

Addendum

Guidelines for Pace Pulse Infrastructure & Facilities

This 2024 addendum to Pace's Transit Supportive Guidelines focuses on tailored development standards for Pulse arterial bus rapid transit service. Through collaboration with units of government, developers, and private property owners, Pulse drives economic development, improves accessibility, and enhances the overall quality of life in our region.

OVERVIEW OF THE PULSE PROGRAM

The Pulse program mission is to provide fast, frequent, and reliable bus service on heavily traveled corridors in Chicagoland. The Pulse program enhances the transit experience by offering high quality service and amenities to passengers.

Pulse service includes the following features:

- » Faster service with limited stops and priority movements at signalized intersections.
- » Pulse-branded buses with free Wi-Fi and next-station digital signage.
- » Modern, Pulse-branded stations with heated shelters, benches, bike racks, and trash receptacles.
- » Real-time bus tracker information.
- » Near-level boarding platforms for an easier boarding experience.



Southbound Touhy Station on the Pulse Milwaukee Line | Photo by Andy Ryan

As part of Pace's strategic vision plan, *Driving Innovation*, Pace is committed to expanding its network of Pulse service. To see the latest Pulse developments, visit pacebus.com/pulse.

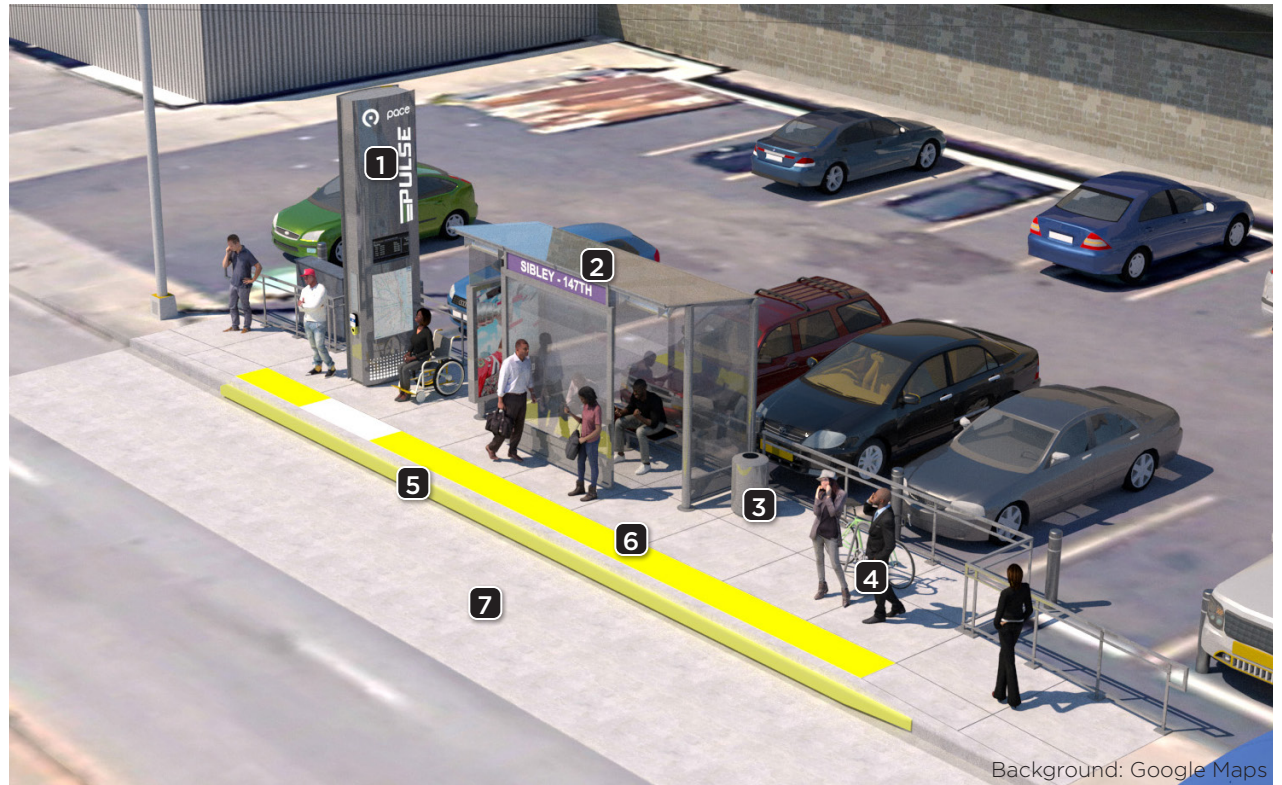
These guidelines are intended to help local, county, and state agency partners prepare for Pulse implementation and maximize the value of the Pulse investment for local communities. Guidelines cover the topics of station placement, right-of-way requirements, queue jumps and bus lanes, bus-bike interfacing, utility work and streetscaping

improvements, local permitting and advertising revenue, local signage, security, and community expression.

STATION AMENITIES

Pulse stations have several amenities to increase the comfort of Pace passengers including heated shelters with interior lighting, panel walls to protect passengers from inclement weather, and benches. Stations contain elements such as an audio enunciator and tactile warning strips to ensure accessibility for all passengers. The 12-inch raised platform height makes it easier to step onto buses for a near-level boarding experience. Additional amenities include real-time bus tracker information, a local area map, a trash receptacle, and a bike rack. Stations also have heated pavement to melt away snow. Customized art on the panels of each individual shelter also offer a greater sense of place and personalized experience to Pulse travel. Railings behind the platform protect passengers on the raised platform and further enhance the sense of place within the station.

Some station amenities are modified or reduced for the length-constrained and depth-constrained Pulse station designs described in the Station Sizes section.



Background: Google Maps

- 1 Vertical marker with real time arrival display
- 2 Heated shelter with custom artwork
- 3 Customizable trash receptacle
- 4 Customizable bike rack
- 5 Bus curb
- 6 12-inch raised platform with heated pavement
- 7 Concrete bus pad

PREFERRED STATION PLACEMENT

Ideal Pulse station sites maximize safety and comfort while optimizing transit operations for schedule reliability. Safety and operational goals are affected by the presence or opportunity to add crosswalks, bus bulbs, continuous curbs, small turning radii, sight lines, pairing of stations, and pedestrian refuges. The placement of stations near or far side of signalized intersections and mid-block crossings are also factors in achieving safe and efficient operations.

CROSSWALKS

Stations should be near existing pedestrian crossing infrastructure for safe access to and from the bus station. Pace can coordinate with municipalities to make improvements where crosswalks and adjoining facilities such as curb cuts, curb ramps, and ADA access are in disrepair or non-existent.

Pace prefers to put stations near crossing infrastructure with a traffic signal and a protected pedestrian phase to maximize pedestrian crossing safety. Pace can assist with signal changes when they are associated with its Transit Signal Priority program.

BUS BULBS

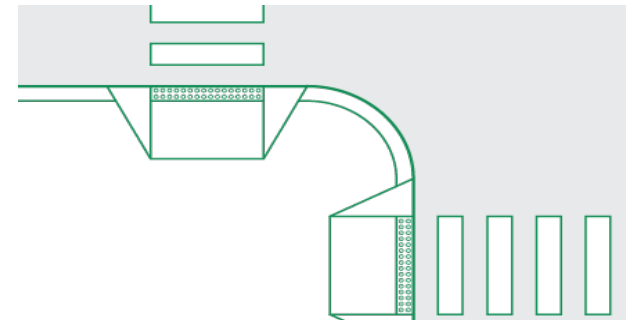
Where there is available space in the right-of-way, Pulse stations can be built on bus bulbs, which extend curbs up to the travel lane. Bus bulbs allow the bus to serve stations without pulling in and out of traffic, enabling faster boarding and alighting of passengers. Bus bulbs also create greater station visibility and space for Pulse riders. When extended all the way to an intersection, bus bulbs can decrease the street crossing distance for pedestrians. Similar curb extension improvements may be implemented outside designated Pulse stations, such as across the street from a station.



A bus bulb station

CURB CONTINUITY

Curb continuity is another safety benefit for pedestrians accessing Pulse stations. Where feasible, Pace will coordinate with municipalities and property owners to close underutilized driveways in order to remove conflict points between pedestrians accessing Pulse stations and vehicles turning in and out of driveways. This also allows more flexibility in the placement of Pulse stations further away from the intersection to preserve intersection sight lines. Typically, driveway closures are considered where driveways are very close to intersections and where there are other driveways that maintain vehicle circulation within the affected private property, or where the private property is no longer using the driveway as originally intended.



A small curb radius

Source: NACTO

TURNING RADII

Turning radii need to be considered at intersections serving Pulse stations to ensure pedestrian safety. Generally, application of the wheelbase 65 (WB65) standard, which is the turning radius for tractor trailers 65 feet in length, should be avoided where permissible to reduce the speed of turning vehicles through Pulse station intersections. The smaller the turning radius, the slower a vehicle will drive and the more likely the driver will see a pedestrian in an intersection.

SIGHTLINES

Stations should be placed far enough from intersections so that station amenities do not obstruct the clear view of oncoming traffic by turning and crossing vehicles. Additional sightline considerations include determining the impact of the station on nearby road signage, surrounding buildings, driveways, and alleyways, and adjusting the placement and design of the station as needed.

FAR SIDE OF SIGNALIZED INTERSECTIONS

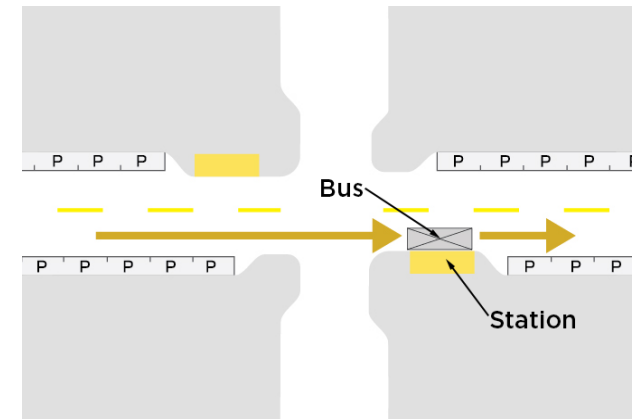
Stations located before a traffic signal, or "near side," cause a bus to have an increased chance of stopping twice at an intersection: once at the station and again if the light changes to red while the bus is still loading passengers. When a station is located on the far side of an intersection, the

bus has an improved chance of having to stop only once. This would occur if the bus approaches the intersection on a green light, immediately passes through the intersection, and then stops to serve the station.

Far side stations also encourage passengers to cross behind the bus rather than in front of it, which is safer and beneficial to bus operations. Additionally, far side station placement is more compatible with transit signal priority technology, which is or will be installed on most Pulse corridors.

FAR SIDE OF MID-BLOCK CROSSWALKS

In urban settings with smaller blocks, regular street grids, and dense land uses, Pulse stations are typically located at signalized intersections where transit access is optimized by crossing infrastructure and transfers to other transit services. In suburban contexts, Pulse station locations are more likely to be sited by an activity generator such as a school, college, library, or government building that may be located in the middle of a block away from a signalized intersection. In this context, Pace will propose crossing infrastructure (if none already exist) near a Pulse station pair, and typically will site the stations on the far side of the crosswalk so that a pedestrian crosses behind a Pulse bus to avoid a potential bus-pedestrian conflict point.



Far side station placement

Source: NACTO



Northbound Touhy Station on the Pulse Milwaukee Line
Photo by Andy Ryan

PREFERRED STATION PLACEMENT

COUPLING OF STATIONS

In general, riders board the bus on one side of the road to start their trip, and then alight on the opposite side after their return trip. Pulse stations are sited where station pairs can be located as close as possible to one another on opposite sides of a roadway. This helps with system legibility and avoids confusion by transit users that expect stations to come in pairs in close proximity to one another.



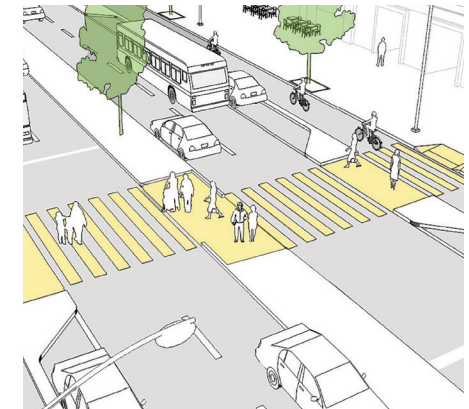
A Pulse station pair

PEDESTRIAN REFUGES

To improve safety, opportunities to implement pedestrian refuges across multi-lane roadways to connect pedestrians to Pulse stations need to be explored by Pace and the roadway jurisdiction. Where possible, pedestrian refuge islands should be 50 feet in length, with a minimum of 30 feet in length where space is constrained. Minimum lengths ensure safety through curb visibility and maximize distance between a pedestrian and vehicle. Furthermore, these islands must have a width of at least six feet, per the Illinois Department of Transportation. Incorporating an offset in the pedestrian island can further improve safety by forcing pedestrians to look toward oncoming traffic.



A pedestrian refuge island



An offset pedestrian refuge island

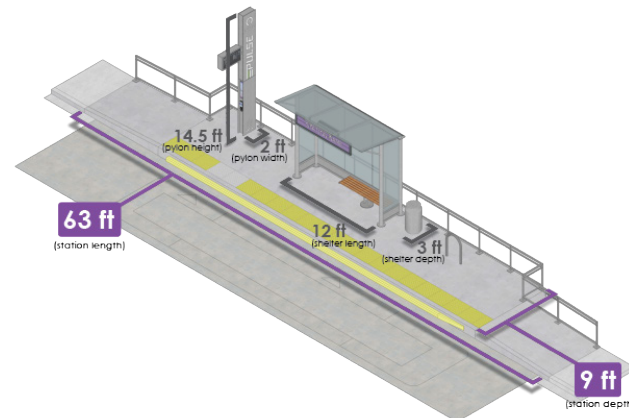
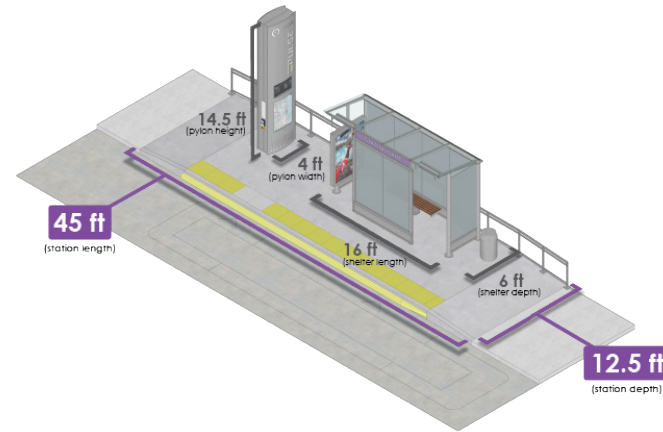
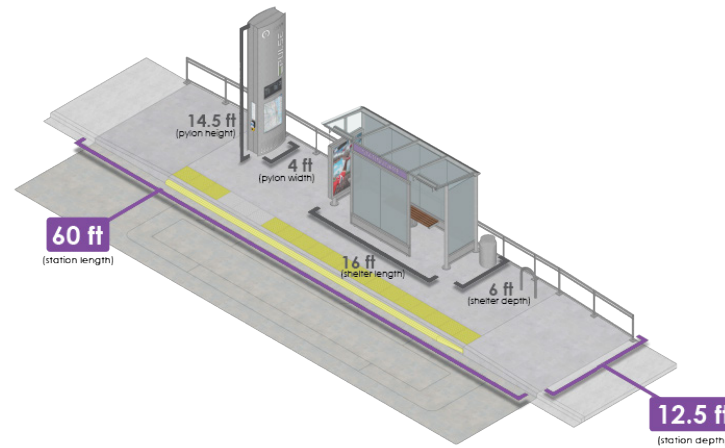
Credits: photos located at the Devon Stations on the Pulse Milwaukee Line | by Andy Ryan
graphic by Global Designing Cities Initiative

STATION SIZES

Three typical station layouts, known as standard, length-constrained, and depth-constrained, have been developed to fit a station into a variety of constraints, such as the presence of driveways and other curb cuts, narrow sidewalks, building frontages, major utilities, trees, or retaining walls and grade changes.

The station dimensions and layouts shown on this page are the templates from which stations are designed. Each can be altered to fit the context of a unique site. For example, station dimensions may be "stretched" to avoid unusable space such as between the back side of a station and private building.

Where stations have significant bus traffic, such as at line termini and transfer points, or where the station is shared by other agencies, a station may be lengthened and contain multiple shelters and features. Stations can also be modified to fit an articulated bus, which is 60 feet long compared to a standard bus length of 40 feet.



Standard

The standard station is the Pulse program preferred station layout that fits all amenities and ample space for passengers. Only when there is limited space in the right of way or other site constraints should the length-constrained and depth-constrained sizes be used.

Length-Constrained

The length-constrained station reduces the total length of the station (including ramps) from 60 to 45 feet through steeper ramps and removal of the bike rack. The depth is the same as the standard station design.

Depth-Constrained

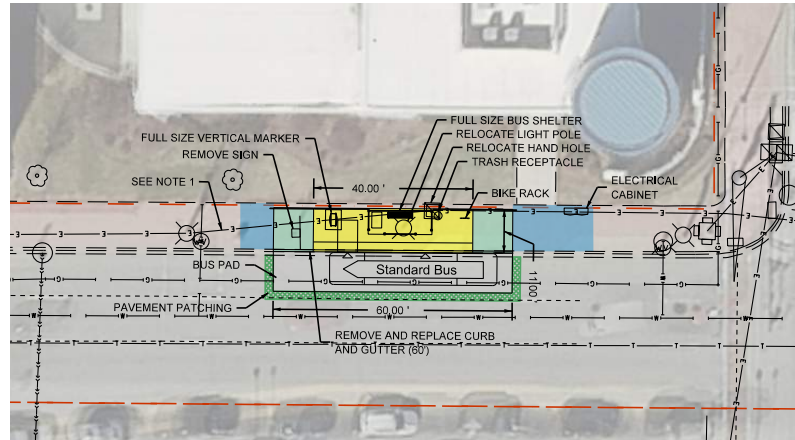
The depth-constrained station reduces the station depth from 12.5 to 9 feet through a smaller shelter with no front wall panel and shallower side panels, as well as a smaller vertical marker pylon.

Layout	Minimum Dimensions	Features
Standard	60 ft long 12.5 ft deep	ADA-compliant ramps, shelter with front and back panels, bench, trash receptacle, vertical pylon (14.5' high by 4' wide), bike rack
Length-Constrained	45 ft long 12.5 ft deep	ADA-compliant ramps, shelter with front and back panels, bench, trash receptacle, vertical pylon (14.5' high by 4' wide)
Depth-Constrained	63 ft long 9 ft deep	ADA-compliant ramps, shelter with back panel, bench, trash receptacle, compact vertical pylon (14.5' high by 2' wide), bike rack

RIGHT-OF-WAY REQUIREMENTS

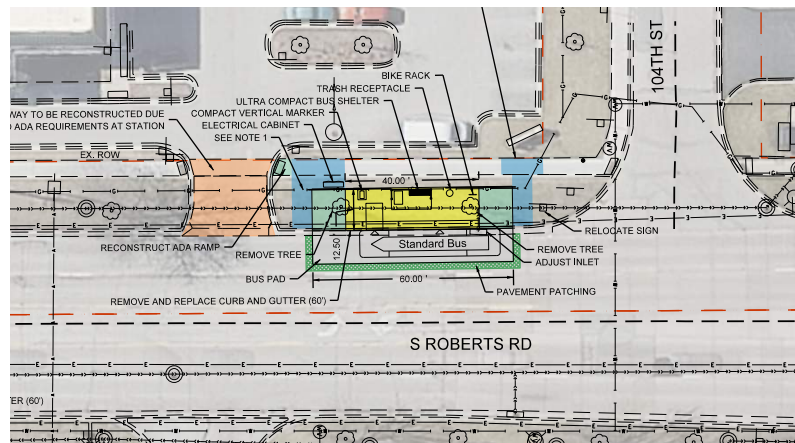
SIDEWALK/STATION CONFIGURATION

Pulse stations are designed for a variety of existing built environments to fit within available right-of-way and existing sidewalks and parkways. For example, stations can be designed with sidewalks running behind the station platform where space allows or integrated with the sidewalk, running through the station itself. When the sidewalk passes through the station, vertical components like the shelter and vertical marker are positioned to allow for a linear pathway for pedestrians. Regardless of layout, stations are designed to meet and, where possible, exceed minimum clearances to comply with the American with Disabilities Act (ADA).



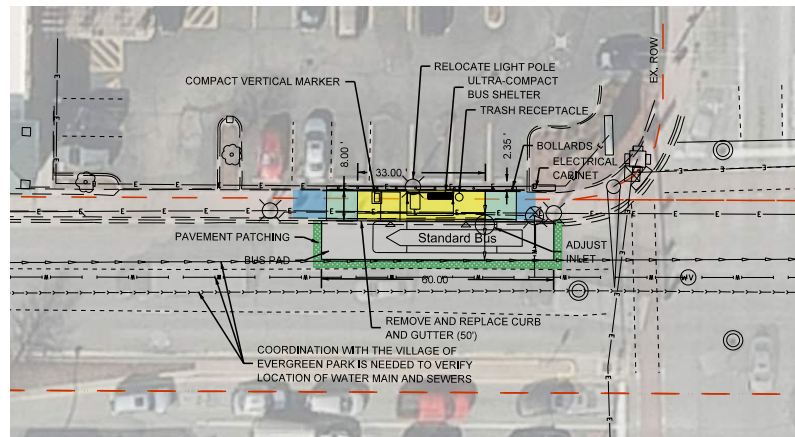
Proposed Pulse Station Design at W 95th St and S Western Ave

An example of a standard station integrated into the existing sidewalk with ample space for pedestrians to safely and comfortably walk through the station.



Proposed Pulse Station Design at S Roberts Rd and 104th St

An example of a station with a sidewalk behind it allowing pedestrians to walk behind the station instead of through it.



Proposed Pulse Station Design at W 95th St and S Kedzie Ave

An example of a depth-constrained station integrated with the existing sidewalk, which is narrow. While this design fits into a smaller area, it is still fully compliant with the ADA.

QUEUE JUMPS AND BUS LANES

Queue jumps are a lane design that helps give priority to buses at intersections. They function by allowing buses to skip from the back of a traffic queue to the front, improving timeliness and reliability. Queue jumps are made possible by a priority lane and special signal phase that allows the bus to “jump” the queue of general traffic at signalized intersections. The higher the traffic congestion is, the increasingly effective a queue jump can be.

Bus lanes are an additional bus priority strategy to improve bus speeds and schedule reliability. Bus lanes can be designed to be exclusive to bus traffic only. Another option, a business access and transit (BAT) lane, can be designed for general traffic to temporarily enter and/or cross bus lanes to make turning movements. Alternatively, some general traffic turning movements can be prohibited altogether. Bus lanes can be fully dedicated throughout the day or can be dedicated during peak travel times only.

The designs to accomplish any type of bus lane can include physical separation of bus and general traffic or delineation of lanes through a combination of pavement markings, tinted pavement, and signage.



Proposed queue jumps combined with far side, bus bulb Pulse stations.

Background: Google Maps



Proposed bus lanes on South Halsted Street in Chicago.

Background: Google Maps

POTENTIAL SOLUTIONS FOR BUS-BIKE INTERFACING

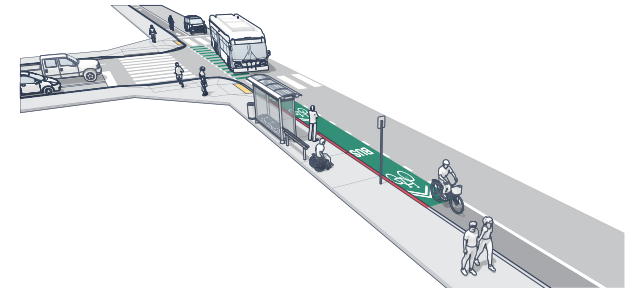
Many municipalities, counties, and roadway agencies across Pace's service area are investing in on-street bicycle infrastructure. This expansion results in an inevitable increase in interactions between bikes and buses. Design strategies that proactively consider these interactions can balance the demand for limited road space while prioritizing the safety of cyclists and bus riders.

There are a number of potential lane and station configurations that accommodate both bikes and buses. On streets with existing marked bike lanes, a common approach is to create a shared zone in front of the bus stop, where a bus must pull into the bike lane to align with the bus stop or station. A disadvantage of this design is the potential conflict point between bikes and buses sharing space, and it can also result in an undesirable "leap-frogging" pattern, where a bus and bike need to repeatedly pass one another as they progress through a corridor.

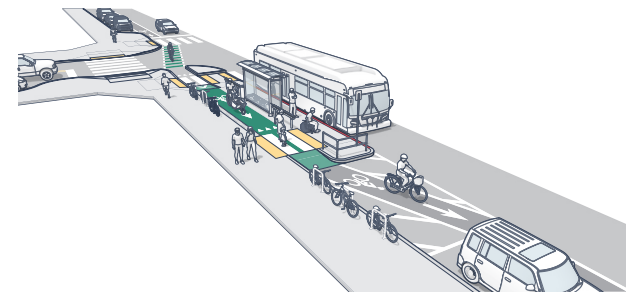
Optimal configurations reduce the conflict points between buses and bikes. A "floating bus stop" is placed between the bike lane and either the general traffic lane or the bus lane eliminating the need for buses to pull into the bike lane. Bus riders will cross the bike lane at designated crosswalks to reach the station.

Floating Pulse stations are likely feasible assuming that adequate space is available for minimum station amenities (shelter, pylon marker, and ADA accommodation). When roadway owners are considering installing bicycle infrastructure on designated future Pulse corridors, Pace encourages them to adequately size floating bus stops to accommodate future upgrades to Pulse stations (see Station Sizes section).

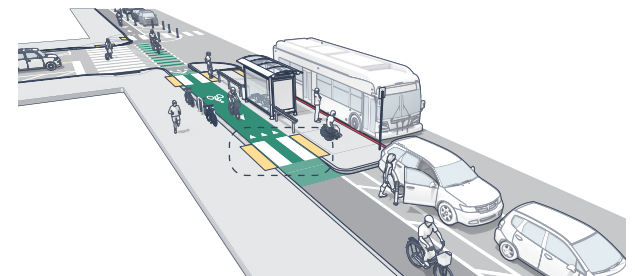
Additional design solutions may be recommended based on an individual corridor's design and context.



Marked bike lane between the curb and a general traffic lane



Floating bus stop with marked bike lane between curbside parking lane and general traffic lane



Floating bus stop with separated bikeway between the curb and parking lane

Source: AC Transit Multimodal Corridor Designs, 2018.

UTILITY WORK

Pulse station construction requires site excavation up to four feet deep to accommodate underground electrical and foundation work. Prior to site excavation, the availability of up-to-date municipal utility plans are essential to avoid conflicts. To the greatest extent possible, Pace will design around known existing utilities to reduce potential accidents and project delays.

Local jurisdictions can consider relocating utilities away from Pulse stations in advance during unrelated road work in order to avoid potential conflicts.



Station under construction on the Pulse Dempster Line | Photo by Andy Ryan

STREETSCAPE IMPROVEMENTS

Pace encourages local jurisdictions to coordinate right-of-way improvements such as resurfacing, painting, lane reconfiguration, or streetscaping in order to set the stage for Pulse improvements. This can include incorporating bus pads, curb extensions, pedestrian refuges, curb cuts, or other transit priority treatments such as queue jumps or dedicated lanes. When designing road improvements, communities should consider proposed stations sites and the approaching and existing bus movements when establishing street parking.

Where there is existing landscaping at a proposed station site, Pace will work with the property owner to incorporate landscaping into the station design. Wherever possible, Pace seeks to minimize impacts to existing landscaping, especially trees, and will make every effort to replace landscaping when it is impacted by the placement of a station.

SPACE FOR STATIONS

Typically, Pulse stations are constructed within the existing right-of-way for Pulse riders to easily access a Pulse vehicle and to avoid impacts to private property owners. However, right-of-way limits are often narrower than the space needed for a Pulse station. In those contexts, Pace will seek a permanent easement from the private property owner for the extents of a Pulse station.

Securing easements requires close coordination with property owners and can cause schedule delays if issues arise. To mitigate this risk, Pace seeks assistance through the following actions by jurisdictional partners:

- » Acquire right-of-way in advance where Pulse stations are planned, especially where right-of-way acquisition is already underway by the jurisdiction as part of other roadway improvements in the corridor.
- » Track and update contact information for property owners near Pulse stations.
- » When approving entitlements or development and incentive agreements, and when the project subject to approval contains or is adjacent to an existing or planned Pulse station, condition approval on accommodating the Pulse station.
- » When reviewing and approving subdivision, resubdivision, and consolidation plats for property adjoining current or future Pulse stations, ensure easement or dedication areas are included on plat for recording.
- » Coordinate with Pace once Pulse conceptual design plans are complete to understand the extent of easement needs and the benefit to residents for that Pulse station site. Additionally, jurisdiction staff and elected officials can assist Pace by expressing their support for Pulse and the benefits it brings to the community.

LOCAL PERMITTING, REVIEW, AND ADVERTISING REVENUE ARRANGEMENTS

Local jurisdictions have their own regulatory processes for the permitting of Pulse stations including number and type of permits, approving bodies, and application processes. Requirements may include right-of-way permits, building permits, design approval through bodies such as an appearance commission, and zoning variances. There may also be applicable restrictions such as sign codes or restrictions on advertising. Pace will benefit from learning in advance a jurisdiction's expectations for the permitting of Pulse stations and a staff contact to guide the permitting process from start to finish. Pace also encourages the jurisdiction to internally document all meetings, coordination and correspondence with Pace in the case of jurisdiction staff turnover during Pulse project final design and construction, which can span up to three years.

It is also recommended that local jurisdictions reach out to Pace before renewing contracts with providers of bus shelters or benches unaffiliated with Pace to ensure these programs do not prohibit Pace from constructing Pulse stations. For Pulse service, stations are maintained by Pace and its contractors, including trash removal, regular station cleanings, and other maintenance such as fixing vandalism or disrepair. For jurisdictions that permit off-premise signs, Pace also offers revenue-sharing options for advertising space in Pulse shelters through our Advertising Shelter Program.



Station under construction on the Pulse Dempster Line | Photo by Andy Ryan

SIGNAGE PLACEMENT AND DIMENSIONS

To achieve the ideal Pulse station placement, local jurisdictions should maximize design flexibility through their ordinances on private signage placement and size standards near Pulse intersections. Signage placement should avoid proximity to Pulse stations so that sight lines of signage are preserved from the right-of-way even when a Pulse station is constructed. To offer the most design flexibility for the siting of Pulse stations, private property signs should be set back from the right-of-way and intersections and should be taller than the standard Pulse shelter height of approximately ten feet.

These general guidelines are encouraged in addition to coordination with property owners and Pace when private developments with new signage are introduced for jurisdiction approval. This coordination should take place as early as possible given that a potential site for a transit station and signage placement is unique to each location. Coordination will ensure station siting proximate to signage maintains sign visibility distance minimums and associated safety standards for general traffic.



A Pulse vehicle on the Pulse Milwaukee Line | Photo by Andy Ryan

SAFETY

To maximize safety for Pulse riders, Pace recommends that municipalities install or upkeep lighting along Pulse corridors and intersecting transit routes. Pace similarly encourages the prioritization of Pulse station intersections for inclusion in any public camera programs.

Municipalities can also improve safety through design of the local environment. Pace encourages local planning, zoning, design review, and/or public works departments to consider transit supportive design in their review of development proposals along Pulse corridors and particularly within a mile of Pulse stations as presented in this Transit Supportive Guidelines document. Municipalities should use local authority to enforce pedestrian scale and street-facing development character for private sector development. Policies such as these can leverage Pace's investment in communities receiving Pulse service by creating the safe environment that attracts transit riders over the long term.



Northbound Devon Station on the Pulse Milwaukee Line | Photo by Andy Ryan

COMMUNITY EXPRESSION ELEMENTS

Pace coordinates with local communities to make Pulse stations easily identifiable and communicate the Pulse brand while incorporating local jurisdictional branding. Pace achieves this through customizable shelter panels, station furniture such as the bicycle rack, bench, and trash receptacle, railings, and landscaping.

SHELTER PANELS

Pulse station shelters will feature polycarbonate panels with a narrow mullion running between them. Customization will take the form of transparent film overlays. Pace will pay for the customized panels for the station shelters and will coordinate with communities on the design of the panel graphics. Pace will cover 100% of the cost of this custom element.

All station shelters can be customized. The following guidelines identify how Pace delegates customization opportunities for shelter panels:

- » If the station is in the public right-of-way, generally the first option goes to the municipality in which the station is located.
- » If the station is partially on private property, the municipality will still have the first option for customization in most cases. The exception to this is if the private property belongs to major institutional uses such as cemeteries, park districts, etc. that are unlikely to change in the near term, in which case Pace may recommend

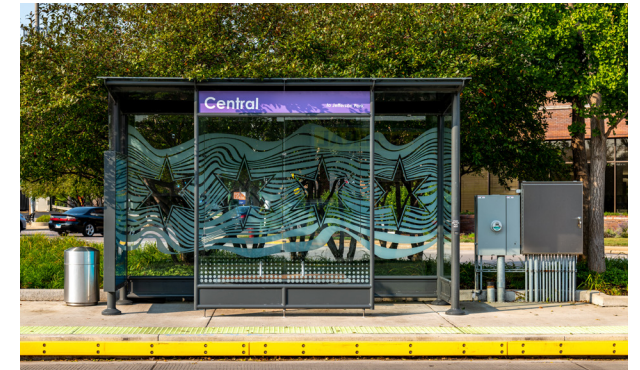
that these entities be given the opportunity to customize the shelter panel design.

- » If entirely on private property, Pace will consider allowing private entities to customize the shelter panels on a case by case basis, depending on the type of use and likelihood that the use will remain unchanged for the life of the investment.

FURNITURE

Pulse stations include standard bicycle rack, bench, trash receptacle, and railing elements. However, municipalities may request a different alternative design to match existing streetscaping or other street furniture program.

If a municipality would like to substitute its locally preferred bicycle rack, bench, trash receptacle, and/or railing element, Pace will make the substitution provided that the cost is similar to or less than the elements selected by Pace. The municipality may also procure the substituted bicycle rack, bench, trash receptacle, and/or railing element that will be installed by Pace during station construction.



Above: Southbound Touhy Station on the Pulse Milwaukee Line
Below: Southbound Central Station on the Pulse Milwaukee Line
Photos by Andy Ryan

COMMUNITY EXPRESSION ELEMENTS

GENERAL PACE GUIDELINES FOR CUSTOMIZATION

A municipality may delegate customization decisions to local organizations. However, Pace accepts direction on station customization only from the municipal government (or county, or private property owner) in which the station is located and will enter into Intergovernmental Agreements only with municipal governments. If a municipality declines the opportunity to customize station features, Pace may opt to proceed with standard station features or custom features of its choosing. Pace has final authority to approve or disapprove all design treatments and customizations. Pace may opt to maintain design control over all features of the Pulse system and its stations, subject to compliance with local, state and federal regulations and permits.



Southbound Harlem Station on the Pulse Milwaukee Line
Photo by Andy Ryan