amenities to ensure they do not obstruct access to the bus stop or the pedestrian access route

Clear zones for rear door access

- Level area free of obstructions to access the bus via the rear door
- Desirable minimum length is 4’ measured perpendicular to the roadway and the desirable minimum width is 10’ measured parallel to the roadway

- Paved area (or a wider sidewalk) is preferred to accommodate rear-door boarding/alighting and provide more space for waiting passengers
- Grass may be provided in certain locations with existing constraints or where rear-door boarding/alighting may be used less frequently.

Safety buffers

A safety buffer should be provided between the end of the bus stop zone and the edge of the crosswalk or intersection/driveway point of curve. The safety buffer prevents buses from blocking access, particularly for pedestrians. The safety buffer distance should be based on existing conditions and sight distance. A safety buffer of 10’ is preferred.

Grading/Stormwater

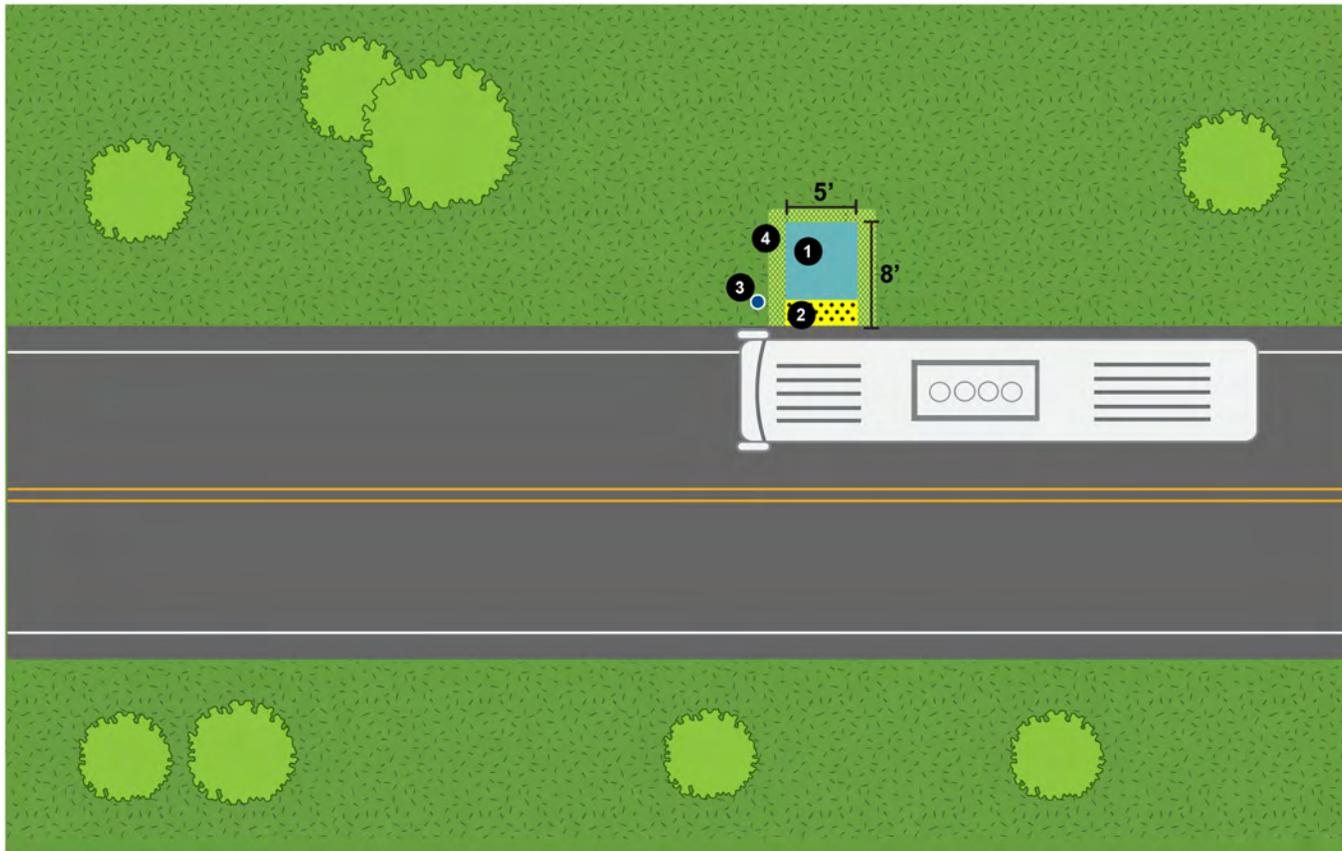
Grading and consideration of stormwater/roadway runoff will be required. The specific design will depend on the existing conditions. Cut/fill slopes adjacent to bus stops shall be 4:1 max, unless site conditions do not allow. A cut/fill slope 2:1 max may be allowed in certain situations, depending upon slope stability and erosion control. The design of potential roadway appurtenances will need to be considered when retrofitting the ADA loading pad in the roadside area. A safety railing, retaining wall, or other ADA compliant barrier may be necessary.

[See Part 2: Design Resources for additional details regarding the design of key bus stop elements](#)



1. Rural/Suburban Stop – Street Level – Limited

See page 3-3 for Notes on Key Bus Stop Elements



Plan View

Not to Scale

- 1 ADA loading pad**
 - Street level in an area adjacent and connected to the shoulder of the roadway
 - Longitudinal slope may follow the roadway slope
- 2 Detectable warning surface**
 - Width consistent with the ADA loading pad
 - 2’ length measured perpendicular to the roadway
 - Design complies with ADA standards
- 3 Bus stop sign**
- 4 Grading/Stormwater Management**

Notes:

- Depending on existing conditions, transit vehicle, and other factors, this design may not meet ADA design standards. In particular, a ramp deployed from the bus to the street level may exceed the maximum slope of 1:6. This should be evaluated during the design process. A curb-height ADA loading pad may be considered.
- The roadway shoulder or other areas within the right-of-way may not meet the requirements of an ADA compliant pedestrian accessible route. Providing a connecting sidewalk or other ADA compliant pedestrian facility is preferred.

Location Characteristics

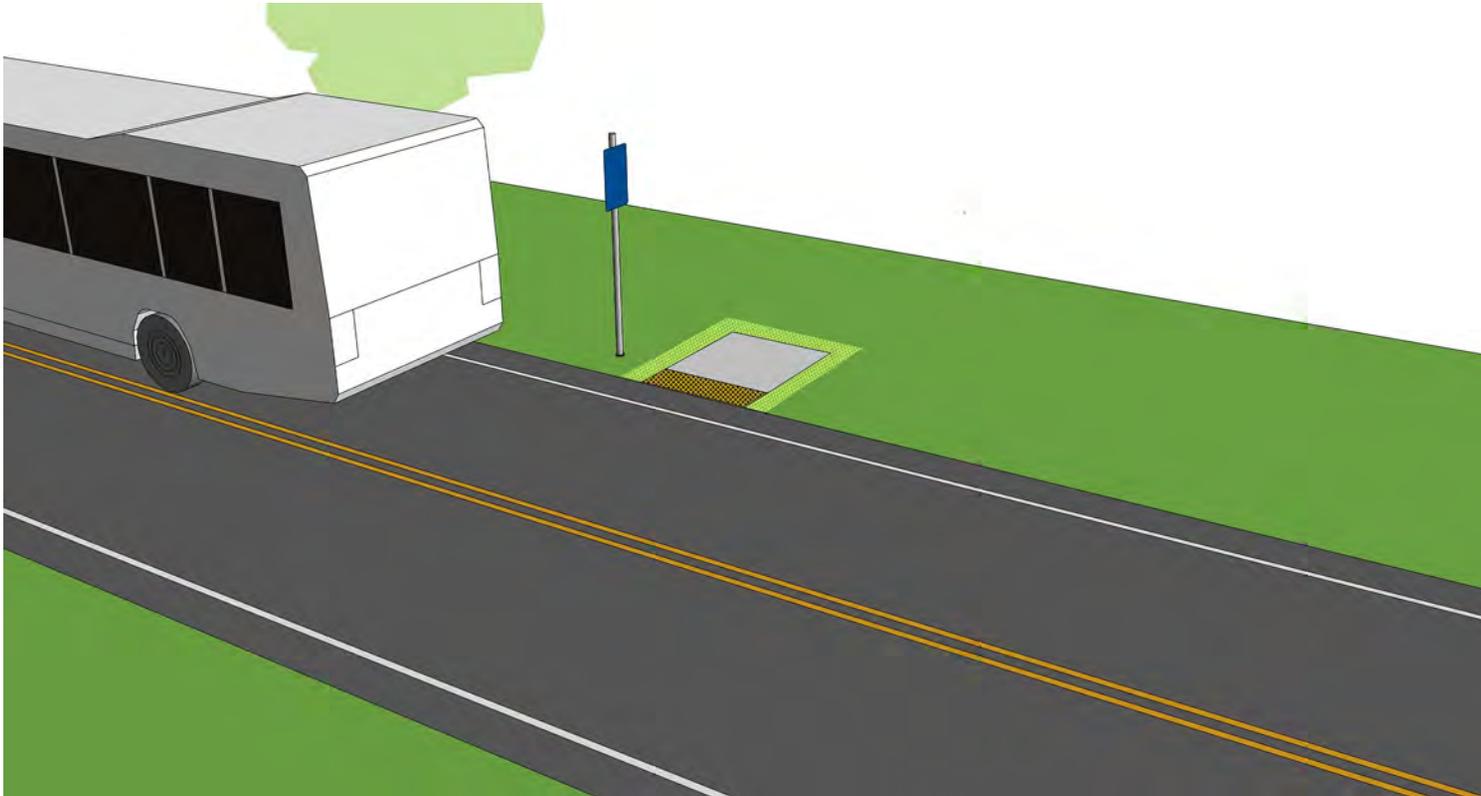
- Near-side, Far-side, or Mid-block
- Curbside
- Travel Lane – Shoulder stop
- Bus stop near a key generator/destination

Roadway & Roadside Characteristics

- Minimal shoulder
- No curb (along roadway)
- No sidewalk
- No parking on roadway



1. Rural/Suburban Stop – Street Level – Limited



3D View

Not to Scale



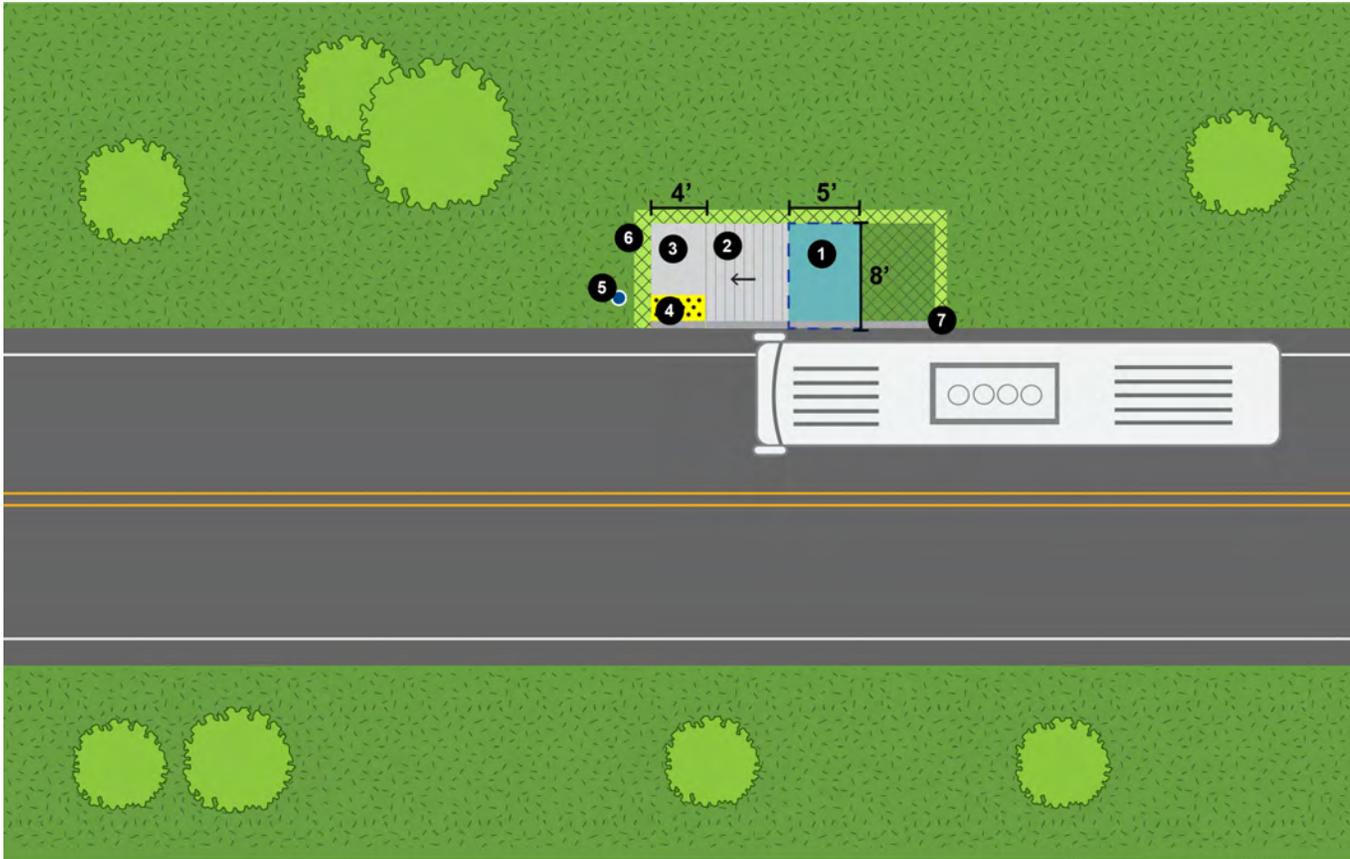
Image of a street level ADA loading pad for an Intercity Transit bus stop in Thurston County, WA

Image credit: Skillings Connolly, Inc.



2. Rural/Suburban Stop – Curb Height – Limited

See page 3-3 for Notes on Key Bus Stop Elements



Plan View

Not to Scale

- 1 **ADA loading pad**
 - Curb height, typically 8"
- 2 **Ramp**
 - Ramp connecting curb height ADA loading pad to street level. The ramp can be provided in either direction from the ADA loading pad
 - Ramp length (measured perpendicular to the road) of 8' and consistent with ADA loading pad is preferred. Minimum ramp length is 5'.
 - Maximum slope of 1:12
- 3 **Level landing area**
 - Minimum 4' width measured parallel to the roadway
- 4 **Detectable warning surface**
 - Width consistent with the landing area
- 5 **Bus stop sign**
- 6 **Grading/Stormwater management**
- 7 **Curb end treatment**

Notes:

- The roadway shoulder or other areas within the right-of-way may not meet the requirements of an ADA compliant pedestrian accessible route. Providing a connecting sidewalk or other ADA compliant pedestrian facility is preferred.

Location Characteristics

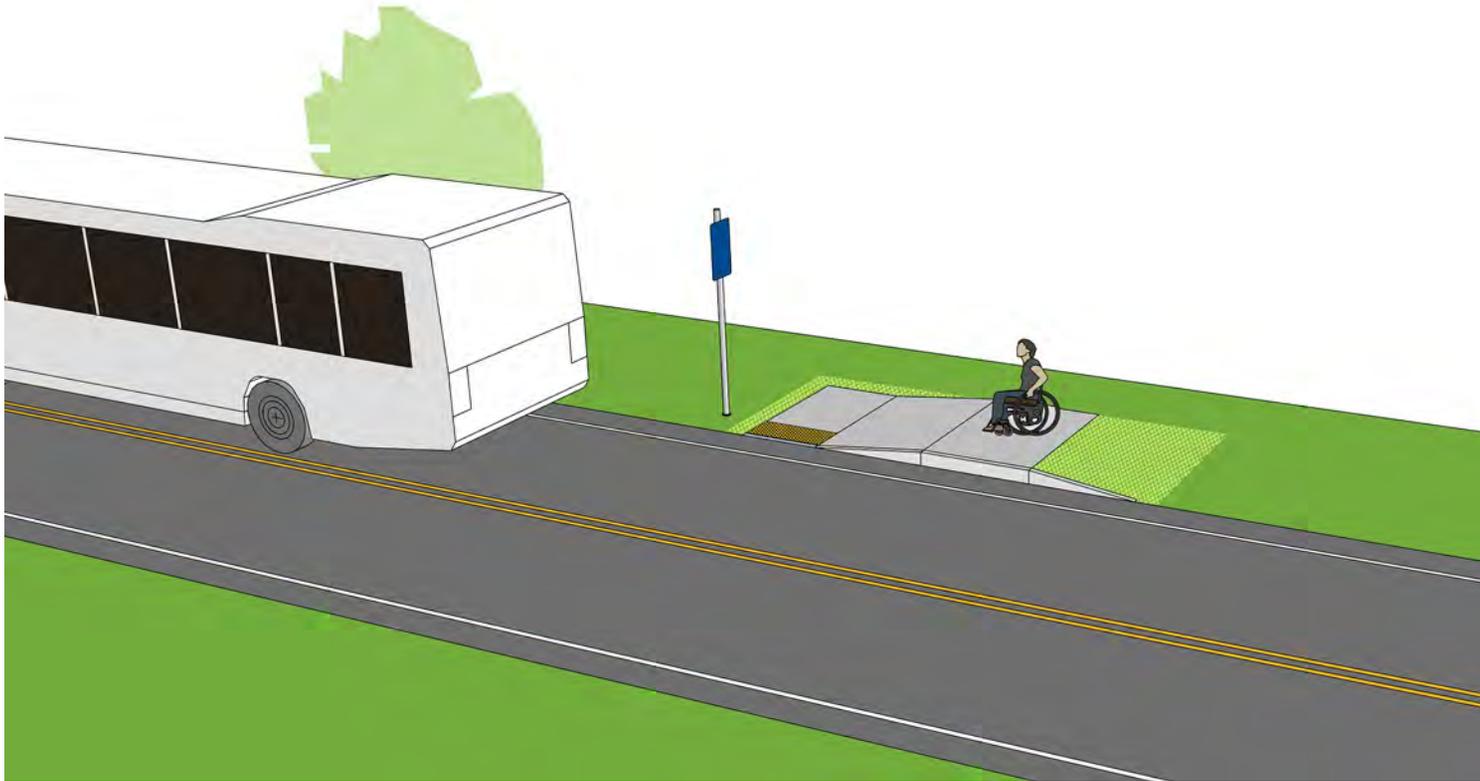
- Near-side, Far-side, or Mid-block
- Curbside
- Travel Lane – Shoulder stop
- Bus stop near a key generator/destination

Roadway & Roadside Characteristics

- Minimal shoulder
- No curb (except along ADA loading pad and connecting ramp)
- No sidewalk
- No parking on roadway



2. Rural/Suburban Stop – Curb Height – Limited



3D View

Not to Scale

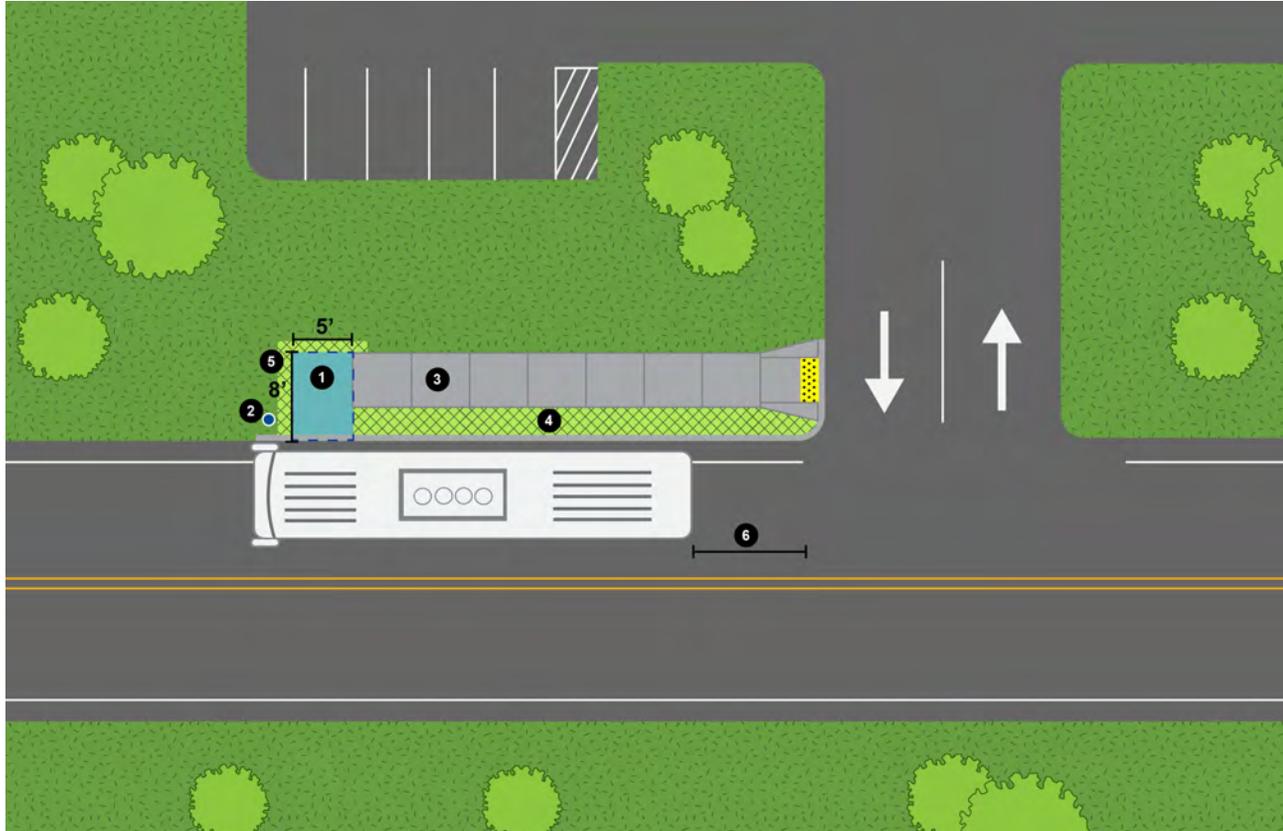


Image of a curb height ADA loading pad for bus stop in Montgomery County, MD

Source: Montgomery County Bus Stop Pad Configurations



3. Rural/Suburban Stop – Far-Side – Commercial Driveway – Basic



See page 3-3 for Notes on Key Bus Stop Elements

- 1 ADA loading pad**
– Curb height, typically 8"
- 2 Bus stop sign**
- 3 Sidewalk, curb, and curb ramp with detectable warning surface**
– Minimum sidewalk width is 5'
- 4 Clear zone for rear door access**
– Paved area (or a wider sidewalk) is preferred, but grass is optional
- 5 Grading/Stormwater management**

Safety buffer

- 10' is preferred

Notes:

- Providing internal pedestrian circulation between the bus stop and building entrance is preferred. ADA compliant pedestrian connections may be provided along driveways or directly from the ADA loading pad.
- Whenever possible, a bus stopped for boarding/alighting should not block a driveway, particularly if it provides the only access to a property.

Plan View

Not to Scale

Location Characteristics

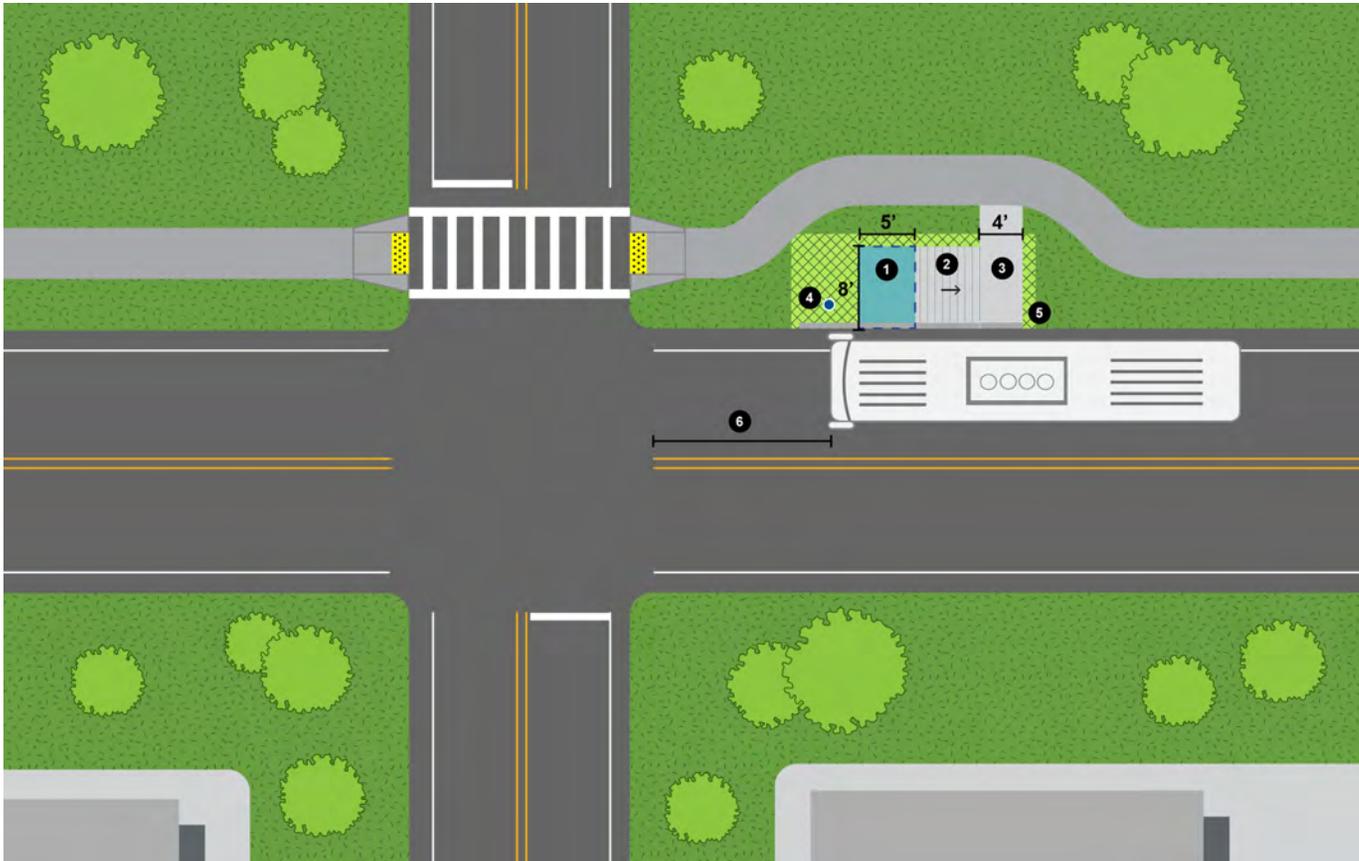
- Curbside
- Travel Lane – Shoulder stop
- Bus stop near a commercial driveway for a key generator/destination

Roadway & Roadside Characteristics

- Minimal shoulder
- No curb (except along ADA loading pad and sidewalk)
- Sidewalk with grass buffer (only at bus stop)
- No parking on roadway



4. Rural/Suburban Stop – Near-Side – Intersection – Basic



Plan View

Not to Scale

See page 3-3 for Notes on Key Bus Stop Elements

- 1 ADA loading pad**
 - Curb height, typically 8"
- 2 Ramp**
 - Ramp connecting curb height ADA loading pad to existing grade
 - Ramp length (measured perpendicular to the road) of 8' and consistent with ADA loading pad is preferred. Minimum ramp length is 5'
 - Maximum slope of 1:12
- 3 Landing area**
 - Minimum 4' width measured parallel to the roadway
 - Connection to path/trail
- 4 Bus stop sign**
- 5 Grading/Stormwater management**
- 6 Safety buffer**
 - 10' is preferred

Location Characteristics

- Curbside
- Travel Lane – Shoulder stop

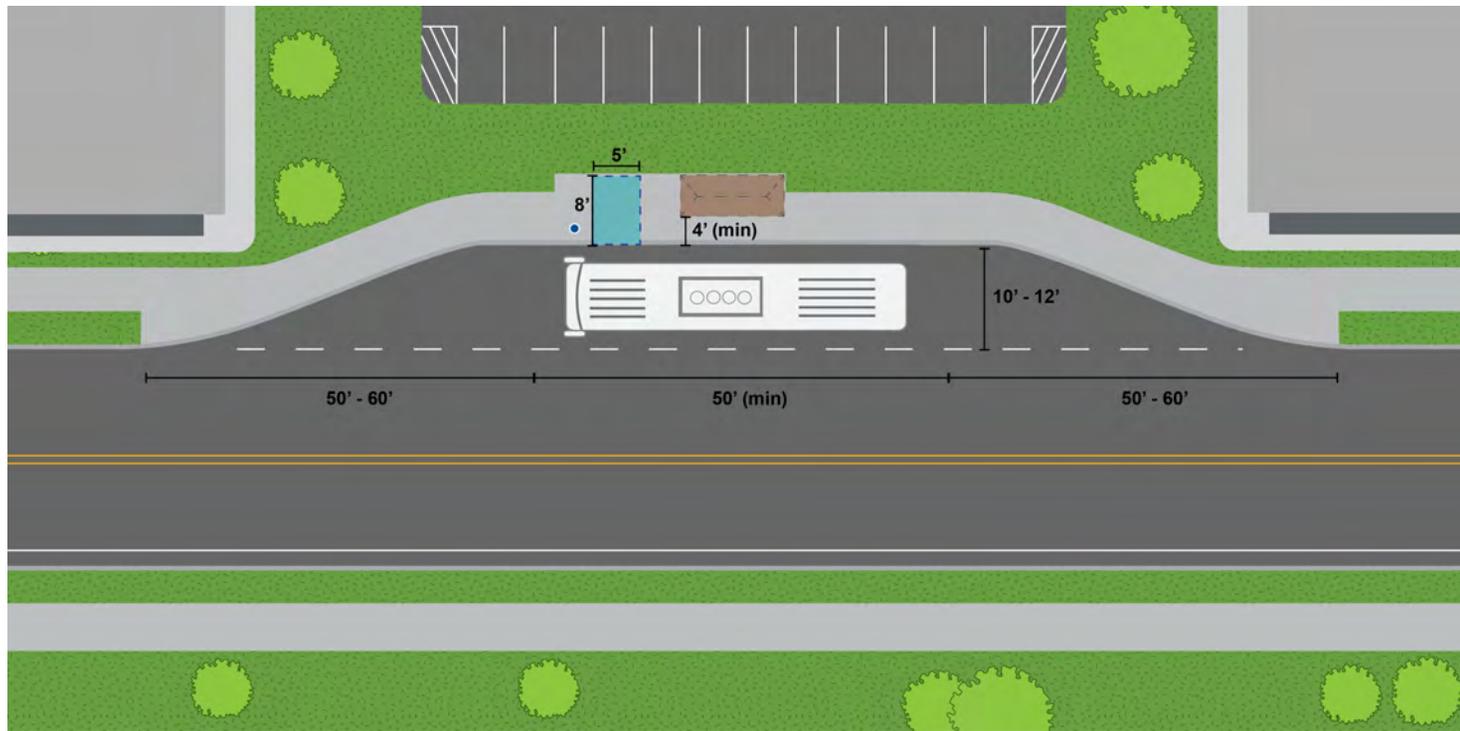
Roadway & Roadside Characteristics

- Minimal shoulder
- No curb (except along ADA loading pad and connecting ramp)
- Asphalt path/trail with grass buffer along roadway
- No parking on roadway



5. Rural/Suburban Stop – Closed Bus Bay – Enhanced

See page 3-3 for Notes on Key Bus Stop Elements



Plan View

Not to Scale

- 1 **ADA loading pad**
 - Curb height, typically 8"
- 2 **Bus stop sign**
- 3 **Shelter (Optional)**
 - Located at least 4' from the curb and not obstructing the clear area for the ADA loading pad or the pedestrian accessible route
 - Provide a minimum clearance of 4' around the shelter, which may be reduced to 2' for the distance between the back of the shelter and a building face or wall
- 4 **Bus bay width**
- 5 **Stopping area**
- 6 **Entrance taper**
- 7 **Exit taper**

Location Characteristics

- Closed bus bay

Roadway & Roadside Characteristics

- Minimal shoulder
- Curb (along roadway)
- Sidewalk with grass buffer along roadway
- No parking on roadway

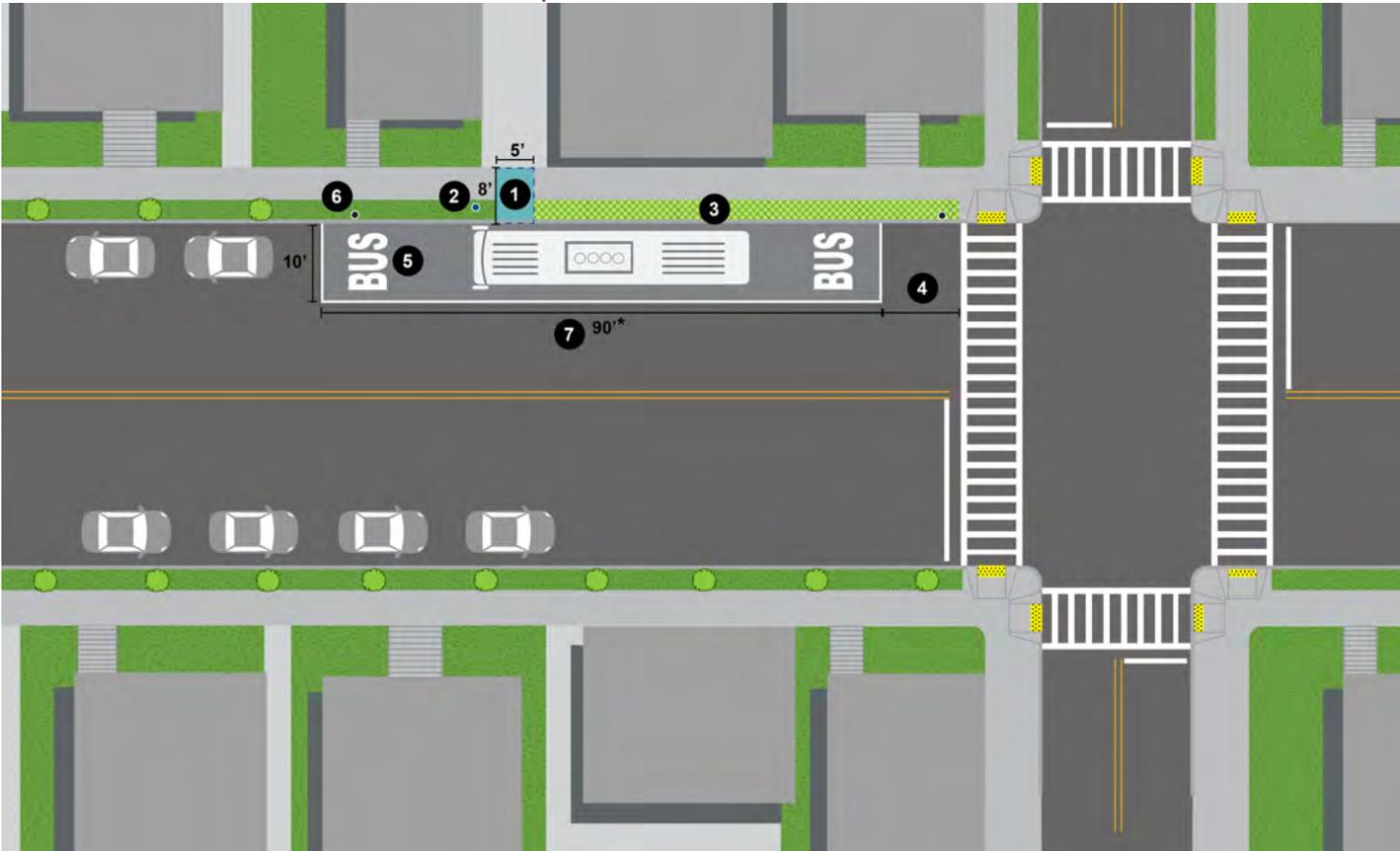
Notes: Bus bay (or turnout) dimensions in the illustration above provide general guidelines for stop locations where a bus is able to decelerate in the travel lane and enter the bus bay at or below 20 mph. The design of a bus bay should be closely coordinated with the transit agency and the municipality. Additional design guidance for bus bays is available in the following references:

- APA Planning and Urban Design Standards, 2006
- AASHTO Guide for the Geometric Design of Transit Facilities on Highways and Streets (2014)
- TCRP Report 19 – Guidelines for the Location and Design of Bus Stops (1996)



6. Urban/Suburban Stop – Far-Side – Basic

See page 3-3 for Notes on Key Bus Stop Elements



Plan View

Not to Scale

- 1 ADA loading pad**
- 2 Bus stop sign**
- 3 Clear zone for rear door access**
– Paved area (or a wider sidewalk) is preferred, but grass is optional
- 4 Safety buffer**
– 10' is preferred
- 5 “BUS” pavement markings (optional)**
- 6 No parking signs or designation**
– No parking within the bus stop zone may be designated with signs, painted curbs, and/or pavement markings
- 7 Bus stop zone length**
– 90' is the preferred length for a far-side stop, but a shorter bus stop zone may be acceptable through coordination with the transit agency and roadway owner. 60' is the recommended minimum for a far-side stop.

Notes:

- Municipalities are responsible for no parking designations, as well as pavement markings for the bus stop.

Location Characteristics

- Far-side
- Parking lane

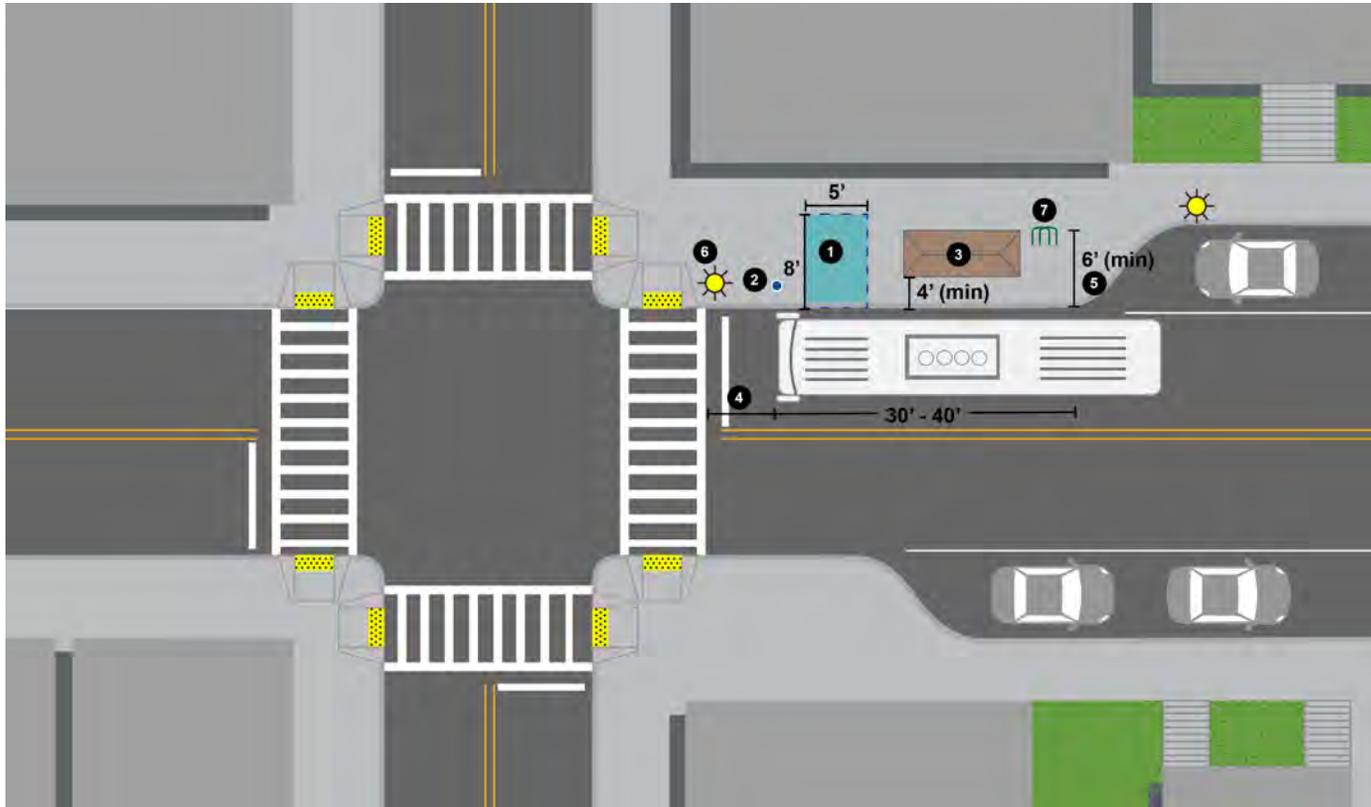
Roadway & Roadside Characteristics

- No shoulder
- Curb
- Sidewalk with grass buffer along roadway
- On-street parking



7. Urban/Suburban Stop – Near-Side – Enhanced

See page 3-3 for Notes on Key Bus Stop Elements



Plan View

Not to Scale

Location Characteristics

- Near-side
- Curb extension

Roadway & Roadside Characteristics

- No shoulder
- Curb
- Sidewalk with grass buffer along roadway
- On-parking on roadway

- 1 ADA loading pad**
- 2 Bus stop sign**
- 3 Shelter (Optional)**
 - Located at least 4' from the curb and not obstructing the clear area for the ADA loading pad or the pedestrian accessible route
 - Provide a minimum clearance of 4' around the shelter, which may be reduced to 2' for the distance between the back of the shelter and a building face or wall
- 4 Safety buffer**
 - 10' is preferred
- 5 Curb extension**
 - [PennDOT PUB 383 Pennsylvania Traffic Calming Handbook](#) provides additional design guidelines for curb extensions.
- 6 Lighting (Optional)**
 - Various options for providing appropriate lighting at the bus stop, including solar powered lights that integrated with the shelter or pedestrian scale lighting that is part of the streetscape
- 7 Bicycle rack (Optional)**
 - Located to ensure that parked bicycles do not obstruct access to the bus or access along the pedestrian route through the stop



8. Suburban Stop—Within a Site—Employment / Commercial Center

Deviating a bus route to serve a key generator must be evaluated and agreed upon by the transit agency. The evaluation should consider several factors, including the potential ridership, additional delay to existing riders, and additional operating expenses. It may also require a legal agreement for access to the property.

When providing a bus stop within a site, the bus routing and the location and design of the bus stop should be based on the specific site and transit service. Listed below and illustrated on the following pages are two general options for potential bus routes and bus stop locations. The advantages and disadvantages listed below provide key considerations that can be used to develop, evaluate, and design bus stops within a site.

Option A

Bus routing and bus stop located away from the building entrance

Advantages

- Reduces conflicts with pedestrians and vehicles associated with high activity areas near the building entrance
- Minimizes impacts to bus travel times and operating expenses

Disadvantages

- Creates potential conflicts with vehicular access, circulation, and parking
- Can impact or reduce on-site parking spaces
- If the bus stop is too far away from the building entrance or in a location that is not visible, it is less convenient and attractive for transit riders

Option B

Bus routing and bus stop located near the building entrance

Advantages

- Provides convenient pedestrian access to the building entrance for transit riders
- Potentially minimizes impacts to on-site parking
- Waiting areas, including overhangs or shelters, can be integrated with the building

Disadvantages

- Creates potential safety concerns, conflicts, and confusion due to navigating through high pedestrian and traffic activity areas near building entrances
- Longer routing, which can increase bus travel times and delays for riders on board

Location Characteristics

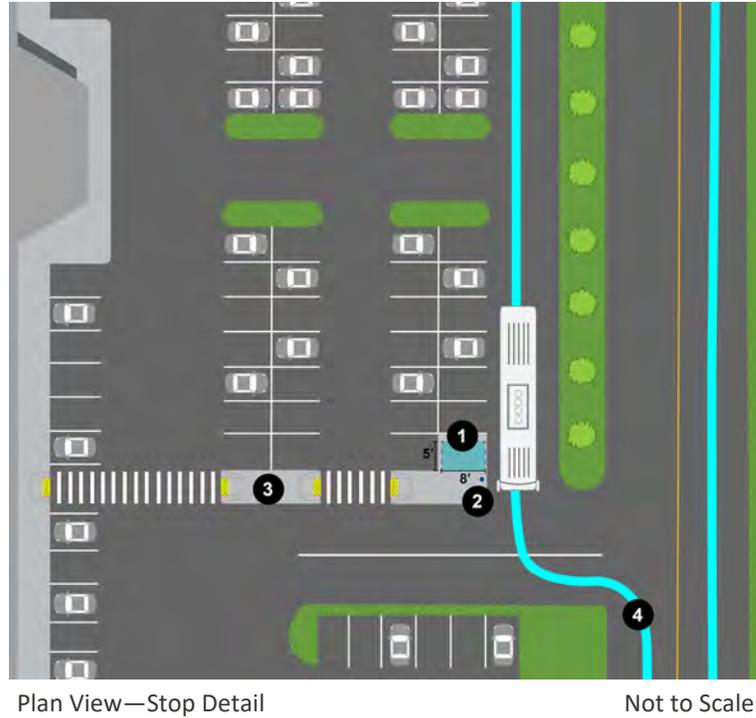
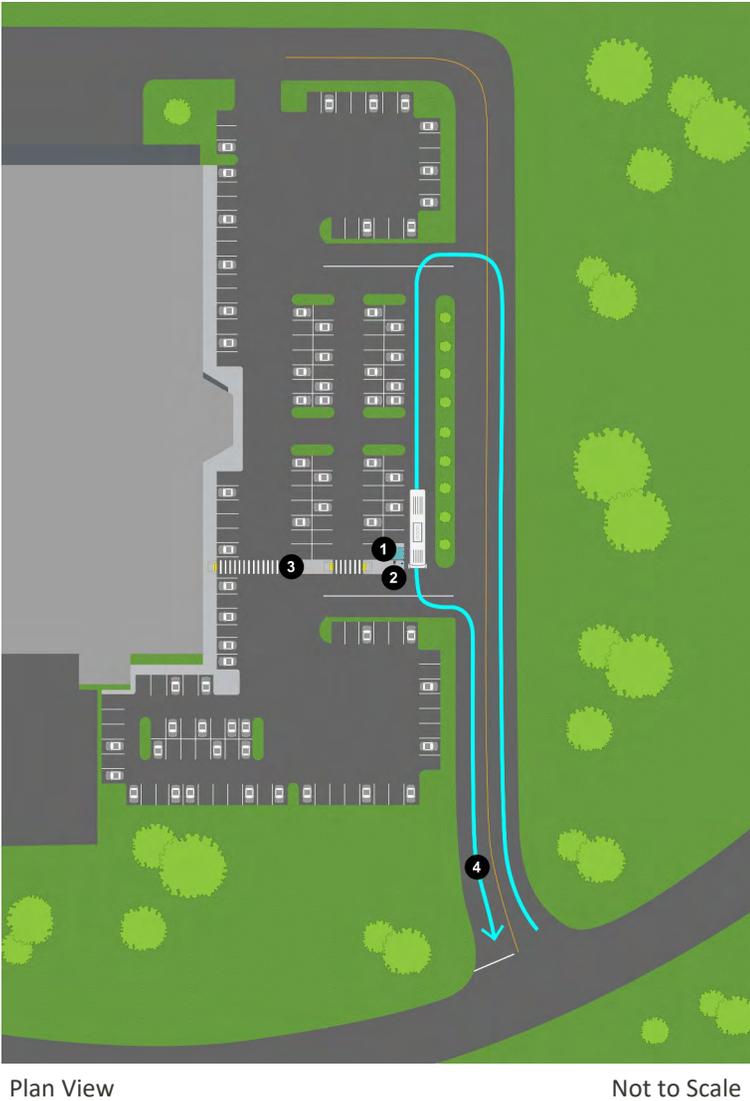
- Off-street stop on the site of a stand-alone major employment or commercial center (i.e., warehouse, corporate office, shopping center, medical facility)
- Bus deviates to serve key generator/destination

Notes applicable to Options A and B

- Bus stops should be located in visible, convenient, and well-lit areas. The location of the bus stop should be clearly identified with signs, pavement markings, or other design treatments.
- The bus stop should not be located at the main entrance for a building, which are high activity areas. The bus stop should be located either before or past the main entrance doors.
- The stop should be designed to prevent obstruction of clear sight lines for pedestrians, waiting passengers, bus operators, and other motorists.
- Pedestrian infrastructure (including sidewalks, paths, and crosswalks) should be provided between the bus stop and building entrances that are key destinations for riders.
- The passenger waiting area and clear zone for rear door access should be designed based on the anticipated number of passengers. For example, if the bus stop serves an employment center with shift work, a larger waiting area may be necessary due to the high number of passengers at a shift change.
- A bench or shelter should be considered, particularly if the bus stop location is further away from the building entrance.
- The deviated bus route should be designed with travel lane widths, clearances, turning radii, and pavement to accommodate buses. This includes travel lane widths of 12' and inside turning radius of 30' and outside turning radius of 50'.
- The deviated bus route should be designed to consider bus service in both directions of travel, if applicable.
- The bus stop design should consider the need for a bus layover or operator relief point, if applicable.



8A. Suburban Stop—Within a Site—Employment / Commercial Center



Option A

Bus routing and bus stop located away from the building entrance, which can reduce conflicts associated with building access

See page 3-3 for Notes on Key Bus Stop Elements

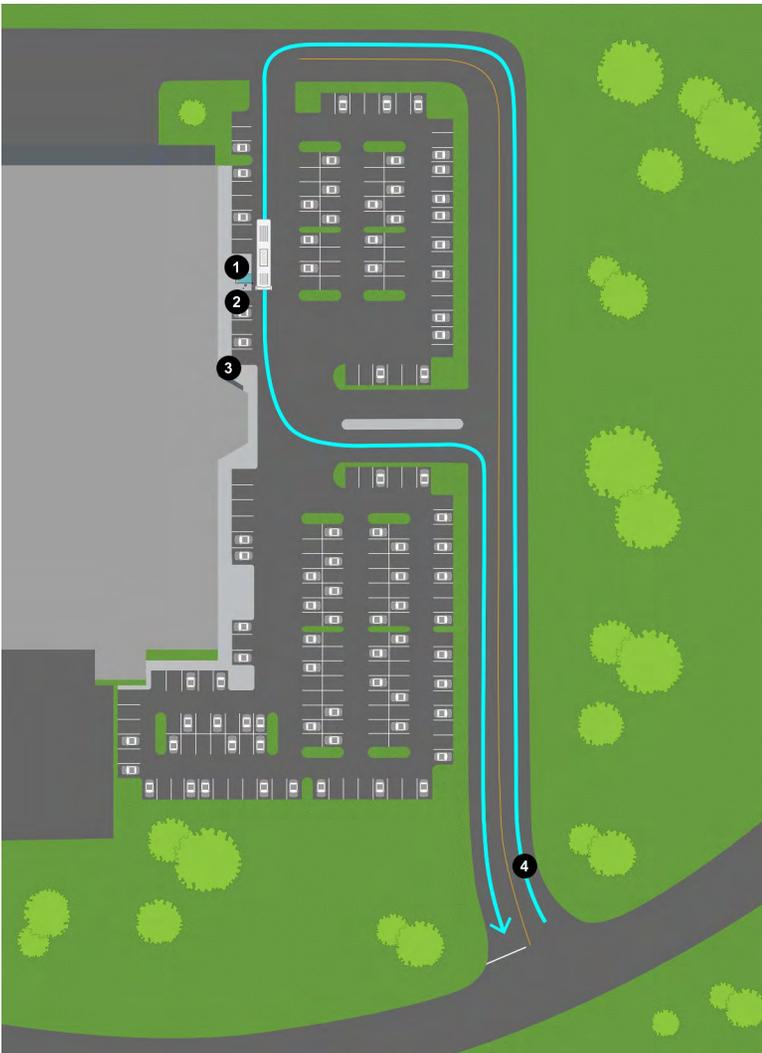
- 1 ADA loading pad**
– Curb height, typically 8"
- 2 Bus stop sign**
- 3 Sidewalks, crosswalks, curb ramps with detectable warning surfaces**
– Direct and convenient connection to the building entrance with appropriate sidewalks, crosswalks, ADA compliant curb ramps, or other pavement markings, possibly through the parking lot

See Notes Applicable to Options A and B on page 3 –13

- 4 Deviated bus route on site**

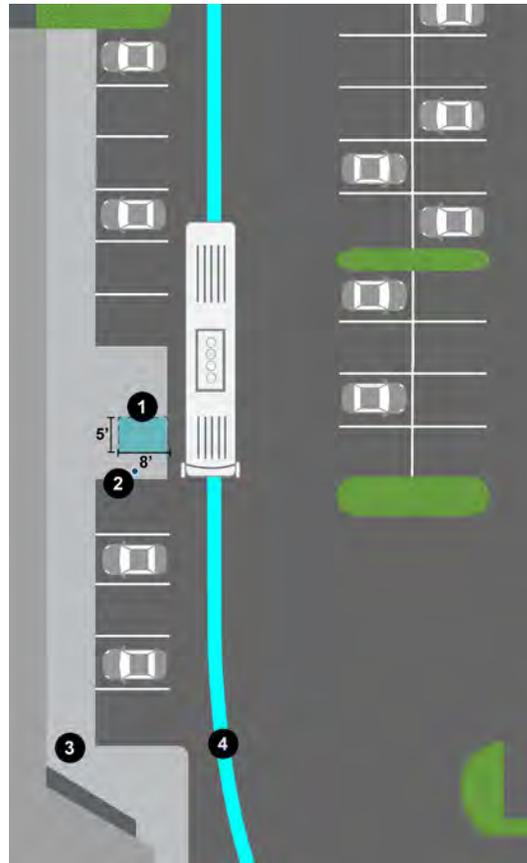


8B. Suburban Stop—Within a Site—Employment / Commercial Center



Plan View

Not to Scale



Plan View—Stop Detail

Not to Scale

Option B

Bus routing and bus stop located near the building entrance, which provides convenient pedestrian access

See page 3-3 for Notes on Key Bus Stop Elements

- 1 **ADA loading pad**
– Curb height, typically 8"
- 2 **Bus stop sign**
- 3 **Sidewalk**
– Connection to building entrance
- 4 **Deviated bus route on site**

See Notes Applicable to Options A and B on page 3–13



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Appendix A | Model Ordinance Language for Better Bus Stops

Introduction

The Pennsylvania Municipalities Planning Code (MPC) provides municipalities with authority to conduct planning and regulate how land is developed, to achieve the type of development and community vision they desire. The MPC empowers counties and municipalities to enact and establish zoning ordinances and/or Subdivision and Land Development Ordinances (SALDOs) to control land use.

Zoning ordinances regulate land use (type), location (where), and density (concentration) of uses, including building coverage and dimensions such as lot size, height, and parking. A SALDO regulates how parcels are divided and improved. While a zoning ordinance regulates the type, location, and density of land use, a SALDO regulates the layout and design of new development and required supporting infrastructure improvements.

The following model ordinance language is offered to assist counties and municipalities with incorporating policies and design guidelines for new or improved bus stops into zoning ordinances and SALDOs. The language could also be used to craft a stand alone bus stop ordinance, which can be incorporated by reference into zoning ordinances and SALDOs. The intent of the language is to:

- Permit and encourage the installation of bus stop infrastructure in appropriate locations as part of the land development process to serve the needs of all members of the community.
- Promote coordination between municipalities, transit agencies, and developers for the installation of bus stop infrastructure.
- Reference applicable design requirements for bus stop infrastructure.
- Define the roles and responsibilities for the review and approval for new bus stop infrastructure.

Since each municipality and transit agency is different, the model ordinance language will need to be modified and tailored to the specific needs of the community and transit service. The model language includes several notes, options, and opportunities for customization, which should be reviewed and considered by the municipal governing body, planning commission, and solicitor and include coordination with the transit agency prior to adoption. In addition, existing zoning ordinance and/or SALDO language may need to be reviewed and revised to incorporate and reference new ordinance sections related to bus stops. The adoption process should comply with the zoning ordinance and SALDO requirements specified respectively by Articles VI and V in the MPC.

In some situations, bus stop infrastructure may not be necessary given current conditions, but could be needed in the future. Municipalities can work with developers and transit agencies to plan for future bus stops during the land development review and approval process. This could include the dedication of an easement to reserve space for a future bus stop or the collection a fee-in-lieu of providing bus stop infrastructure or connecting sidewalks. However, the MPC does not allow municipalities to require off-site transportation improvements as part of the land development approval process. The municipality can adopt an official map that identifies future bus stop locations and planned sidewalk connections.



Definitions

The following definitions should be included, added, or updated in the definitions sections of a municipal Zoning Ordinance and/or Subdivision and Land Development Ordinance (SALDO).

- **ADA** – The Americans with Disabilities Act of 1990.
- **ADA Loading Pad** – A level loading area with a firm, stable surface where the front door of a bus opens to receive and discharge passengers. The ADA loading pad may be a stand-alone facility or may be integrated with the adjacent sidewalk.
- **Bus Passenger Bench** – A seat where multiple people may sit at one time while waiting for a bus.
- **Bus Shelter** – A permanent roofed structure located at a bus stop that provides protection from the weather to persons waiting for a bus. The shelter is often semi-enclosed and may provide seating.
- **Bus Stop** – A designated place where a bus may stop to allow boarding or alighting of public transit riders. A bus stop is marked with a bus stop location sign and may include infrastructure or amenities, such as a bus shelter or bus passenger bench.
- **Bus Stop Infrastructure** – Facilities located at a bus stop that are designed and intended to provide safe access to fixed route public transit service, including ADA loading pads, bus passenger benches, and bus shelters.
- **Bus Stop Passenger Information Sign** – Printed or electronic display at a bus stop that provides information to waiting passengers related to the public transit services, such as maps, schedules, or real-time information about the location or anticipated arrival of a transit vehicle.
- **Bus Stop Street Furniture** – Bus stop street furniture that provides comfort to public transit riders and may include, but is not limited to, bus passenger benches, leaning rails, waste receptacles, and bicycle racks.
- **Bus Stop Location Sign** – A marker identifying a location used as a bus stop, typically listing the name of the public transit service provider and bus routes serving the stop.
- **Crosswalk** – Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other pavement markings, often connecting sidewalks or paths.
- **Fixed Route Public Transit Service** – Public transportation service provided in vehicles operated on public or private roadways along a prescribed route according to a fixed schedule, not including school bus service or intercity bus service.
- **Park and Ride** – Parking lots designated to allow people to park at a common site and use public transportation, vanpools or carpools.
- **Sidewalk** – Paved right-of-way, adjacent and generally parallel to, but separated from a street or driveway that is accessible and designed for use by all pedestrians.



Model Zoning Ordinance Language for Bus Stops

The following section can be added to the General Provisions, General Regulations, Requirements Applying to All Districts, or another comparable section of a county or municipal zoning ordinance. The following language is also intended to be administered and enforced in conjunction with the model SALDO language in the following section. The language could also be used to craft a stand alone bus stop ordinance, which can be incorporated by reference into the zoning ordinance and SALDO.

Section XXX. Bus Stops and Shelters for Fixed Route Public Transit Service

The following general provisions shall apply to all bus stops for fixed route public transit services.

- A. Bus stop infrastructure, including ADA loading pads, bus passenger benches, and bus shelters, as well as bus stop location signs and bus stop passenger information signs, shall be permitted by right in all zoning districts and shall be considered an accessory use/structure that can stand alone without the accompanying principal use.
- B. Bus stop infrastructure shall be exempt from minimum lot size, open space, yards, and setback requirements as specified under the applicable zoning district(s).
- C. The location and design of the bus stop infrastructure shall be reviewed and approved by the transit agency and the municipality. The transit agency shall provide written documentation certifying that a location is an existing or potential future bus stop.
- D. The municipality may authorize a credit towards the off-street parking requirements specified in this Ordinance for the provision of bus stop infrastructure. Whenever an ADA loading pad, bench for a bus stop, and/or bus shelter is provided, the applicable off-street parking requirements may be reduced by one (1) or more vehicular parking space(s) for each bus stop location.
- E. Bus stop location signs and bus stop passenger information signs installed and maintained by the transit agency shall be permitted within the public right-of-way and on private property and shall be exempt from municipal sign ordinance requirements.
- F. Bus stop infrastructure must comply with all provisions of SALDO Section ____ [specific municipal ordinance section in SALDO related to bus stops].

A bus stop can be considered an accessory use because it may be located on the same parcel as a principal use and is incidental to the principal use.

The location of a bus stop is not related to specific zoning districts. Rather, bus stops should be located to provide access to existing and planned bus routes and serve the surrounding land uses.

This optional credit offers a small incentive to applicants for providing bus stop infrastructure and improving access to public transportation by offsetting the additional impervious surface areas associated with bus stop infrastructure.

A municipality may elect to offer additional incentives by reducing off-street parking requirements due to transit access and usage in the appropriate section of the zoning ordinance. Reductions in off-street parking requirements may be appropriate in areas with frequent bus service and connected pedestrian infrastructure.

Applicable for a municipality that has or also adopts bus stop infrastructure requirements in their SALDO.



- G. If bus stop infrastructure is located within a public right-of-way, the provider of the bus stop infrastructure shall secure all necessary rights/permissions from any governmental entity responsible for the particular right-of-way to be used.
- H. If bus stop infrastructure is located outside a public right-of-way, the provider of the bus stop infrastructure shall secure all necessary rights/permissions from the applicable private property owner(s) for the infrastructure to be located on the property and open to the public.
- I. All applicable permits shall first be obtained by the provider of the bus stop infrastructure.

For bus shelters within state-owned right-of-way, PennDOT requires a Transit Shelter Right-of-Way Placement Agreement with the transit agency.

Park-and-ride lots and bus maintenance facilities can also be incorporated into zoning ordinances, particularly to specify the zoning districts where these principal land uses are permitted and specify other size and setback requirements.



Model Subdivision and Land Development (SALDO) Language for Bus Stops

The following section can be added to a county or municipal Subdivision and Land Development Ordinance (SALDO). These requirements are intended to apply to new or improved bus stops that are part of a land development project. Installation of bus stop infrastructure that is not associated with a subdivision or land development application may be subject to a different review/approval process based on the administration and requirements of other county or municipal ordinances or policies. The bus stop location and design guidelines included in the model ordinance reflect best practices and applicable design requirements. The language could also be used to craft a stand alone bus stop ordinance, which can be incorporated by reference into the zoning ordinance and SALDO.

Section XXX. Bus Stops and Shelters for Fixed Route Public Transit Service

A. General Provisions

- a. The applicant shall notify and coordinate with the transit agency to determine if a bus stop is appropriate when the proposed subdivision or land development meets any one of the following criteria:
 - i) Located within three-quarters of a mile of an existing or planned fixed route public transit service.
 - ii) Has a character, magnitude, or location that will have substantial effect upon the health, safety, or welfare of citizens in more than one municipality and could be considered a development of regional significance and impact, such as regional shopping centers, industrial or commercial parks, warehouses, residential developments, regional entertainment or recreation centers, hospitals or medical care facilities, and educational institutions. Proposed land development that meets any one of the following characteristics, which are consistent with Transportation Impact Study warrants included in PennDOT’s Transportation Impact Study Guidelines (Publication 282):
 - (1) Site is expected to generate 3,000 or more average daily trips or 1,500 vehicles per day.
 - (2) During any one hour time period of any day of the week, the development is expected to generate 100 or more vehicle trips entering the development or 100 or more vehicle trips exiting the development.
 - (3) For existing sites being redeveloped, the site is expected to generate 100 or more additional trips entering or exiting the development during any one hour time period of any day of the week.
 - (4) In the opinion of the municipality, the development or redevelopment is expected to have a significant impact on the transportation system, even if the above warrants are not met.

The criteria provided in this section are intended to identify proposed land development projects that warrant review by the transit agency and consideration by the municipality for transit service. The criteria should not be used to evaluate the validity or feasibility of providing transit service to the proposed project.

The three-quarters of a mile distance is provided as a general guideline and can be modified based on the context of the community, transit network, and input from the transit agency.

The thresholds provided to define “development of regional significance and impact” are consistent with PennDOT’s Transportation Impact Study warrants as specified in PennDOT’s Transportation Impact Study Guidelines (Publication 282). Alternatively, municipal thresholds for traffic studies could be used or thresholds could be developed based on the land use and size of the proposed development. The thresholds should be adjusted based on the specific context of the municipality and transit system.



- b. The location and design of a bus stop shall be reviewed and approved by the transit agency. The transit agency shall provide written documentation certifying that a location is an existing or potential future bus stop.
- c. The location and design of a bus stop, including conformance with other approved municipal ordinances and construction standards, shall be reviewed and approved by the municipality.
- d. On-street parking and loading zones shall be prohibited or limited at the bus stop to avoid obstructing the curbside in the area of the bus stop and provide sufficient space for the bus to pull to the ADA loading pad and/or curb. The no parking zone shall be based on the location and configuration of the bus stop, designated with signs or pavement markings, and reviewed by the municipality and/or government entity responsible for the public right-of-way.

e. Bus stop infrastructure for fixed route bus stops shall be designed and constructed in accordance with ADA requirements, including Section 810 of the United States Department of Transportation’s ADA Standards for Transportation Facilities (2006), the Pennsylvania Public Transportation Association’s Building Better Bus Stops Resource Guide, and ___ [transit agency specific bus stop design guideline documents].

f. There shall be a written and legally binding agreement by a responsible entity to properly maintain a stand-alone ADA loading pad, bus passenger bench, and/or bus shelter in good condition and remove the bench and/or shelter if the transit agency determines it is not needed or it is not properly maintained. No bus passenger benches and/or bus shelters shall be removed without the mutual and written approval by the municipality and transit agency.

g. ADA loading pads that are integrated with the adjacent sidewalk shall be maintained in compliance with requirements for the maintenance of adjacent sidewalk as specified in ___ [specific municipal ordinance title and section addressing maintenance of sidewalks].

h. Bus stop infrastructure must comply with all provisions of Zoning Ordinance Section ___ [specific municipal ordinance section in Zoning related to bus stops].

B. ADA Loading Pads

a. A level loading pad shall be provided adjacent to the curb or roadway edge where the front doors of a fixed route bus service open to receive and discharge passengers at a designated bus stop. A second loading pad located at the rear door of the bus may be required.

The following bus stop design guidelines can be referenced in municipalities within the service areas for the respective transit agencies:

- SEPTA Bus Stop Design Guidelines, 2nd Edition (2019)
- Port Authority of Allegheny County’s Bus Stop and Street Design Guidelines (2019)
- Northwest Commission’s Bus Stop Guidelines: Design and Amenity Standards (2018)

Transit agencies may be able to enter into a blanket agreement with a municipality or PennDOT to specify maintenance responsibilities for multiple bus stops within a jurisdiction or PennDOT District.

If the county or municipality does not have an existing ordinance addressing maintenance responsibilities for sidewalks, the local municipality or property owner is responsible for sidewalk maintenance. Additional language could be added specify other maintenance requirements for ADA loading pads or the connecting sidewalk segments.

Applicable for a municipality that has or also adopts bus stop infrastructure requirements in their zoning ordinance.



- b. All ADA loading pads shall be provided at curb-height to accommodate bus wheelchair lifts and/or ramps. A street-level ADA loading pad may be provided as an alternative with approval from the transit agency and municipality.
- c. All ADA loading pads shall be connected via an ADA accessible route to adjacent pedestrian infrastructure, such as a sidewalk, path, or multi-use trail. ADA loading pads may be integrated with the sidewalk or other pedestrian infrastructure. A stand-alone ADA loading pad with an ADA accessible route to the nearest roadway or public right-of-way may be provided as an alternative with approval from the transit agency and municipality.
- d. Utility poles, fire hydrants, street furniture, overhangs, trees, shrubs, and similar obstacles shall not obstruct the minimum clear area of the ADA pad for boarding and alighting, which is five (5) feet measured parallel to the roadway and eight (8) feet measured perpendicular to the roadway.
- e. Dimensions.
 - i) The minimum clear width of five (5) feet shall be provided for the loading pad, measured parallel to the roadway.
 - ii) The minimum clear length of eight (8) feet shall be provided for the loading pad, measured perpendicular to the curb or roadway edge.
 - iii) A longer and/or wider loading pad is desirable and shall be provided if directed by the transit agency or municipality.
- f. Slope.
 - i) Parallel to the roadway, the slope of the loading pad shall be the same as the roadway, to the maximum extent practicable. Perpendicular to the roadway, the slope of the loading pad shall not be steeper than 1:48.
- g. Minimum construction standards.
 - i) The ADA loading pad shall have a firm, stable, and slip resistant surface, preferably concrete built consistent with the minimum construction standards for sidewalks as specified in ___ [specific municipal ordinance title and section addressing concrete sidewalk construction standards] or asphalt consistent with the minimum construction standards for paths and multi-use trails as specified in ___ [specific municipal ordinance title and section addressing asphalt path/trail construction standards]

If the county or municipality does not have an existing ordinance that addresses materials and construction standards for sidewalks and paths/trails, provide standards specifically for ADA loading pads.

C. Bus Shelters

- a. All aspects of the bus shelter shall comply with ADA requirements, including but not limited to access points, clearance and circulation within the shelter, and seating.



- b. The bus shelter shall be integrated with the ADA loading pad or connected to the ADA loading pad via an ADA accessible route.
- c. A bus shelter includes a roof or canopy and may be enclosed on up to three sides with partial enclosure of a fourth side permitted for protection against wind or other weather elements. A bus shelter may be integrated with the structure of an adjacent building or externally attached.
- d. For security and safety purposes, the majority of the side and rear panels of the shelter shall be constructed of a clear, shatter resistant material.
- e. Bus stop passenger information signs may be provided within or on a bus shelter and shall be considered exempt from municipal sign ordinance requirements.
- f. All advertising within or on a bus shelter must comply with municipal sign regulations. If included, advertising panels shall be placed on the interior or exterior of the side shelter panel farthest from oncoming traffic and perpendicular to the road. Advertising panels shall not obstruct sight lines for pedestrians, transit vehicles, or other road users.
- g. Any lighting for a bus shelter shall be installed in such a manner to provide adequate visibility during darkness for patrons of the transportation system. The lighting shall be installed in such a way so that the source of light shall be shielded from all abutting residential properties and traffic along the roadway where the shelters are located. The lighting shall not conflict with any traffic control devices.
- h. Bus shelters shall be installed according to the manufacturer's design specifications.
- i. Location.
 - i) The shelter shall be located near the front end of the bus stop zone to minimize the distance to access and board the bus.
 - ii) The shelter shall not obstruct the required minimum clear area of the ADA loading pad for boarding and alighting, which is five (5) feet measured parallel to the roadway and eight (8) feet measured perpendicular to the roadway.
 - iii) The shelter shall be within fifty (50) feet of the ADA loading pad.
 - iv) The location of a bus shelter shall not interfere with horizontal clearance for access and maintenance, including pedestrian traffic along a sidewalk or curb ramps. A minimum clearance of four (4) feet shall be maintained around the shelter, but may be reduced to two (2) feet for the distance between the back of the shelter and a building face, wall, or similar vertical barrier.
 - v) The shelter, including roof or panels, shall be located a minimum of four (4) feet from the curb or roadway edge.

Possibly reference county or municipal specific sign requirements provided in an existing ordinance or provide additional language to clarify requirements for advertising signs at bus stops.



vi) The location of the bus shelter shall conform to clear sight triangles and other minimum sight distance requirements for driveways and intersections.

vii) The shelter shall provide a clear view of the roadway and approaching bus.

j. Dimensions.

i) The minimum clear floor area of thirty (30) inches by forty-eight (48) inches shall be provided within the perimeter of the shelter.

ii) The minimum shelter opening of thirty-six (36) inches shall be provided.

k. Foundation.

i) The bus shelter shall be anchored and attached to a concrete foundation with a slope that is not greater than 1:48.

ii) Specifications for the bus shelter and foundation shall be consistent with the manufacturer's specifications (if applicable) and approved by the transit agency and municipality.

D. Bus Stop Street Furniture

a. Bus stop street furniture may include, but is not limited to, bus passenger benches, leaning rails, waste receptacles, and bicycle racks.

b. Bus stop street furniture shall not obstruct the required minimum clear area of the ADA loading pad for boarding and alighting, which is five (5) feet measured parallel to the roadway and eight (8) feet measured perpendicular to the roadway.

c. The location of bus stop street furniture shall not interfere with horizontal clearance for access and maintenance, including pedestrian traffic along a sidewalk.

d. The location of street furniture shall conform to clear sight triangles and other minimum sight distance requirements for driveways and intersections.

e. Furniture shall be anchored securely to prevent unauthorized movement, but must be able to be relocated or replaced by those authorized to maintain the furniture.

f. Bus Stop Passenger Benches.

i) Benches shall be ADA compliant in terms of dimensions and construction.

ii) Benches shall be placed facing the roadway and outside of boarding and alighting areas and pedestrian routes.

iii) Benches shall be installed on a firm, stable, and slip resistant surface.

iv) Benches shall be located a minimum of four (4) feet from the curb or roadway edge.

Possibly reference municipal specific sight distance requirements provided in an existing ordinance.

Provision of bus stop street furniture is optional. Street furniture can improve the comfort and convenience of passengers and help integrate the bus stop with surrounding land uses.

Possibly reference municipal specific sight distance requirements provided in an existing ordinance.



E. Bus Stop Signs

- a. Bus stop signs, including bus stop location signs and bus stop passenger information signs, installed and maintained by the transit agency shall be permitted within the public right-of-way and on private property and shall be considered a governmental sign.
- b. All advertising signs posted at a bus stop or integrated with bus stop infrastructure shall comply with municipal sign regulations.
- c. **Bus Stop Location Signs.**
 - i) Bus stop location signs shall be placed to clearly identify the location where passengers access fixed route public transit service. The bus stop sign shall be located in close proximity, but not within the ADA loading pad.
 - ii) The sign post shall be located a minimum of two (2) feet from the curb or roadway edge.
 - iii) The minimum and maximum vertical clearance from the ground to the bottom of the sign shall be seven (7) feet and eight (8) feet, respectively.
 - iv) The sign shall be visible to approaching buses and other traffic, as well as pedestrians on the sidewalk. It shall not be blocked by trees, signs, or other obstacles.
 - v) Bus stop location signs shall be mounted on either their own post or on another existing pole or bus shelter to minimize clutter or conflicts. Bus stop location signs shall not be mounted on the same pole as a traffic control device.
- d. **Bus Stop Passenger Information Signs.**
 - i) Bus stop information signs shall not obstruct pedestrian access routes or the required minimum clear area of the ADA loading pad for boarding and alighting, which is five (5) feet measured parallel to the roadway and eight (8) feet measured perpendicular to the roadway.
 - ii) Bus stop information signs shall be either mounted on the same post or pole as the bus stop signs or shall be integrated with the bus shelters.

Possibly reference county or municipal specific sign requirements provided in an existing ordinance or provide additional language to clarify requirements for advertising signs at bus stops. Advertising signs could be provided to off-set capital or maintenance costs of bus stop infrastructure.



Appendix B | Plan Review Checklist for Better Bus Stops

Introduction

This Plan Review Checklist provides a quick guide for planners, engineers, and other design reviewers to reference when evaluating design plans that may incorporate bus stops. It can be used to evaluate whether a land development plan and proposed bus stop complies with the requirements included in the zoning ordinance and/or Subdivision and Land Development Ordinance (SALDO). Additionally, it can be used to confirm that preliminary engineering plans for a transportation improvement project include appropriate bus stop infrastructure. Determination of a bus stop location and bus stop design should be closely coordinated with the transit agency and municipality.

This Plan Review Checklist is intended to be a tool and resource and can be customized based on the needs and context of a specific transit agency, municipality, or other reviewing agency.

For all projects

	Yes	No	Comments
Is the proposed project located adjacent to an existing or planned bus stop?			
Does the proposed project include bus stop infrastructure?			
Is the proposed land development project located adjacent to or within 3/4 mile of an existing or planned bus route?			
Is the proposed land development project considered a development of regional significance and impact? (Does the proposed project meet PennDOT’s criteria for a Transportation Impact Study?)			
Is there public and community support for a new, relocated, or improved bus stop?			
If the answer to any of the above questions is “Yes,” has the applicant contacted and coordinated with the transit agency? (Request documentation of coordination.)			
Has the transit agency reviewed and approved the bus stop location?			
If it is determined that a bus stop is not necessary based on current conditions, but could be needed in the future, can an easement be dedicated or right-of-way reserved for future bus stop infrastructure or connecting sidewalks?			



Bus Stop Information

It may be helpful to gather the following basic information about the existing and/or proposed bus stop.

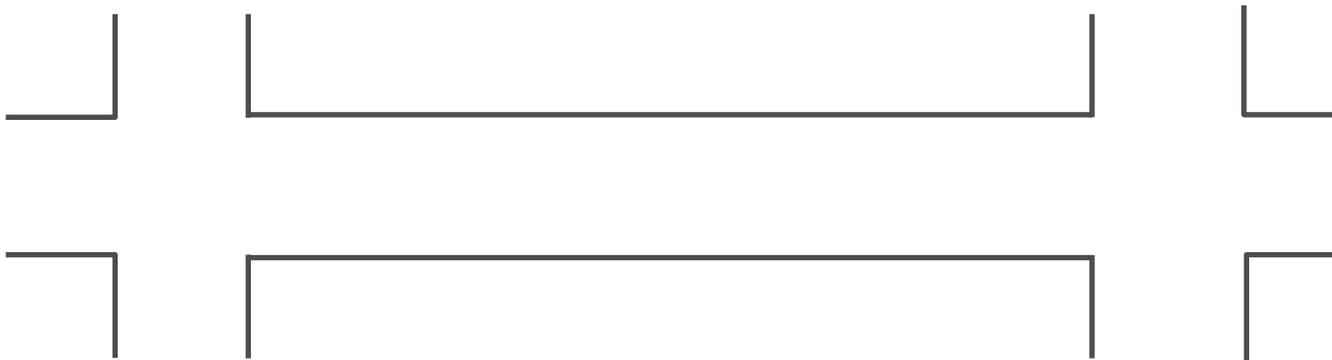
Basic Information	
Municipality	
Bus Route(s) Served	
Bus Route Direction	
Street Name/Intersection	
Stop Name/Location	
Stop ID # (Publicly available or provided by the transit agency)	

Placement	
Near Side	
Far Side	
Mid-Block	
Off-Street / Within a Site	

Location	
Travel Lane	
Parking Lane	
Right-Turn Lane	
Shoulder	
Bus Bay	
Within a Site/Off-Street	

Bus Stop Sketch

A bus stop sketch should be developed to illustrate the features of an existing or new bus stop. When a new stop is proposed, the sketch may simply include a note to refer to the land development plan. The sketch should include any relevant details such as: primary street name, secondary street name(s), other driveways, number of travel lanes, turning lanes, on-street parking, bike lanes, fire hydrants, sidewalks, street furniture, etc.



For proposed projects where the transit agency approves the bus stop location

If the transit agency approves the bus stop location and it is determined that bus stop infrastructure should be provided as part of the proposed project, the following questions can be used to review the design of the proposed bus stop infrastructure. The General, ADA Loading Pad, and Bus Stop Signs questions apply to all bus stops. The Bus Stop Street Furniture and Bus Shelter questions apply only when those bus stop elements are determined to be appropriate for the location.

General	Yes	No	Comments
Has the location and design of the bus stop been reviewed and approved by the transit agency?			
Are adjacent property owners and the public aware of the proposed bus stop infrastructure?			
Are on-street parking and loading zones prohibited or limited at the bus stop?			
If the bus stop infrastructure is located within the public right-of-way, is there a permit or agreement from the governmental entity responsible for the right-of-way?			
If the bus stop infrastructure is located outside of public right-of-way, is there an agreement with the property owner?			
Is there a written agreement regarding maintenance of all bus stop infrastructure?			

ADA Loading Pad	Yes	No	Comment
Is an ADA loading pad provided adjacent to the curb or roadway edge where the front doors of the bus open?			
If required by the transit agency, is a longer or wider loading pad or a second loading pad provided at the rear door of the bus?			
Is a minimum clear area of 5' measured parallel to the roadway and 8' measured perpendicular to the roadway provided?			
Is the minimum clear area for the ADA loading pad free of all obstructions?			
Is the ADA loading pad at curb-height?			
Is the loading pad connected via an ADA accessible route to adjacent pedestrian infrastructure?			
Is the slope of the loading pad less than or equal to 1:48, measured perpendicular to the roadway?			
Is the loading pad to be constructed of a firm, stable, slip resistant surface? (preferably concrete)			



Bus Stop Signs	Yes	No	Comment
Is a bus stop location or information sign to be provided by the public transportation agency? If Yes, complete the following checklist to confirm that it can be installed at an appropriate location.			
Will the bus stop location sign be located at least 2' from the curb or roadway edge?			
Will the vertical clearance from the ground to the bottom of the bus stop location sign be a minimum of seven 7' and maximum of 8'?			
Will the bus stop location sign be visible to pedestrians, passengers, transit vehicle operators, and other roadway users?			
Will the bus stop location sign be clear of any obstructions that may now or in the future affect the visibility of the sign?			
Will the bus stop location sign be mounted on a dedicated post or another pole without a traffic control sign or device?			
Are all bus stop signs located to prevent obstruction of the pedestrian access route or the clear			
Bus Stop Street Furniture (Optional)	Yes	No	Comment
Will bus stop street furniture (i.e. bench, leaning rail, waste receptacle, bicycle rack) be provided? If Yes, complete the following checklist.			
Will street furniture be located to prevent obstruction of the clear area for the ADA accessible loading pad?			
Will street furniture be located to prevent obstruction of pedestrian access to, around, or through the bus stop area?			
Will street furniture be located to prevent obstruction of clear sight lines for pedestrians, waiting passengers, transit operators, and other road users?			
Will street furniture be securely anchored?			
Bus Stop Passenger Bench			
Will the bench be ADA compliant in terms of dimensions and construction, including installation on a firm, stable, and slip resistant surface?			
Will the bench face the roadway?			
Will the bench be located at least 4' from the curb or roadway edge?			



Bus Shelter (Optional)	Yes	No	Comment
Will a bus shelter be provided? If Yes, complete the following checklist.			
Will the bus shelter be ADA compliant?			
Will the bus shelter be integrated or connected to the ADA loading pad via an ADA accessible route?			
Will the bus shelter be constructed with clear, shatter resistant material?			
Is the bus shelter design/installation consistent with the manufacturer's specifications?			
Will the bus shelter be located in a way to prevent obstruction of the pedestrian access route or the clear area for the ADA loading pad?			
Will the bus shelter be located near the front end of the bus stop zone and within at least 50' of the ADA loading pad?			
Will the bus shelter be located with a minimum of 4' clearance around the shelter or at least 2' for the distance between the back of the shelter and building or wall?			
Will the bus shelter be located at least 4' from the curb or roadway edge?			
Will the bus shelter located in a way to prevent obstruction of clear sight triangles from driveways and intersections?			
Will the bus shelter be located to provide a clear view of the roadway and approaching bus?			
Will a minimum clear floor area of 30" by 48" be provided within the bus shelter?			
Will the bus shelter opening be at least 36"?			
Will the slope of the bus shelter foundation be less than or equal to 1:48, measured perpendicular to the roadway?			
Will advertisements be installed on any shelter panels? If Yes, will the advertisements be located to prevent obstruction of sight lines for pedestrians, waiting passengers, transit operators, and other road users?			
Will lighting be installed with the shelter? If Yes, will it be create conflicts with any abutting residential properties or traffic control devices?			



Additional Design Considerations

Below are additional items that should be considered and evaluated as part of the bus stop design and review process, particularly in terms of pedestrian access and potential traffic hazards.

General	Yes	No	Comment
Will the bus stop be located in an area with sidewalks that provide clear path of travel to desirable destinations and are a minimum of 4' wide?			
Will there be a companion bus stop for service in the opposite direction?			
Will there be a sidewalk (or trail) and crosswalk with ADA compliant curb ramps to provide a connection to the companion bus stop or other nearby destinations?			
Will there be a traffic signal and pedestrian signal located at the crosswalk to provide a connection to the companion bus stop or other nearby destinations?			
Will the bus stop be located near an at-grade railroad crossing?			
Will the bus stop be located on a high speed roadway (> 40 mph speed limit)?			
Will the bus stop be located just over the crest of a hill?			
Will the bus stop be located just after a curve in the road?			
Will pedestrian scale lighting be provided at the bus stop?			
If the bus stop is located off-street and within a site, is the driveway and access road adequate for bus maneuvering?			

