Chapter 8: Group Transportation

CHAPTER HIGHLIGHTS

- Introduction
- General Design Guidance
- Potential Projects

Introduction

Group Transportation is defined as the bus, passenger rail, and passenger air modes. Of these three, only the transit mode is defined as having a network; the other modes gain access to the transportation network at specific points, which typically are intermodal stations. The three modes within Group Transportation category therefore define five distinct sub-modes:

- Bus, defined as The HOP's local bus network.
- Intercity bus, defined by the stations served by commercial long-distance bus.
- AMTRAK, defined by the station directly serving AMTRAK passenger rail.
- Bus-AMTRAK Connection, defined by the station linking the two services.
- Air, defined by the airports with regularly-scheduled commercial service.

The purpose of this regional Plan is to define the group transportation modes so that all potential projects may be displayed and reviewed together, and so that the appropriate right-of-way may be identified and planned for. A key component of this planning task is to define the Functional Class for each appropriate proposed project, and to define typical designs for each Functional Class. The concept of Functional Class is used as an organizing element for the bus network only; the other modes of intercity bus, AMTRAK, the bus-AMTRAK connection, and passenger air do not have associated networks or defined Functional Classes.

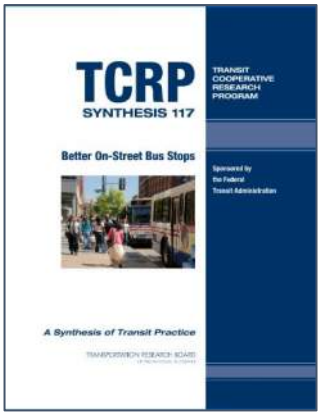
Typical designs are intended to illustrate the maximum right-of-way needed for each mode. It is recognized that the actual design needed for any specific project at a given time depends on several factors, including the needs of the bus stop, physical characteristics of the street, traffic volumes, ADA compliance and safety considerations, local standards and preferences, and funding. Therefore, the designs presented in this plan are meant as guidance for the typical conditions, and should be refined as needed for each specific project.

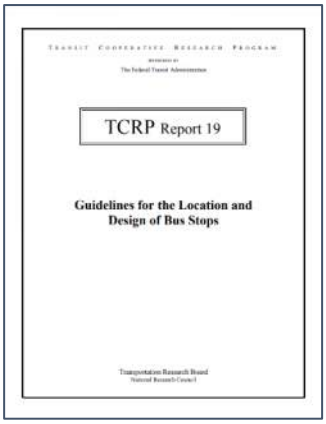
Group Transportation Systems General Design Guidance

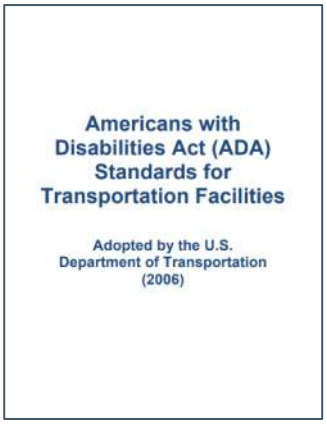
General Design Guidance for the Bus Network

Functional Classes for the bus network have been defined in terms of the amenities present at stops. The four bus Functional Classes include the ***Station Functional Class***, ***Shelter Functional Class***, ***Bench Functional Class***, and the ***Basic Bus Stop Functional Class***.

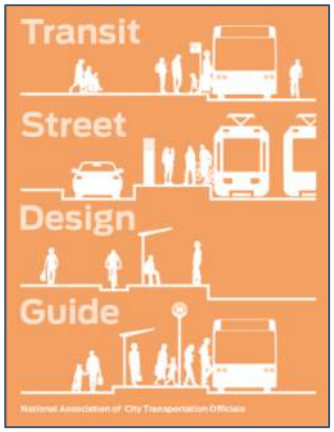
General design guidance for bus stops is provided at the national and state levels. Guidance includes national-level research studies such as *TCRP Synthesis 117: Better On-Street Bus Stops* and *TCRP Report 19: Guidelines for the Location and Design of Bus Stops*, and regulatory guidance such as the *USDOT's Americans with Disabilities Act (ADA) Standards for Transportation Facilities* and *FTA Circular FTA C 4710.1* providing ADA guidance.

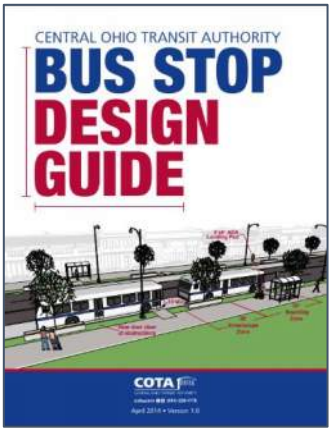






Optional and unofficial design guidance for transit stops and for transit operations on streets are provided by widely-recognized best practices from national organizations and from prominent transit agencies such as the *NACTO Transit Street Design Guide*, the *Enhanced Transit Corridors Plan Toolbox* from Tri-Met in Portland, Oregon, and the *Bus Stop Design Guide* from the Central Ohio Transit Authority in Columbus, Ohio. These types of publications provide guidance on state-of-the-practice facilities for bus stops.





ADA requirements pertain to surfaces, clearances from curbs and roadways, cross slopes, and accessible connections to streets, sidewalks, and pedestrian paths. The U.S. Access Board publishes *ADA Accessibility Guidelines* (ADAAG) and *ADA Standards for Transportation Facilities*. Pertinent sections of the ADA Standards are Section 810.2: Transportation Facilities, Bus Boarding & Alighting Areas and Section 402: Accessible Routes.

ADA standards are not "best practices" for the industry; they are the minimum requirements to comply with Federal legislation. Going beyond the ADA minimum requirements, a new concept of Universal Design (UD) has been developed. Universal Design is intended to provide improved access for people with disabilities while also going further to accommodate the needs of the whole population who may have no protected disabilities, but who do have special needs related to their need for ramps, slower walking speeds, or other issues. Targeted groups with special needs include children, parents pushing strollers, and older adults. General design guidance and background information on Universal Design is available through the Center for Inclusive Design and Environmental Access at the University of Buffalo at http://www. udeducation.org/.

There are three examples of the ***Station Functional Class*** in the region: the Southwestern Coaches intercity bus station on 4th Street in Killeen, which supports linking bus service to the AMTRAK station in Temple; the Greyhound intercity bus station on S 5th Street in Temple; and the AMTRAK station on W Avenue B in Temple. All three facilities are privately owned and operated, but all are served by the regional transit system and have public access. ADA compliance and Universal Design for the facilities and for access to the facilities are issues for consideration in station design.

General design guidelines for the ***Shelter Functional Class***, the ***Bench Functional Class***, and the ***Basic Bus Stop Functional Class*** all have a similar basis because of their physical and functional similarities.

In general, the overall design guidance for all Functional Classes of bus stops is that all stops must include a 5’ x 8’ pad for wheelchair loading at the bus door. If a shelter is present, a 2.5’ x 4’ wheelchair space for maneuvering must be provided within the shelter. Other bus stop attributes, including the adjacent sidewalk and sidewalk access, must comply with ADA standards.

Compliance to ADA requirements for every bus stop in the system is an expensive and complex task. Oftentimes, balancing passenger needs, physical constraints, and budget constraints in planning for full ADA compliance requires the development of a facility Capital Improvement Plan to inventory gaps, define and prioritize projects, and develop a project implementation plan and schedule.

Two general placements of the required ADA landing pad for wheelchairs are possible. **Figure 8-1** shows the landing pad placed partially within the shelter, combining the required maneuvering room with the pad. In **Figure 8-2**, the landing pad is placed fully outside the shelter and the maneuvering room is separate. This configuration affects the distance that the shelter must be placed from the curb.

Figure 8-1: Bus Stop With Shelter with Wheelchair Landing Pad at the Shelter

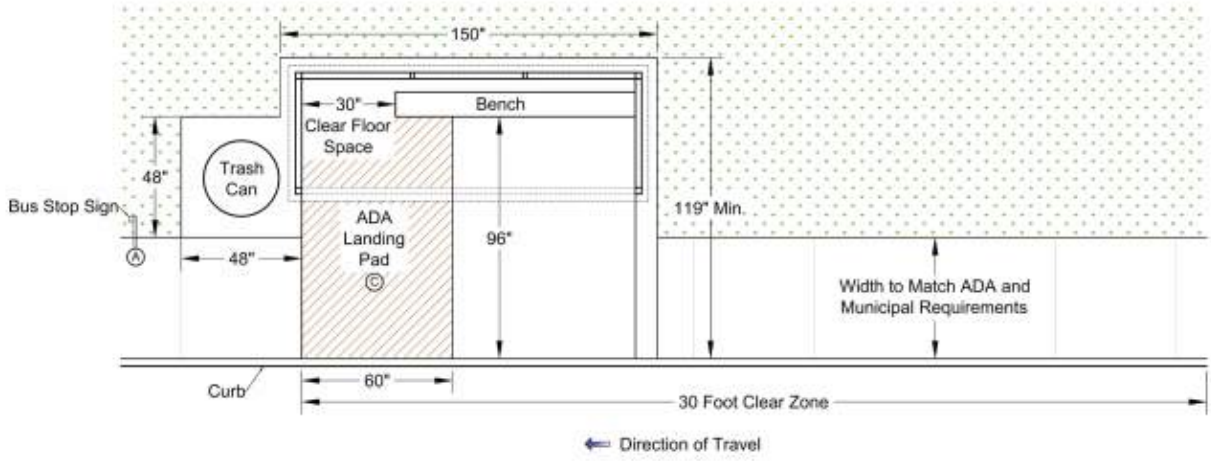


Figure 8-2: Bus Stop With Shelter with Wheelchair Landing Pad Outside the Shelter

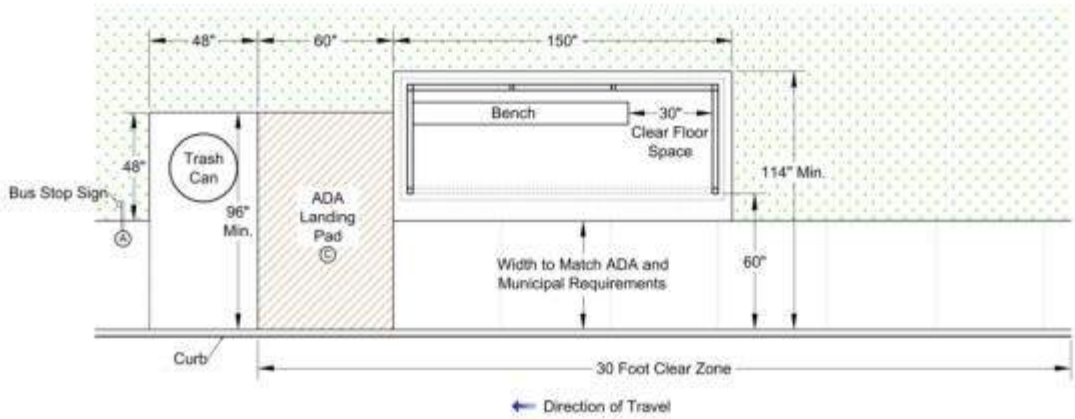


Figure 8-3: Sidewalk Placed Behind a Bus Stop

Figure 8-3 shows another configuration with just a bench, with the sidewalk placed on the back side of the pad rather than against the curb. The general design guidance for the bus stop is not affected; the same requirements for the ADA landing pad and maneuvering room must be met.

Figure 8-4: Bus Stop With Bench and Wheelchair Landing Pad

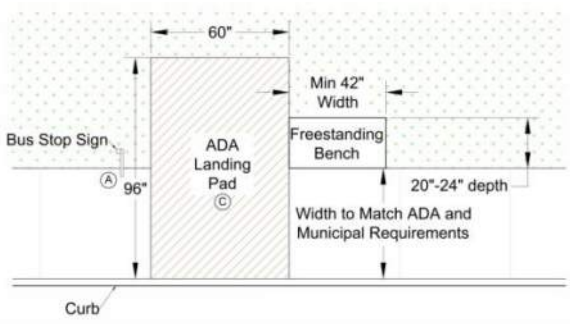


Figure 8-4 illustrates the general design criteria for a bench or a simple bus stop. Since the size of the 5' x 8' landing pad is deeper than the sidewalk, it extends further back than the sidewalk or the bench. This configuration also provides room for a wheelchair to be placed out of the walking path of the sidewalk.

In addition to the consideration of ADA compliance for the design of bus stops and the placement of stops in relation the street, the placement of stops in relation to adjacent buildings should also be considered as a general design guideline.

Figure 8-5: Bus Stop Separated from Building

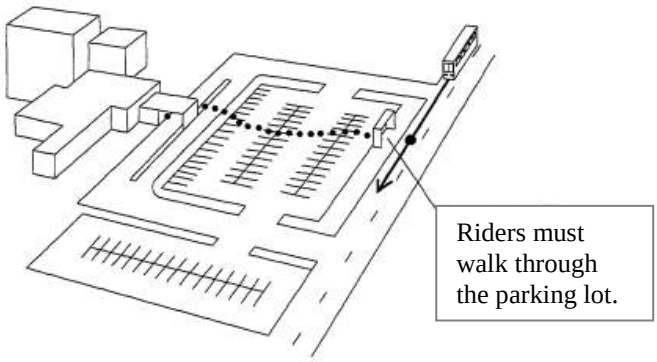


Figure 8-5 shows a configuration of a bus stop and an adjacent building that is typical for suburban areas. In this instance, a large parking lot is placed between the street and the building entrance. With the bus stop placed on the street on the periphery of the site, riders must walk through the parking lot in order to access the bus stop or the building. This configuration is present in the region at places such as the VA Hospital and the Scott & White Hospital in Temple, some entrances to the Temple Mall, Central Texas College in Killeen, and shopping destinations such as Wal-Mart, HEB, and strip malls throughout the region.

Figure 8-7: Bus Stop Adjacent to Building

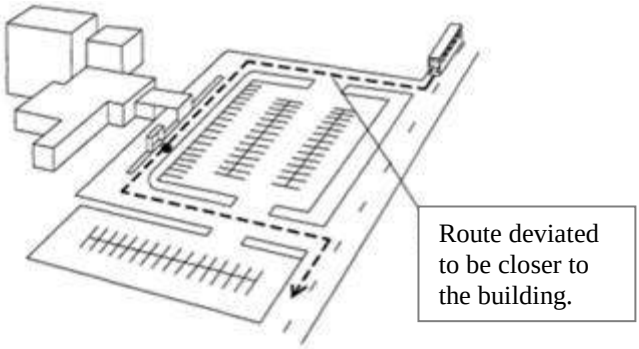


Figure 8-6 shows one way that this access, convenience, and safety issue can be addressed. This design has the bus route deviated into the parking lot, allowing the stop to be placed closer to the building. This placement eliminates the need for riders to walk through the parking lot, but it increases length of the bus route.

Figure 8-6: Bus Stop Connected with a Path

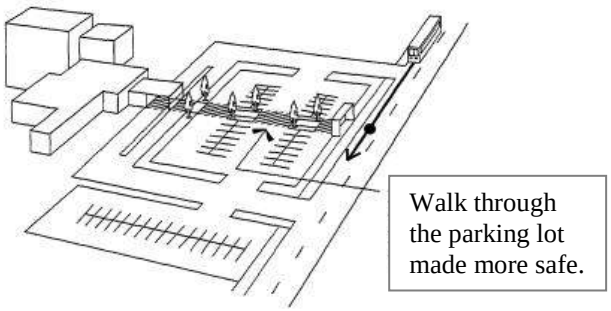


Figure 8-7 shows another alternative for increasing access and safety for a bus stop. This design provides a distinct pedestrian path between the bus stop and the building. While the riders still must walk through the parking lot to access the bus stop and the building, the path is designed for pedestrians to make the access more visible and thus safer. This design also has the advantage of not impacting the length of the bus route with any deviations.

Table 8-1 summarizes the recommendations for right-of-way applicable to all transit network Functional Classes. It includes ADA requirements for the landing pad, sidewalks, accessible ramps, surfaces, and cross slopes.

Table 8-1: Summary of Design Guidelines for Bus Network Functional Classes

Feature	Minimum Dimensions	Preferred Dimensions	Max Slope	Clearance	From	Notes
Bus Stop Sign on Pole				2.5'	Curb	
Landing Pad	5' x 8'	10' x 8'				5' wide parallel to road; 8' deep perpendicular to road
Bench	20" x 42"	24" x 42"		4'	Pedestrian Path	
Maneuvering Space	2.5' x 4'				Bench or Shelter	Clear space for wheelchair
Bus Shelter				11'	Curb	Must not block the pedestrian path
				5'	Sidewalk	
				2'	Curb	
				12'	Buildings or Walls	
Sidewalk Accessible Path	4'	5'				
Ramp Detectable Warnings						Truncated domes in aligned pattern, with color contrast
Ramp			1:12			Max ramp length 15'
Ramp Flared Sides			1:10			
Adjacent Road & Gutter			1:20			
Surface of Path	3'		1:20			
Cross Slope			1:48			

General Design Guidance for Other Group Transportation Modes

The remaining four group transportation modes of intercity bus, AMTRAK, the Bus-AMTRAK connection, and passenger air are all privately owned and operated and all relate to operations rather than to infrastructure. Since the design standards for their facilities are both limited and are under the

jurisdiction of the private sector, only the general requirements for ADA compliance that apply to all public facilities are relevant for these modes. ADA compliance must be applied to all public facilities that interface with these private group transportation modes.

Potential Group Transportation Mode Projects

In contrast to the road network which provides physical infrastructure, the bus network primarily provides transportation services through bus operations. The concepts of road projects and bus projects are therefore significantly different. Where the road network cites specific physical infrastructure projects such as new construction or adding lanes to existing roads, projects for the bus network are typically grouped projects. The 2019 – 2022 Transportation Improvement Program (TIP) listings for the bus network includes items for vehicle purchases, capital preventative maintenance, and operating funds. No physical infrastructure projects are listed.

For other group transportation modes, the 2040 Metropolitan Transportation Plan (MTP) lists two lighting projects for the Draughon-Miller Central Texas Regional Airport. MTP projects for group transportation are shown in Table 2.

Table 2: Group Transportation Projects from the 2040 MTP

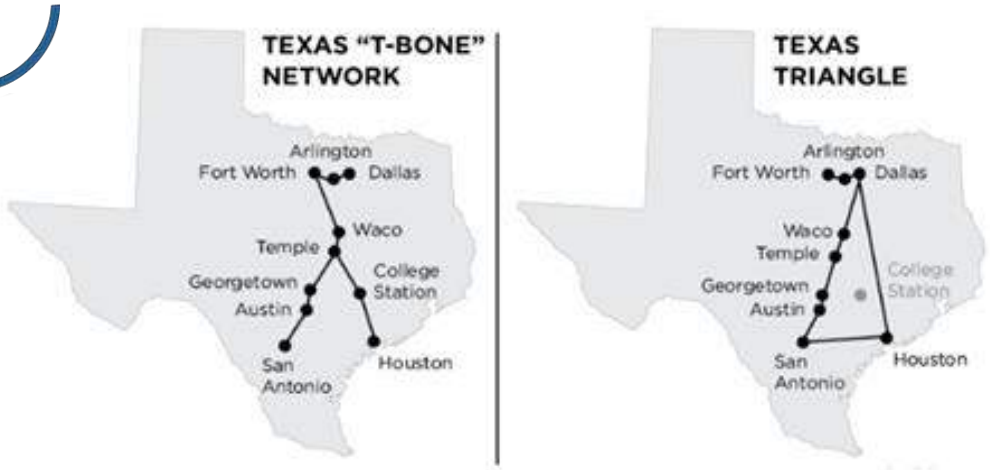
Mode	Project ID	Project	Project Description	City	Source	Year
Bus	A40-15	Fleet Replacement	Purchase new buses	N/A	Funded Cat 7	2020
Passenger Air		Draughon-Miller Central Texas Regional Airport	Engineering & lighting design	Temple	Aviation Capital Improvement Program	2019
Passenger Air		Draughon-Miller Central Texas Regional Airport	Lighting on runways and apron	Temple	Aviation Capital Improvement Program	2020

There is, therefore, not a set of specific group transportation projects which can be built into a network and plan which is equivalent to the Thoroughfare Plan for the road network.

Although there are no specific public sector projects for other group transportation modes, there are several private sector projects in planning stages related to passenger rail service through Temple.

The Federal Railroad Administration (FRA) has issued a Draft Environmental Impact Statement (DEIS) for the Texas Central bullet train between Houston and Dallas. This planning document sets the approval for the project's planning, design, and pre-construction phases. The preferred route as designated in the DEIS follows existing electrical transmission lines and has only one mid-point stop, so the route does not pass through the KTMPO region. However, Texas Central has reached an agreement with AMTRAK for through tickets and seamless connections between the services, which will link the high-speed rail service to AMTRAK the Texas Eagle route through Temple. The Texas Central service is distinct from both the related "Texas T-Bone" and the "Texas Triangle" high-speed rail alternatives shown in **Figure 8-8**, both of which feature routes directly through Temple.

Figure 8-8: Proposed High Speed Rail Routes in Texas



At the state level, TxDOT partnered with the Oklahoma DOT and FRA on the *Texas-Oklahoma Passenger Rail Study*, which was concluded in 2017 with a service-level Environmental Impact Statement, a Record of Decision, and a service development plan. This study examined various options for enhanced passenger rail service, but the three NEPA-preferred alternatives are all for high-speed service, with twelve to twenty daily round trips passing through Temple. The three preferred alternatives are identical from Hillsboro to San Antonio, as shown in **Figure 8-9**.

Figure 8-9: NEPA-Preferred Alternatives from the Texas-Oklahoma Passenger Rail DEIS

The TxDOT *2016 Texas Rail Plan Update* reviewed potential near-term improvements to current AMTRAK service. The report noted a strong connection between the Texas Eagle route through Temple and the Sunset Limited route running east-west through San Antonio. Its core recommendations were for projects to increase the current three-times-a-week service on both routes to daily service. While daily service was shown to be efficient and is a cost-effective project with a return on investment of 2.45, the plan noted that the project was not supported by the Union Pacific Railroad because of the need for double-tracking to address capacity issues. The 2016 estimate for the capital funding required to upgrade the tracks for daily service was $750 million.

Summary

Based on the definitions of Functional Class for the bus network, general design guidance for bus stops and for the placement of stops in relation to adjacent buildings was listed. Specific details depend on several factors, including the needs of the bus stop, physical characteristics of the street, traffic volumes, ADA compliance and safety considerations, local standards and preferences, and funding. Therefore, the treatments are presented as guidance for typical conditions, and should be refined as needed for each specific project.

Potential projects for group transportation modes typically relate to operations rather than infrastructure. Project listings in the 2017-2020 TIP and the Mobility 2040 MTP generally are grouped categories rather than specific physical projects. As a result, there can be no physical map or plan of group transportation projects equivalent to the Thoroughfare Plan. Conceptual specific and system-wide projects for group transportation are listed in Chapter 12.