TCRP Research Brief

TCRP Report 163: Strategy Guide to Enable and Promote the Use of Fixed-Route Transit by People with Disabilities

Improving Bus Stops and Pedestrian Infrastructure Accessibility

Improving the accessibility of bus stops and the surrounding pedestrian infrastructure is a key strategy for enabling people with disabilities to use fixed-route transit. Bus stops have been a focus for many transit agencies' accessibility improvements since the Americans with Disabilities Act (ADA) was enacted, but the need for accessibility extends *beyond* the actual stop to the pathways that connect to the stop.

The research project's survey of people with disabilities indicated that accessibility of the pedestrian environment to and from transit stops and stations was the most important factor in determining whether or not they could use fixed-route transit.

The broader geographic scope—the bus stop and immediate connecting sidewalks, curb ramps, and crosswalks—is referred to as the *pedestrian infrastructure*, *pedestrian environment*, and *path-of-travel infrastructure*. These various terms share a relationship with concepts underlying *walkable communities*, *livable communities* and *complete streets*, all of which feature design attention to creating communities that facilitate pedestrian travel with higher densities, mixed land uses, and street networks favorable to pedestrians as well as bicycles and transit. Every bus trip begins and ends with a pedestrian trip, thus the pedestrian infrastructure is integral to increasing fixed-route transit use by people with—and without—disabilities.

Common Problems: Utility Pole Blocks the Sidewalk and Overgrowth Restricts Usable Area
(Photo courtesy of KFH Group)

The Bus Stop and Beyond

Accessibility requirements for bus stops are defined through the ADA Standards for Transportation Facilities. However, accessible connections to and from the stop are not always provided, often because the transit agency does not have control over sidewalks or other parts of the rights-of-way where bus stops are located. Incomplete or poorly maintained sidewalks, difficult street crossings, lack of curb ramps, and obstacles in the pathway such as utility poles create barriers for people with disabilities, limiting or preventing access to fixed-route transit service.

To complicate matters, the barriers and their improvements vary in how they affect mobility for people with different disabilities. A person who uses a wheelchair requires curb ramps to cross a street for accessing a bus stop, yet certain types of curb ramps (diagonal) are unsafe for an ambulatory person with a vision impairment, channeling that person using a white cane into the middle of—rather than across—the intersection. People who use wheelchairs and scooters require a wider path of travel than those who are ambulatory. Cross-slopes that change very rapidly cause problems for wheelchair users. For ambulatory people who use walkers, there may be problems with steep grades and steep cross-slopes, as well as uneven surfaces.

These different types of barriers, their impacts on riders with disabilities, and the different improvement requirements make both the assessment of the pedestrian infrastructure and the subsequent improvement efforts complex.

Transit Agency Efforts to Improve Stops and the Pedestrian Infrastructure

Despite complexities, many transit agencies report efforts to construct improvements at non-accessible bus stops, according to the research project's survey. The full *TCRP Report 163* details efforts of a number of these transit agencies that have proactively improved accessibility of their stops and, importantly, the surrounding pedestrian infrastructure.

The impetus for such improvement efforts vary. The **Utah Transit Authority** found problems with its fixed-route pedestrian infrastructure when the authority introduced conditional eligibility for its ADA paratransit program. With input from the disability advisory group, the transit authority found particular problems with impassable sidewalks as barriers to use of fixed-route service. Since sidewalk improvements were outside its control, the transit authority worked with the city to obtain funding for sidewalk improvements.

Montgomery County, Maryland, funded a significant effort to improve more than 2,500 bus stops and surrounding infrastructure for the county's fixed-route bus system, with a focus on safety after an increase in pedestrian accidents and fatalities.

The **Town of Cary, North Carolina,** uses its control of local development to improve the town's pedestrian infrastructure for a more walkable community, which benefits access to the town's fixed-route bus service.

In central Washington State, **Link Transit**—with routes extending from Wenatchee into surrounding rural counties—found an innovative and cost-effective way to improve rural stops. The transit agency uses a commercial product, informally called "rhino snot," to provide a flat, stable surface at the stops typically located in the unpaved shoulder of rural roadways. This improves safety and convenience and provides a level pad for riders using wheelchairs to board and alight.

Link Transit: Improved Rural Bus Stop Using "Rhino Snot"
(Photo courtesy of Link Transit)

Do Bus Stop Accessibility Improvements Result in More Fixed-Route Use by Riders with Disabilities?

Where transit agencies or their communities have invested in accessibility improvements to the bus stops and, in some cases, the surrounding pedestrian infrastructure, transit agencies can report additional boardings by riders in wheelchairs at the improved stops to assess results of the improvements. The full *TCRP Report 163* documents several case study examples of transit agencies with such data. TriMet in Portland, Oregon, collected data that goes beyond counts of wheelchair boardings to evaluate the impact of stop and infrastructure improvements made in 2009.

Case Study of TriMet, Portland Oregon

Background: TriMet's Line 57, one of the transit agency's busiest, travels along State Highway 8/Tualatin Valley Highway (known locally as TV Highway), a roadway with a history of pedestrian safety and connectively concerns. Typical of many state highways, TV Highway is characterized by relatively fast-moving traffic and signalized intersections (and hence signalized pedestrian crossings) spaced relatively far apart. Land uses along the corridor include commercial properties with driveways traversing existing sidewalks. Adding to these safety concerns is the presence of an active freight rail line that runs along the south side of the corridor. Flanking the corridor are high-density residential areas populated largely by transit-dependent low income populations, including a large Hispanic population.

TriMet's Bus Stop Improvements along Tualatin Valley Highway: "Before" and "After" Stops
(Photos courtesy of TriMet)

Improvements: Given Line 57's high service frequency and ridership (nearly 50,000 passenger trips per week) and rapid growth over recent years, combined with the pedestrian safety concerns, TriMet initiated a project in 2009 to implement bus stop and pedestrian infrastructure improvements. The goal of the project was to make TV Highway safer and easier to use by pedestrians and bus riders.

Over the summer months in 2009, TriMet, in partnership with the Oregon Department of Transportation, improved 17 bus stops and pedestrian paths along TV Highway. Bus stops and pedestrian facilities were improved by fixing incomplete, damaged sidewalks and adding new sidewalk sections. Ten new bus shelters were installed, and concrete pads were added at bus stops for better access. Grant funds paid for the majority of these improvements, which cost

$512,167 ($417,415 in construction costs and $94,752 in shelter amenity costs). This investment resulted in profound improvements at many locations.

Evaluation of Improvements: TriMet conducted a comprehensive assessment of the results of the bus stop and infrastructure improvement project, finding that lift/ramp boardings nearly doubled across all 17 improved stops from Fall of 2008 to Fall of 2009. The boardings continued to grow in the subsequent years; see Table 1. Average weekday ridership overall also increased at a number of these stops following installation of the improvements.

Table 1: TriMet's Line 57 Lift/Ramp Usage Trends

Project Improvements	Monthly Fixed-Route Lift/Ramp Usage				Percent Change, 2008-2009	Percent Change, 2008-2011
	Fall 2008	Fall 2009	Fall 2010	Fall 2011		
Total for All Project Improvements	172	337	343	364	95.9%	111.6%

Data are monthly lift/ramp deployments based on quarterly ridership census.

ADA paratransit ridership was also examined to determine if there was a corresponding impact on paratransit ridership. TriMet queried its ADA paratransit ridership data for trips that originated or ended within ¼ mile radius of the improved stops. (One-quarter mile is the typical walking range that transit planners cite as the distance people are willing to walk to a bus stop.)

This data analysis showed that ADA paratransit ridership by riders who are conditionally eligible decreased by 12% in the areas of the improved stops, comparing data from before the improvements—2008—to 2011. Data for fully eligible riders, however, remained essentially unchanged over the same time period (a 0.5% decrease). It is conditionally eligible riders who will most benefit from stop and infrastructure accessibility improvements, as these are the riders able to use fixed-route transit in some cases.

ADA paratransit ridership by conditionally eligible riders decreased by 12% in the areas where TriMet improved the accessibility of bus stops and the surrounding pedestrian infrastructure.

Cost Impacts: If one assumes that the new lift/ramp trips at the 17 bus stops can be attributed to the improvements, and that without the improvements those trips would be on TriMet's ADA paratransit service, TriMet is saving nearly $60,000 per year accommodating additional lift/ramp-using riders on fixed-route transit as a result of the improvements installed in 2009 (using the FY 2012 operating cost per ADA paratransit trip of $29.87).

Information in this Research Brief was taken from *TCRP Report 163: Strategy Guide to Enable and Promote the Use of Fixed-Route Transit by People with Disabilities*. It presents one of the strategies suggested in the report—improving bus stop and pedestrian infrastructure accessibility. More information about this, as well as other strategies, is contained in *TCRP Report 163*. Copies of the report are available from TRB at www.trb.org.