TOLAR
MANUFACTURING

RETHINKING

THE CRITERIA FOR PLACING AMENITIES AT BUS STOPS

AN ASSESSMENT TOOL FOR ALLOCATING AMENITIES TO TRANSIT-DEPENDENT RIDERS

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Overview

The decisions behind installing bus shelters and other amenities at bus stops across North America are complex and a matter of providing the best quality experience for bus riders. Providing access to comfort, shade, and shelter at bus stops across North America from continuously growing extreme weather conditions fulfills a vital need for those most dependent on public transportation to get them to medical appointments, school, jobs, and other daily responsibilities. Lack of access to bus shelter comfort and coverage as one begins their journey should be considered as part of a community's safety and accessibility. Based on current industry and economic data and as the largest bus shelter and street amenities design manufacturer in North America, with over 30 years' experience, we offer our perspective on the decisions behind providing riders with the amenities they need.

Contents

Chapel Hill, NC

Introduction

Through our research, we found that often, the considerations for when a shelter or other amenity should be placed at a bus stop were limited to ridership and wait times, without serious consideration for other factors including heat index, access to shade, and transit dependent ridership.

Transit-Dependent Riders: any individual that lacks access to an independent source of transportation and must rely on public transit to accomplish necessary daily tasks.

For transit-dependent riders, access to appropriate amenities is necessary for a quality experience on their journey that starts at the stop. Shade and shelter should be prioritized, especially for transit dependent riders. Lack of access to coverage for those most dependent on transit provides a high risk and is a danger to riders' safety and security. Improving bus stops with amenities will also appeal to individuals who are not transit-dependent, encouraging more people to consider public transit as a viable, comfortable alternative. This increased ridership has downstream economic impacts, including greater foot traffic for nearby businesses, reduced congestion-related productivity losses, and long-term public savings from lower transportation and healthcare costs associated with more active, accessible commuting options.

Decisions about where bus shelters are placed should prioritize transit-dependent riders, weighing considerations beyond the number of boardings to provide riders with a high-quality experience on every journey. In understanding how to best provide this experience we examined how transit dependent riders are considered in the decisions regarding amenities. We also were able to identify key ways in which new efforts are being made to directly address the climate needs of transit-dependent riders in places across the country, including specific examples which demonstrate these efforts.

We have created a Decision Matrix which cities, transit agencies, and departments can use to assess the needs of their ridership to provide amenities which prioritize the needs of transit dependent riders. Cities, transit agencies and departments may be motivated to prioritize the needs of transit-dependent riders to increase overall ridership and demand for public transportation.

San Bernardino, CA

Transportation at a Glance

In 2023 there were nearly 3.5 million unlinked transit passenger trips via bus according to the 2023 Quarter Four Ridership report released in March of 2024.

In 2017 APTA released a report which provided a summary of passenger characteristics, "Who Rides Public Transportation." The summary was compiled from two hundred eleven separate passenger survey reports representing the services of 163 transit systems throughout the United States. The surveys were conducted from 2008-2015. The 211 reports were based on 695,748 respondents making up 8.4 million unlinked passenger trips, 506,693 of the respondents rode the bus and made up 3.9 million of the unlinked passenger trips. It is important to note that the results represent ridership and not individual riders. This report, while conducted prior to the 2023 Quarter Four Ridership report can provide important insights into ridership patterns throughout the country.

Weekly Riders
47%
of bus riders use public transportation 5 times a week.

Commute
44%
of bus trips are for employment.

Employment
74%
of bus riders are employed or preparing for employment (students).

License
44%
of bus riders do not have a license.

Car Ownership
68%
of bus riders do not have a vehicle available to them.

Wages
69%
of bus riders earn less than $50,000 annually.

Education
42%
of bus riders hold a bachelor's degree or higher.

Consumer Spending
36%
of bus trips are for shopping or recreational spending.

Affordability
40%
of bus riders reported having no money or transportation alternatives.

Economy
80%
of bus trips involve direct economic impact.

Bus shelters at a glance

Nationwide

Criteria surrounding which bus stops receive which amenities vary across the country by agency, city, and department. Similarly, the number of sheltered and unsheltered bus stops can vary. In May of 2022, data compiled by The Washington Post revealed that only 20% of more than 122,000 bus stops served by 16 of the nation's largest transit agencies have shelters.

Los Angeles

To provide a narrower view into the issue, a report from the UCLA Luskin School of Public Affairs, authored by Anne Yoon, titled "Bus Shelter Equity: A study of the distribution of bus shelters in Los Angeles County and unincorporated communities" revealed that in October 2019, 67% of bus stops in Los Angeles County did not have shade and 50% of all boardings happened at stop without a bus shelter.

The same report then compares unsheltered riders in unincorporated communities throughout Los Angeles County to better understand which riders in which communities are unsheltered. The report found that District 2 had a significant share of the County's boarding's bus stops and unsheltered riders. The rate of sheltered to unsheltered bus stops is relatively consistent from district to district, averaging near the county rates of 23% sheltered to 67% unsheltered.

However, 35% of all boardings are in District 2 and 40% of all unsheltered rides happen in District 2, while 50% of unsheltered stops and 60% of unsheltered riders are also in the district. According to the 2018 Los Angeles City Council District 2 City and Community Health Profiles by the Los Angeles County Department of Public Health, 38% of residents were below 200% of the Federal Poverty Line.

Ultimately, the report found that stops in District 2 had the highest levels of boardings and were more likely to be in neighborhoods with higher socio-economic and transit related needs and have less access to shade. The report also found that the process for erecting non-ad shelters was primarily guided by the number of boardings.

How decisions are made

The decision to add a shelter to a bus stop has historically been determined by the number of boardings.

In a 2010 a transit agency located in an area which averages up to 60 inches of rain annually, bus shelters were considered an "optional" amenity and used "ridership figures as the primary criterion for determining shelter placement." Some additional considerations were made when ridership figures did not support shelter placement which included considerations for riders who utilized the lift, senior riders, and riders who experienced waits over 17 minutes, but the criteria often still included some form of boarding element.

In their 2019 guidelines, a transit agency located near Appalachia identified nominations for potential placement of bus stop shelters using number of boarding, listing it as the first criteria, stating "how many passengers utilize the stop? Are there enough passengers to justify upgrading the bus stop to include extended amenities?" The remaining criteria include site considerations, economic and financial considerations, and considerations about pedestrians, traffic, and ADA accessibility. The guidelines also stated:

> "Stops which include extended amenities, such as bus stop shelters, are designed to provide the best rider experience. In a perfect world with unlimited resources, all bus stops would provide shelter amenities. Resource limitations, however, require [Agency] and City staff to carefully plan provision of transit system amenities and strive for an effective return on investment. The intent of this document is to describe bus stop shelter considerations and educate the public on the means of providing input for bus shelter planning."

Transit agencies face the ongoing challenge of balancing service enhancements with budget constraints. While historically, shelter placement decisions were primarily guided by ridership figures, recent guidelines reflect a broader consideration of factors. This shift underscores a growing commitment to enhancing rider experience and accommodating transit dependent riders, such as seniors or those with mobility challenges.

How decisions are made

Considerations for Transit Dependent Riders

Despite resource limitations, transit departments are evolving their approach to shelter placement, aiming to optimize investments and provide supportive amenities across their service areas. This reflects a positive trend toward more comprehensive and inclusive planning, even within the constraints of available funding. These amenities also play a direct role in attracting choice riders, (those who choose public transit), helping to grow ridership. Notably, amenities at the stop are the second most visible transit element to non-riders, making them a key factor in shaping public perception and encouraging broader adoption of transit services. Increased ridership can have a direct economic impact on areas serviced by public transit by increasing foot traffic.

Alameda - Contra Costa County

Alameda Contra-Costa County Transit District (AC Transit) in Alameda-Contra Costa County released their Bus Stop Furniture Guidelines in September 2022, outline the criteria for adding a shelter to a stop. With consideration for funding and maintenance resources, the agency determined three basic criteria:

Locations with high ridership and high wait times.
Neighborhoods with higher populations of people of color and low-income individuals.
Social Service Locations within a quarter mile of a bus stop. These include locations that serve people with disabilities, housing for older adults, hospitals, healthcare clinics, or social service providers.

While number of boardings and wait times remain the primary criteria for determining shelter placement, AC Transit has also included consideration for transit dependent riders. Shelters placed within a quarter mile of social service locations will facilitate trips for rider populations such as seniors or those with disabilities who depend on public transportation. What remains missing from this picture is the other half of the journey when riders board closer to their homes, where they may be waiting at an unsheltered stop before arriving at the social service location.

How decisions are made

San Diego - North County

North County Transit District in San Diego, California released their Bus Stop Development Handbook in March 2018. The agency categorizes each of its bus stops into 3 types: basic, bench, and shelter. The types are determined by number of boardings as well as development density, from low to medium to high, respectively. While the number of daily boardings and development density remain the primary criteria, there is also a population consideration for youths, students, disabled persons, and low-income households. The consideration recommends a shelter within ⅛ mile of population concentrations reflecting these groups and a bench within ¼ mile of population considerations. Other considerations include land use, planned development, and transit connections.

North County San Diego, CA

While funding and resource limitations continue to be the determining factors of shelter placement, the number of daily boardings will continue to take precedent as a metric for determining how funds should be allocated toward the placement of new shelters or the replacing of outdated shelters at bus stops. However, both AC Transit and North County Transit District have demonstrated that it is possible to include considerations which look at the riders beyond the numbers, including transit dependent riders.

How decisions could be made

As agencies begin to take riders into account beyond the number of daily boardings, new considerations are arising which center the rider experience to provide comfort and safety.

The Transit Street Design Guide was created by the National Association of City Transportation Officials (NACTO) in 2016 to set a new vision for how cities can create active and efficient streets in neighborhoods and downtowns. The guide provides design guidance for transitways, intersections, transit systems, and stops elements for the development of transit facilities.

The guide recommends the placement of small shelters be prioritized with the goal of improving comfort for the most passengers. The guide outlines the following considerations:

Moderate number of boardings
Transfer Points
Stops in weather exposed locations or without nearby potential sheltering locations
Stops with relatively high use by senior and child passengers

While continuing to prioritize number of boardings, the criteria also include vulnerable rider populations and introduces a new consideration, "stops in weather exposed locations or without nearby potential sheltering locations." Heat exposure and access to shade are growing considerations among agencies across the United States.

How decisions could be made

Los Angeles - Sidewalk and Transit Amenities Program

The Sidewalk and Transit Amenities Program (STAP) was announced in November 2023 by Los Angeles Mayor Karen Bass and is intended for building 3000 bus shelters and 450 shade structures throughout the city. STAP is a self-sustaining program to provide shelter, shade, safety, and comfort to support an increased use of transit and alternative transportation, with the goal of providing 75% of bus riders in each Council District within Los Angeles with bus shelters. Installation of the 3000 shelters is prioritized based on the following criteria:

High transit ridership
Exposure to Heat
Minority populations, low-income households, and zero-vehicle households
Proximity to trip generators, key destinations, and service facilities
"Low Frequency" Bus Routes that indicate long wait times

STAP continues to prioritize the number of daily boardings but has now introduced exposure to heat as the second key consideration for bus shelter placement. Including heat as part of the decision-making process helps to include rider comfort and safety when placing bus shelters. The remaining considerations continue to center the rider experience, even "low frequency bus routes that indicate long wait times" provides shade and comfort to riders who have increased exposure without requiring a ridership minimum.

Next-Gen Bus Shelters, Los Angeles, CA

How decisions could be made

Why weather matters

Heat and extreme weather are a growing consideration among agencies across the United States. Between 2020 and 2020, at least 40 people died from heat at bus stops in Phoenix, AZ. As of August 2023 73% of the city's 4067 bust stops had bus shelters, with the goal of adding 80 each year until 2027.

Recognizing the threat of extreme heat, in 2021 the city of Phoenix established the Office of Heat Response and Mitigation (OHRM) to address the hazard of urban heat in the hottest large city in the United States. OHRM addresses both heat response and heat mitigation, coordinating programs and policies year-round to lower urban temperatures and protect public health. The office also tracks trends, collects data, and collaborates with governments and organizations to share ideas and find solutions.

This is not unique to Phoenix, in July 2023, 180 to 184 million Americans were under a heat advisory as temperatures across the country reached dangerous levels. In response to extreme heat nationwide, the United States launched Heat.gov with interactive maps, weather forecasts and tips for fighting heat. Along with Phoenix, Los Angeles and Miami also have "chief heat officers" to coordinate a response to dangerous heat levels. California has also developed Cal-heat.org to understand heat vulnerability driven by climate change and where action can be taken to mitigate the public health impacts of extreme heat.

As extreme heat continues to be a growing threat in the United States, measures are being taken and tools are being developed to nationwide to address rider safety. It is essential that public transportation be included in the conversation.

Heat Index

Heat Index (HI) is one of a few tools used by the National Weather Service (NWS) to inform the issuance of NWS official heat watches, warnings, and advisories. The HI is an attempt to measure how hot it "feels" when factoring relative humidity and actual air temperature. A separate chart is used for areas with high heat and low relative humidity. The HI was developed for shady conditions and exposure to full sunshine can increase HI values up to 15 degrees Fahrenheit. The NWS will issue alerts when high HI conditions are expected for at least two consecutive days.

How decisions could be made

Heat Index (Cont.)

Rising temperatures are posing growing challenges for public transit systems, affecting both service reliability and passenger well-being. Research by Yulia Dzyuban published in the International Journal of Biometeorology found that in dry-heat cities such as Phoenix, Arizona, transit stops exposed to direct sunlight can reach surface temperatures between 125°F and 160°F. These conditions can increase the perceived heat index by as much as 15°F compared with shaded locations, a serious concern for riders facing long wait times or managing health conditions sensitive to heat exposure.
The same research shows that shade has a substantial cooling benefit: on average, shaded settings lowered the physiological equivalent temperature (PET) by roughly 35°F. Such extreme surface temperatures are often driven by the Urban Heat Island (UHI) effect.

Physiological Equivalent Temperature (PET) - Measures how hot or cold the human body feels by accounting for air temperature, humidity, wind speed, and solar radiation

Urban Heat Island (UHI) Effect - Highly paved corridors with limited vegetation or shading retain heat throughout the day, often coinciding with areas of high transit dependency.

A study led by the University of Texas Health Science Center at Houston further indicates that shelter design can meaningfully reduce heat exposure. Design elements like perforated roofing and ventilated side panels help limit heat accumulation, while shelters with deep acrylic walls that restrict airflow may inadvertently create a greenhouse effect, trapping radiant heat and resulting in higher interior temperatures than shelters designed to promote air circulation.

In 2024, Tolar manufactured, delivered, and installed fourteen 10-ft Sunset “Mini” bus shelters in Houston for the Greater Southeast Management District. Featuring perforated metal walls, lighting, and seating beneath a full-sized Sunset roof on a compact base, the shelters provide protection in a smaller footprint. This design enables GSMD to add shelters at stops where full-size models are not feasible.

How decisions could be made

Heat Index (Cont.)

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Bus Shelter & Amenities Decision Matrix

To address extreme heat concerns and to ensure that transit dependent riders are considered when deciding whether to build a bus shelter, we have developed the Bus Shelter & Amenities Decision Matrix. The Matrix is a tool to assist agencies, cities, and transit departments throughout North America in determining which amenities are best suited for a specific bus stop, based on a recommended set of criteria. The goal of the Matrix is to provide shelters are more stops where they are needed, with consideration for daily boardings, but also considering transit dependent riders and extreme heat.

You can access the Bus Shelter & Amenities Decision Matrix here:
https://tinyurl.com/Tolar-Decision-Matrix

How it works

Users can select from five categories to determine which set of criteria best describe the bus stop being considered for improvements: daily boardings, headway times, service hours, rider population and additional considerations. Based on the selected criteria, the Matrix will recommend customized amenity solutions for the bus stop being considered for improvements.

Criteria

Daily Boardings

Number of daily boardings remains the key metric for determining amenities. While the ideal would be to have a shelter at every stop, funding and resource limits require agencies, cities, and transit departments to prioritize bus stops where they can provide shelter for the greatest number of riders.

Headway Times

Headway times account for the amount time riders spend waiting at their bus stop. This is more than just a matter of convenience, the amount of time waiting at an unsheltered bus stop could mean the amount of time exposed to the sun and extreme heat. While shade does not reduce temperature, bus shelters provide necessary relief from sun exposure and radiation. Exposure to the sun can raise the heat index up to 15 degrees Fahrenheit compared with shaded areas, creating an elevated risk for heat related illness.

Bus Shelter & Amenities Decision Matrix

Criteria

Service Hours

Services hours help to determine sun exposure but can also determine the need for lighting which provides security at the stop, another consideration which helps to center rider comfort and safety.

Rider Population

By identifying primary rider populations for specific bus stops, agencies, cities, and transit departments can take the needs of vulnerable groups and transit dependent riders into consideration, ensuring that shelters are being provided to the groups that need them most. These groups include mobility restricted riders, students, women, essential workers, and choice riders.

Additional Considerations

Some criteria are more unique to specific shelters. This category allows for the description of unique characteristics that may affect the need for amenities, including high heat index, other extreme weather, physical site limitations and public safety concerns.

As extreme heat continues to effect more major cities and major transit districts across the country, heat index considerations should be part of the criteria for determining the need for a bus shelter at a bus stop as a means of providing necessary access to shade. In certain regions this consideration should be extended to extreme circumstances of rain, wind, or snow, all of which have grown more common. In September 2023, 87% of Americans reported experiencing an extreme weather within the previous five years, according to a poll by the Associated Press.

Physical site considerations allow for bus stops with unique footprints to offer amenities in situations where they previously may have been deemed unfit for a shelter or other amenities. Public safety considerations can help to determine the best lighting and shelter customization to best suit the bus stop.

Bus Shelter & Amenities Decision Matrix

Amenities

Once the criteria have been selected to match the bus stop being considered for improvements, the Matrix will automatically provide recommended amenities including options for shelters, lighting, seating, information displays, waste receptacles, branding and add-ons. There is also an opportunity to manually identify additional criteria to which can provide added comfort and safety for riders. Upon completion, the Matrix is then used to facilitate the selection of amenities for any bus stop based on industry research and recommendations.

Lake George, NY

Health and Happiness: Benefits to Riders

A public transit system that provides a high quality transportation experience for riders and facilitates a mobile community has many direct benefits to riders, including both their mental and physical well being.

In 2016, the Victoria Transport Policy Institute developed "Evaluating Public Transportation Health Benefits," a report for APTA which found that convenient, comfortable, fast rail and bus transport and transit oriented development provide large health benefits. The benefits include: reduced traffic collisions, reduced pollution emissions, increased physical fitness, improved mental health, improved access to medical care and healthy food choices as well as increased affordability, reducing stress on lower-income households.

"Measures of a Sustainable Commute as a Predictor of Happiness," a paper published in 2017 in the journal Sustainability, found a link between commuting methods and happiness, concluding that sustainable commutes can reduce negative feelings and improve contentment. The paper reviewed data from 187 U.S. cities for one year and evaluated physical well-being, community well-being, social well-being, financial well-being, career well-being and purpose. The results indicated that commuters who used sustainable and communal commute modes rather than being isolated while driving-alone had higher well-being scores while controlling for other key predictors of happiness.

Accessibility and Adaptability

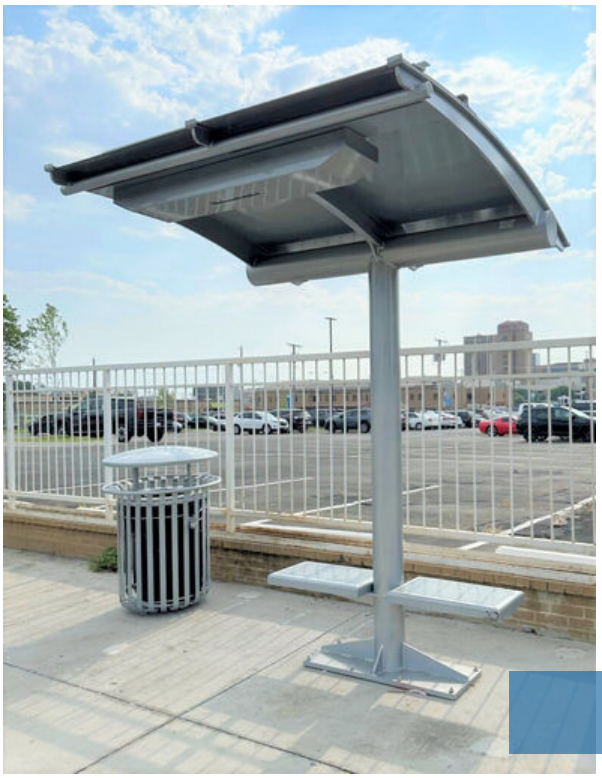
Tolar shelters can be customized to address the specific needs of a transit stop. Tolar also offers a variety of custom designed solutions which also provide riders with shade, shelter, security and comfort.

With custom design solutions, agencies can provide riders with necessary amenities at more transit stops, including transit stops where a standard shelter may not be suitable due to site restrictions or limited right-of-way.

EcoSeat

EcoSeat is a complete stand-alone bus stop solution that provides passenger seating and solar security lighting in the same space as a standard pole stop. The EcoSeat provides comfortable seating along with the PV Stop Plus 20W solar bus stop lighting solution or the PV Stop Max 42W solar bus stop lighting solution, which provides additional PV power available for operation of Real-Time Information Signage (RTIS) such as E-Ink displays or other passenger amenities.

ACROSS NORTH AMERICA



EcoShade

Inspired by the EcoSeat, Tolar Manufacturing's Signature Sunset EcoShade monopole shelters creatively and effectively incorporates a 6-ft wide by 6-ft deep weather protecting roof along with comfortable seating for two and 80W solar security lighting capable of providing power for integrated technologies such as E-Paper Real Time Information Signage (RTIS), and USB charging.

A complete stand-alone bus stop solution, the EcoShade shelters are perfect for small spaces with limited right of way and are an economical way to provide passenger comfort and security in a single package.

Ft. Worth, TX

Conclusion

Reevaluating the criteria for placing amenities at bus stops is essential for ensuring equitable access and enhancing the overall transit experience, particularly for transit-dependent riders.

Our exploration of the decision-making processes behind bus shelter allocation underscores the need to move beyond conventional metrics like ridership numbers alone. By broadening the scope to encompass factors such as heat index, shade availability, and the needs of vulnerable populations, transit agencies can take meaningful steps towards addressing the rider experience, attracting new riders and increasing local economic impact.

A 2021 University of Washington study found that adding amenities like shelters and real-time information can boost bus boardings by 80–200%. According to APTA, every $1 billion invested in transit supports about 49,700 jobs, and each $1 invested generates roughly $5 in economic benefits. Communities with access to high-quality transit also see higher home values, with median sale prices increasing by 4–24%.

Our Bus Shelter & Amenities Decision Matrix provides a comprehensive tool for cities, transit agencies, and departments to make informed decisions that prioritize the well-being of transit-dependent riders. This matrix encourages a shift towards a more rider- and heat-conscious approach, enabling the identification of bus stops most in need of amenities based on a range of criteria. As extreme heat continues to pose challenges it is imperative that public transportation planning adapts to ensure the safety and comfort of all riders. Through initiatives like the Matrix and the insights gleaned from our research, we advocate for a thoughtful approach to amenity placement that supports rider comfort and safety and enhances the quality of public transportation for all individuals across North America.

Lawrence, MA

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