GoTriangle

Bus Stop Guidelines

November 2025

GO Triangle

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Introduction

Introduction

GoTriangle's mission and vision are to connect people and the region with high-quality transit and to be the region's trusted mobility partner. Those goals involve many different working parts, from vehicles to operators to planning to financing. They also all involve the one commonality all transit trips have: the bus stop.

From stations to shelters to basic stops with a landing pad and sidewalk connection, every rider's journey involves a bus stop. The location and quality of these stops can make or break the transit experience – and even determine whether a trip takes place at all.

Bus stops do more than serve riders on transit. They also serve as a primary means of marketing transit. They signal to potential riders how they might use transit and what the quality of the experience would be like. At their best, they signal an easy and comfortable trip awaits, with a common design language that implies coordination across routes and agencies.

Stops also are visible pieces of community infrastructure. They can add or subtract to the visual quality of a city or region. They can indicate that transit and the public realm are valued in the community.

GoTriangle seeks to make bus stops a positive contribution to the community streetscape and a place where riders can safely and comfortably use transit services. Often, the public's first impression of any transit service is the bus stop. It is important that bus stops are easily identifiable, safe, and accessible. These guidelines provide a framework for developing and maintaining bus stops. They promote consistency for good design and the provision of bus stop infrastructure.

These guidelines are written for GoTriangle staff, other transit providers, other entities that provide transit stops or interact with transit, and the general public. This document has four main goals:

- Outline the role and importance of bus stops as part of a transit system.
- Describe the process for managing and developing bus stops at GoTriangle, including relevant jurisdictional authority, public input, and other factors.
- Establish guidelines for the location and spacing of bus stops.
- Establish guidelines for the design of bus stops and the placement of bus stop elements such as shelters, benches, and landing pads.

Through explanations and illustrations, this document, along with the standard design details for various types of stops, provides the tools needed to plan GoTriangle bus stops and associated improvements.

Section 2:

Bus Stop Policy

Bus Stop Policy

Stops and Stop Infrastructure Basics

GoTriangle continually evaluates routes for the need for new, improved, or relocated stops or for stop upgrades based on ridership. Bench and shelter assessments are reviewed based on ridership warrants[1], but also can account for special circumstances.

Maintenance is an important consideration for planning for the life cycle cost of a stop. Shelters and benches should be cleaned and maintained on a regular basis. Depending on the stop location and ownership, this may be the responsibility of municipalities, NCDOT, private entities, or GoTriangle. Where GoTriangle shares service with another transit agency, GoTriangle will defer to the other agency for any improvements and subsequent maintenance.

Constructability and nearby projects are also fundamental considerations. GoTriangle will minimize the impact of stop construction by always seeking locations and designs that fit in the existing right of way where possible. Avoiding physical and environmental constraints like steep slopes, riparian areas, and public/private utilities. GoTriangle will avoid construction of a bus stop or improving a bus stop where pending roadway or other adjacent improvement will likely demolish the improvement in the near future.

Stop with shelter and cart corral.

[1] See Table 3: Regional Stop Warrants Based on Average Weekday Boardings.

Jurisdictional Authority

GoTriangle does not have control over land use or permitting in the jurisdictions where it operates. Permission must be granted by the jurisdiction and often by the North Carolina Department of Transportation (NCDOT) when they control the right-of-way. Because of this, GoTriangle may not be able to install additional stop elements if they do not meet local land use or NCDOT policies.

A high percentage of GoTriangle's stops are on roads controlled by NCDOT. As a general policy, GoTriangle only uses NCDOT-approved equipment at all stops. More information is available at NCDOT's website. NCDOT also has guidance on bus stop location and related pedestrian crossings. This guidance is applicable both generally and as a review guideline for stops on NCDOT-controlled streets.

NCDOT requires all improvements (excluding signs and posts) within their right-of-way to be reviewed and approved by the Department prior to any construction. This includes the use of bus shelters, landing pads, sidewalks and benches or any other equipment that will be placed in the public right-of-way. When working with NCDOT, planning packages need to include the completed encroachment agreement form along with plans and supporting calculations addressing clear recover zones and sight distances meeting the requirements of *A Policy on Geometric Design of Highway and Streets*, by the American Association of State Highway and Transportation Officials (AASHTO), latest edition. All plans and calculations are signed and sealed by a North Carolina Licensed Professional Engineer.

Acquiring Property or Easements for Bus Stops

GoTriangle is committed to providing ADA accessibility at all stop locations. When additional space is needed to provide an ADA-compliant landing pad, GoTriangle will work

Shared stop with two shelters.

with the adjacent property owner to provide property for the stop improvement. In order to avoid the need for a future transaction should ridership increase, any time a real estate transaction is initiated, GoTriangle will seek the space for a future shelter pad regardless of current ridership.[2]

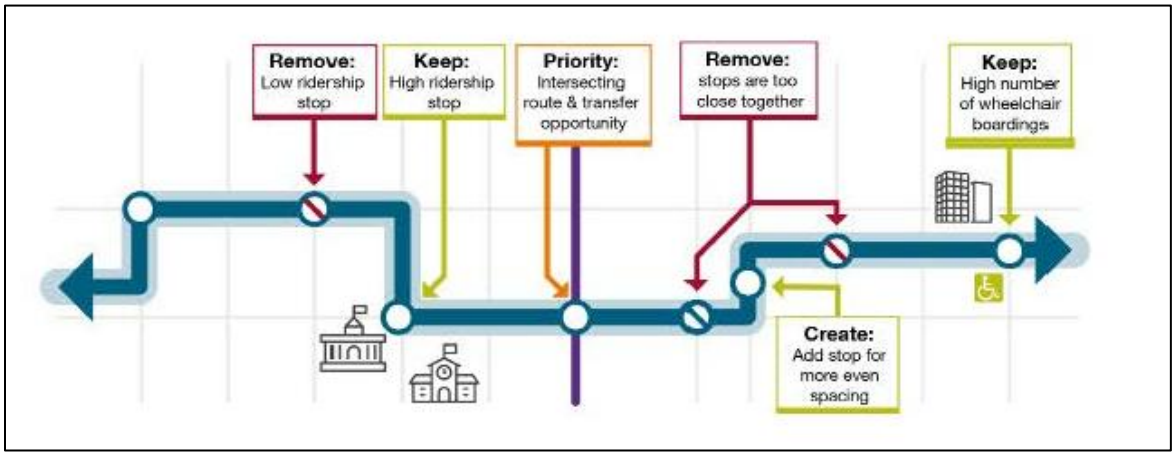
When ridership warrants meet thresholds for additional infrastructure at an existing, ADA-compliant stop, any space needed for the additional stop infrastructure will initiate a real estate transaction. For more detail on how GoTriangle pursues real estate needs, see the Appendix.

New Stop or Infrastructure Request

New stop requests are reviewed by GoTriangle Planning and Capital Development staff. Several factors will be taken into account, including safety (for pedestrians, traffic, and transit operations), schedule reliability and travel time, traffic impact, stop constructability, and ADA compliance including the ability to cross the street safely (for paired stops), and overall costs and benefits. For additional bus stop elements, the cost of the project, size, and Title VI compliance will play a role in the approval or denial of the request.

[2] See Table 3: Regional Stop Warrants Based on Average Weekday Boardings.

GoTriangle receives a number of requests every year to provide additional equipment at stops. Requested improvements primarily include new shelters, trash receptacles, bike racks, benches, or new sidewalk access[3] to the transit stop. All are subject to NCDOT and jurisdictional requirements but will be considered if they are feasible with existing conditions.



Examples of considerations involved in changes to stop locations.

Stop Relocation Request

As a part of GoTriangle's good neighbor practice, GoTriangle staff endeavors to be responsive to requests for bus stop adjustments where passenger safety, comfort and convenience are not compromised. When a request is made to relocate a bus stop, cooperation with adjacent properties to bus stops is appropriate.

Stop relocation requests are handled in the same manner as new stop requests. If a stop is relocated, online and other information is updated as needed.

Where stops are located at intervals of 750 feet or less, requests to remove or relocate stops may be accomplished through consolidation of adjacent stops. There must be an appropriate location and an ADA-compliant pathway from the removed stop to the new stop location or proof of extenuating circumstances. Consolidation of stops may have the positive result of improving travel time and resolving spacing issues.

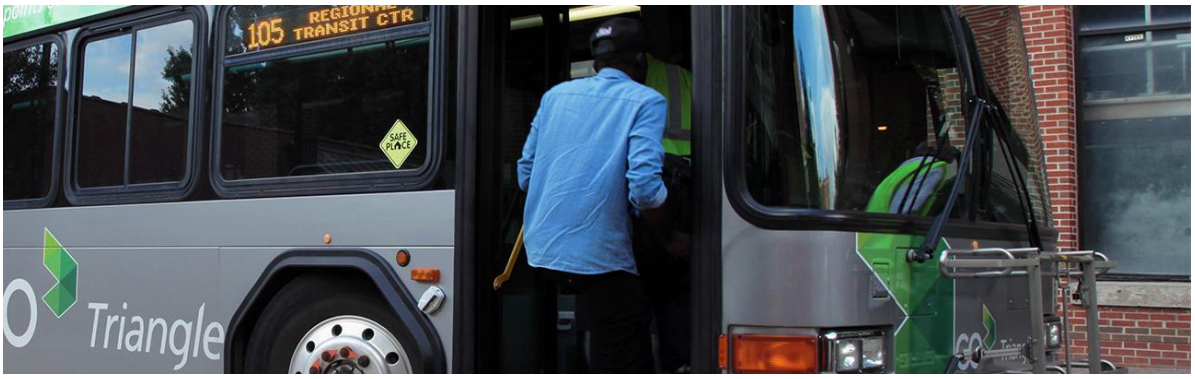
It is GoTriangle practice to not remove or relocate stops, benches, or shelters when such action would negatively impact customer convenience, safety or comfort. GoTriangle policy prohibits bus stop removal or relocation where such requests have the appearance of

[3] See Overall Siting Considerations for when GoTriangle may build sidewalk in lieu of the City or Town.

being motivated by bias regarding the ethnicity, income level or social status of customers using the bus stop location.

Title VI Compliance

GoTriangle hereby gives public notice of its policy to uphold and assure full compliance with Title VI of the Civil Rights Act of 1964 and all related statutes. Title VI and related statutes prohibiting discrimination in federally assisted programs require that no person in the United States of America shall, on the grounds of race, color, national origin, sex, age, or disability be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.



Any person who believes they have been aggrieved by an unlawful discriminatory practice regarding GoTriangle's programs has a right to file a formal complaint. Any such complaint must be in writing and submitted to GoTriangle's Title VI Coordinator within 180 days following the date of the alleged occurrence. For more information regarding civil rights complaints, please contact: Director, Equal Opportunity and Compliance, GoTriangle, 4600 Emperor Boulevard, Durham, NC 27703. Complaints and questions can also be made by emailing titlevi@gotriangle.org or calling (919) 485-7518.

Stop Maintenance

The quality and appearance of bus stops plays an important part in providing high-quality bus service. GoTriangle's Transit Amenities Specialist maintains bus stops within the GoTriangle system that are not maintained by others, including garbage collection, graffiti removal, and vandalism repairs. Should a customer notice a vandalized shelter or sign they should contact us at 919-485-7433. If a shelter is replaced due to vandalism, the location will be monitored. If the locations are considered a location of habitual vandalism or damage, the shelter will not be re-installed.

Section 3

Bus Stop Spacing

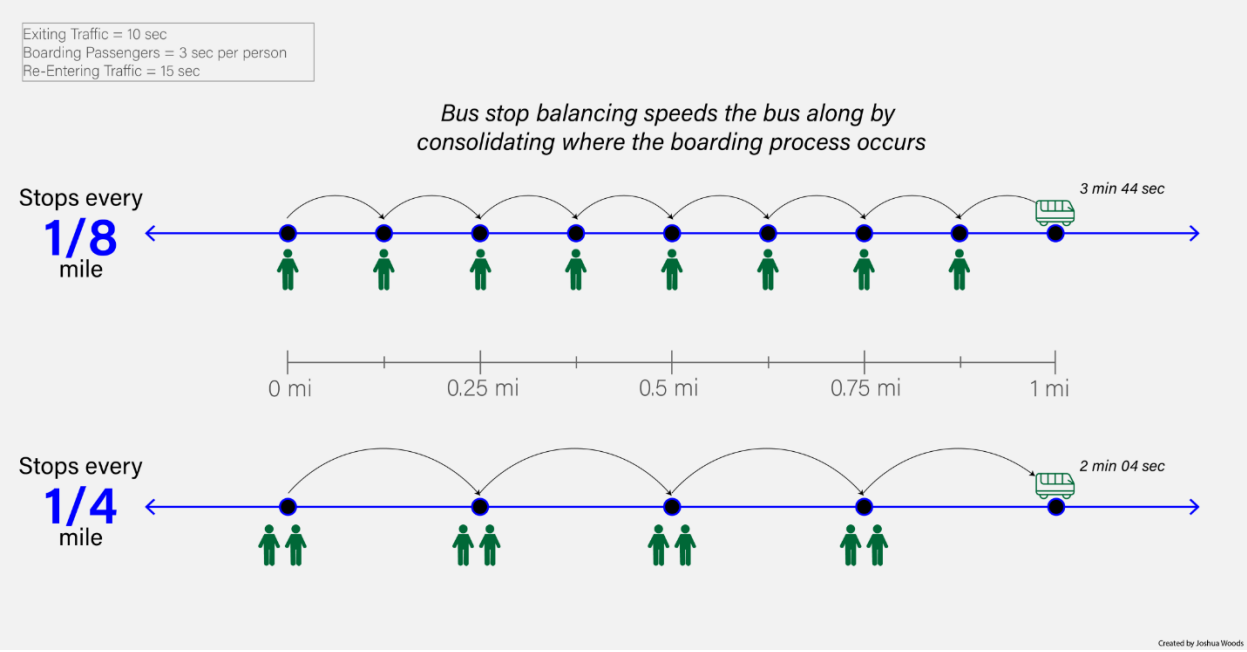
Bus Stop Spacing

Bus stop spacing is the distance between successive, designated stop locations in the same direction of travel along a bus route. Bus stop spacing should be related to land use and the density of development along a route. Bus stop spacing is a significant measure of accessibility. However, spacing also affects bus travel times and transit's competitiveness with driving, as close spacing can significantly add time to a route. When stop locations are being designated, it is necessary to consider customer convenience, customer safety, and transit operation and travel time impacts.

Stop Spacing in General

Bus stop spacing is an important consideration. It involves unavoidable tradeoffs. Stops that are spaced closer together minimize the distance riders must walk. However, frequent stops slow down bus service, making it less useful for many riders.

Spacing is also very dependent on context. Stops in dense urban areas are typically closer together, and each stop may attract many riders. Routes that serve low-density areas, however, typically have stops much further apart. In both locations, the presence of larger residential or employment areas may lead to closer spacing. Conversely, transit that travels on a limited access highway may not stop for several miles.



Graphic illustrating the tradeoff between closer stops and faster transit service.

The type of transit service determines spacing as well. Local service designed to serve every part of a dense downtown will stop often. However, express service designed to connect a distant suburb with a downtown or to connect two downtowns will provide faster service by leaving much longer distances between stops.

GoTriangle operates in different contexts but is primarily a regional transit service. In some areas where there is no other transit provider, GoTriangle may also act in a "local service" capacity. Given this, both types of stop spacing are included below.

Local Service Stop Spacing

The Transportation Research Board, a primary national source of research and guidance, has published typical base stop spacing ranges. These are highly context dependent. In other words, stops are closer together in denser areas in and near downtowns or other major centers. They are farther apart in areas with fewer people and destinations.

Typical Stop Spacing Guidelines

- Downtown: Typically 300 to 1000 feet between stops.
- Urban: Typically 500 to 1,200 feet between stops.
- Suburban: Typically 600 to 2,500 feet between stops.
- Rural: Typically 650 to 2,640 feet between stops.

These ranges are all for local service. Ranges are higher for express, bus rapid transit, or other longer-distance service. The Federal Transit Administration provides this perspective here. That consideration is relevant to GoTriangle service, much of which is express or similar.

The wide ranges shown in the guidelines above reflect the fact that many factors include spacing decisions. Particularly in the southeastern United States, land use patterns make applying strict spacing guidelines difficult along the entirety of routes. Compared to older northeastern cities, densities are much less uniform. In the Southeast, downtown density typically drops off very quickly, often leading to long stretches of low density. Similarly, in suburban contexts, retail centers, institutions, or employment areas may generate relatively high ridership, but are often separated by very low-density areas. This translates into many routes that have closer spacing along parts of the route, but wider spacing elsewhere.

For the above reasons, national guidelines emphasize the fact that guidelines will not apply perfectly to every route or even sections of routes. "A Guidebook on Transit-Supportive Roadway Strategies," also published by the Transit Cooperative Research Program, emphasizes this need to allow variation from strict standards in some contexts:

"A flexible approach to applying stop spacing policy is also recommended. There will be situations where the locations of passenger trip generators, infrastructure constraints, and similar factors will suggest a different stop spacing than the typical spacing given in the policy.

Regional Service Stop Spacing

Regional bus service has inherent differences from local service. By definition, routes are typically longer, as they are focused on connecting regional locations. They also are much more likely to serve suburban areas. They are less likely to extensively serve downtowns, as that service is provided by cities in the region. They are more likely to be or to act like express services, with wide stop spacing necessary to avoid very long trip times. Lastly, they also often run parallel with, at least in more urban areas, local bus routes provided by individual city transit agencies.

All of these characteristics describe regional transit provision in the Triangle. The Triangle also reflects typical land use characteristics in the Southeast. It has highly uneven density, with denser downtowns and other nodes surrounded by much lower density development and with a quick drop from urban to very suburban densities. Street grids are also much less regular in the southeast, with downtown grids quickly giving way to very fragmented grids in suburban areas. These road networks, which generally feature a widely spaced network of arterial roads with relatively few connecting local streets in between, are not conducive to close bus stop spacing. Finally, although much of the Triangle is suburban, there are many pockets of undeveloped land that, from a transit perspective, are effectively rural in terms of transit demand.

Agencies that provide regional or primarily regional service reflect the above considerations in their stop spacing recommendations, which are all higher than typical urban service. Table 1 below summarizes guidelines from several such services. All differentiate stop spacing based both on density (downtown or lower density) and type of service. They also include much wider stop spacing than purely city-based transit providers typically use.

Table 1: Comparison of Regional Transit Agency Approaches to Stop Spacing

Agency/Context	Downtown	Urban/Higher Density	Low Density/Suburban	Express
SMART (Detroit)	Every few blocks	1,320-1,760	2,220-2,640	1-2 miles
PART (Piedmont Triad)	1,000 – 1,760 ft	1,760 – 2,640 ft	1,760 – 5,280 ft	Not specified
Golden Empire (Bakersfield)	850-1,300 ft	850-1,300 ft	850-1,300 ft	2/3 mile
NCRTD (Santa Fe)	1,300 ft average	1,300 ft average	1,300-2,650 ft (no max in rural areas)	Not specified

Links and more information: SMART; NCDRT; PART; Golden Empire.

GoTriangle Stop Spacing Policy

In terms of considering stop spacing, GoTriangle routes generally fall into one of two categories: 1) Express routes between major centers with local spacing at each end or 2) suburban routes with generally wide but more uniform stop spacing, although sometimes with gaps due to express segments or low-ridership or undeveloped segments.

Downtown Raleigh (City of Raleigh Photo)

Express routes with local spacing at one or both ends of the route.

An example of this is the Interstate 40/local streets corridor connecting Raleigh with Research Triangle Park. In downtown Raleigh, density is high, but not nearly as high as in cities such as New York or San Francisco. The middle portion of the corridor follows Interstate 40, a limited access highway. The end of the route serves RTP, which has a large amount of employment but in a spread-out form.

Accordingly, the stop spacing reflects these different contexts. Downtown Raleigh is not dense enough to serve with one stop, so the route includes multiple stops spaced from 1,500 to 2,000 feet apart. It is important to note that GoTriangle service is augmented along the corridor by the presence of GoRaleigh service that includes closer stop spacing along the same route.

A larger gap between stops exists where the route crosses Interstate 440, an area with lower density and with interruptions to the urban fabric from the interchange. The section that operates on I-40 is an express segment, running roughly eight miles with no stops. The route concludes with roughly half-mile spacing between stops in the RTP segment, which is suburban in nature.

Suburban service and spacing along the entirety of the route.

An example of this is the corridor options between downtown Cary to the Regional Transit Center. Much of the area along this route consists of low-density residential areas interspersed with suburban retail and employment areas. Some areas are still undeveloped, while others have segments with buildings or residential areas that do not have a connection to the route or are not within walking distance of the route. Accordingly, stop spacing varies, with 1,500-foot spacing in some places and more than 3,000 feet between other stops.

Example of suburban area in Triangle (Town of Cary photo)

Some routes contain elements of both. For instance, some corridors lend themselves to suburban spacing but include a smaller section of express/highway operation with low density and/or auto-oriented land use such as car sales in the middle.

Because most GoTriangle routes include significant express sections, calculating average spacing for a route does not provide an accurate representation of how other areas along the route are served. Instead, these guidelines are only appropriate for use along non-express route sections.

Similarly, downtown or urban service areas along these routes does not have the same goal as city bus service in those areas. The goal of GoTriangle service is not to serve every few blocks, but to collect riders for express service while avoiding unnecessary delays.

For overall spacing guidance, GoTriangle relies on typical urban/suburban spacing guidelines, but modified to reflect the needs of regional transit service.

Urban/downtown (in or within one mile of a city center): Typically 1,000-2,000 feet between stops, but may be wider depending on the presence of interchanges, large institutional areas with low ridership, or other considerations.

Suburban (all other locations): Typically 1,500-2,500 feet between stops, but may be wider (up to 3,500 feet or more) in the instances mentioned above, as well as large areas of very low density, areas that are only partially or not developed, or areas with land uses, such as car dealerships, that generate very few transit trips.

Note that the above guidelines apply to the sections of routes that are not along limited access highways. Those sections may have several miles between stops, as this is necessary based on the nature of these highways and on the need to provide faster transit between major centers in the region.

See the chart below for a summary of GoTriangle's spacing guidelines.

GoTriangle Stop Spacing Guidelines

Context	Typical Condition	Wider Spacing Condition*	Highway/Express Sections
Urban	1,000-2,000	2,000-3,000+	1 mile or more
Suburban	1,500-2,500	2,500-3,500+	1 mile or more

* Areas with interchanges, that are undeveloped or partially developed, or that have uses that are not conducive to transit ridership.

Section 4

Bus Stop Siting and Placement

Bus Stop Siting and Placement

It is impossible to force every bus stop location to conform to a standard. As a rule, well-located bus stops have adequate sidewalk connections and roadway crossing infrastructure (i.e. marked crosswalks, median islands, curb ramps, pedestrian signals, etc.). Detailed information on the design of these accessibility factors can be found in the Americans with Disabilities Act Standards for Accessible Design and the Federal Highway Administration's Pedestrian Safety Guide for Transit Agencies. More recently, the Public Right of Way Accessibility Guidelines (PROWAG) provides detailed technical guidance on bus stop and shelter design.

After general bus stop spacing is determined, the bus stops are placed in one of three locations: near-side, far-side, and mid-block, based on where the stop will be relative to intersections with cross streets. By "far-side stop," this document refers to a stop the bus reaches after traveling through the intersection. Specifically, this refers to an intersection with another named street where stop control exists or where North Carolina General Statute §20-155(c) governing unmarked crossings applies, but not a driveway – driveways are addressed in another section of this document. Similarly, "near-side stop" is a stop located before the bus enters the intersection. Note that design details for these and other standard bus stop configurations are available in the appendix Transit Standard Details.

Bus stops are predominantly located at the near side or far side of an intersection which maximizes pedestrian accessibility from both sides of the street and can provide connections to intersecting bus routes. Under certain situations, bus stops may also be placed at a mid-block location. The placement of bus stops at intersections varies from site to site. These guidelines have been developed based on traditional safety guidance from Manual of Uniform Traffic Control Devices (MUTCD).

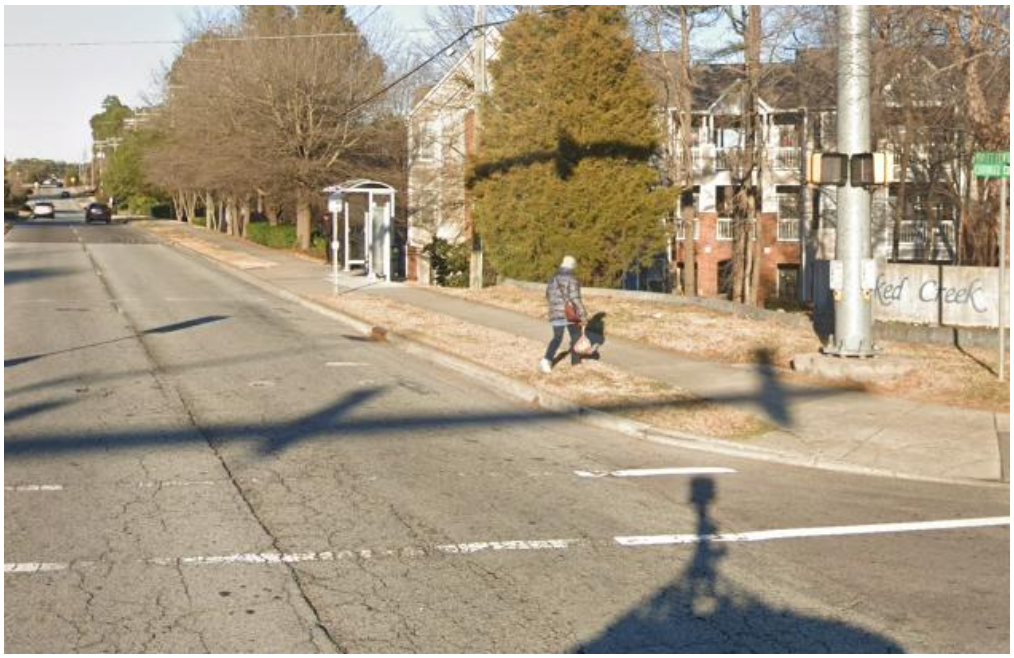
Overall Siting Considerations

GoTriangle will provide ADA-compliant stops for its entire system. Where an existing sidewalk network does not exist, GoTriangle will make sure the stop itself complies with the Americans with Disabilities Act but expects the jurisdiction where the stop is located to be responsible for the sidewalk. However, wherever GoTriangle provides service in both directions, GoTriangle will ensure that there is a safe, ADA-compliant path to cross to the counterpart stop on the other side of the street. If a safe crossing cannot be found, GoTriangle may choose to not serve that location until the crossing can be remedied.

Because of this, GoTriangle will first seek stops where a crossing already exists, and along high-volume streets seek stop locations where a signalized intersection already exists.

Far-Side Stops

Far-side stops, located after a bus crosses an intersection, are the most common locations for stops.



Example of far-side bus stop.

Advantages include:

- Minimizes conflicts between right-turning vehicles and buses.
- Maintains right turn capacity by making curb lane available for traffic.
- Minimizes sight distance problems on approaches to intersection.
- Encourages pedestrians to cross behind the bus.
- Shortens deceleration distances for buses that stopped at signal.
- Allows bus to take advantage of gaps in traffic flow created at traffic signals.

Disadvantages include:

- May result in intersection being blocked during peak periods if more than one bus arrives at stop.
- May obscure sight distance for crossing vehicles.
- Impedes sight distance for crossing pedestrians.
- Can cause a bus to stop after stopping for a red light.
- May increase number of rear-end accidents since some drivers may not expect buses to stop again after a red light.
- Could result in traffic queued into intersection.

Near-Side Stops

Near-side stops are also common stop locations. They are often used when a far-side stop is not viable at a specific intersection.

Example of near-side bus stop.

Advantages include:

- Minimizes interference when traffic is heavy on the far side of the intersection.
- Allows passengers to access buses closest to the crosswalk.
- Provides the width of the intersection for the driver to pull away from the curb.
- Allows passengers to board and alight while the bus is stopped at a red light.
- Provides driver with opportunity to look for oncoming traffic.

Disadvantages include:

- Potential conflict with right-turning vehicles.
- Stopped buses may obscure traffic control devices and crossing pedestrians.
- May impede sight lines for cross vehicles stopped to the right of the bus.
- May block the through lane during peak period with queuing buses.
- Impedes sight lines for crossing pedestrians.
- Can require bus to stop twice if queued vehicles make bus unable to reach the stop at a red light.

Mid-Block Stops

Mid-block stops refer to stops not located at an intersection. Because intersections are generally the safest crossings for pedestrians, mid-block stops are less commonly used. However, they can be advantageous at locations with significant activity. If needed, mid-block crossings, including traffic signals, can be installed to improve safety.

Mid-block crossing with crosswalk and pedestrian island.

Advantages include:

- Improves sight distance for vehicles and pedestrians at intersections.
- May result in passenger waiting areas experiencing less pedestrian congestion.
- Can shorten distances for people walking to the stop if a significant origin or destination is midblock.

Disadvantages include:

- Requires additional distance for no parking restrictions.
- Requires safe crossing accommodations that may face approval hurdles.
- Increases walking distance for patrons crossing at intersections.

Summary of Stop Location Guidance

Table 2 below provides a summary of the decision-making process for siting a stop at an intersection or at a mid-block location.

Table 2: GoTriangle Stop Location Guidance

Any signalized intersection where bus will stop out of travel lane	Far side
If bus turns left at an intersection	Far side
Intersection with high number of right turn movements	Far side
Complex intersections with multi-phase signals or dual turn lanes	Far side
If two or more consecutive stops have added timed signals	Alternate near side and far side (starting near side) to maximize advantage from timed signals
If obvious, heavy single-direction transfer activity	One near side; one far side to eliminate crossing required to transfer
If blocks are too long to have all stops at intersections	Mid-block
Major transit generators not served by stops at intersections	Mid-block
Mid-block pedestrian-crossing defined by refuge island and/or striping	Mid-block
The primary trip generator is downstream from the intersection	Near side
Existing pedestrian facilities are greater than on the far-side	Near side
Pedestrian movements are safer than on the far-side	Near side
Route requires a right turn at the intersection	Near side
If no specific reasons exist for near side or mid-block stops	Far side

Stops are at intersections for multiple reasons. These include that:

- Walking distances between origins/destinations and stops are reduced.
- Street crossings are legal at intersections.
- Street crossings are generally safer at intersections, and curb ramps and other benefits of accessibility are generally located only at intersections.

Placing stops on the far side of the intersection is preferred in most cases for signalized intersections because they result in:

- Fewer bus delays and improved safety, as the bus clears intersection blocking fewer movements.
- Fewer conflicts between buses and pedestrians (no pedestrians trying to cross in front of bus, where passing autos cannot see them).
- Greater bus maneuvering area.
- More effective priority signal treatments.
- Eliminating the danger of cars turning right in front of buses (as happens near side) and minimized parking restrictions necessary to get bus to curb (shorter bus zones because buses use the intersection as part of approach to zone).

Passenger Boarding and Alighting

GoTriangle's practice is to place bus stops along raised curb areas with sidewalks when possible and provided other criteria are met. This provides customers with safe and convenient boarding and alighting. Stop placement should avoid vehicle doors opening in proximity to catchment basins, newspaper stands, and other such pedestrian hazards.

Passenger at Regional Transit Center.

"Good Neighbor" Practice

GoTriangle's practice is to place bus stops in locations that minimize conflict with adjacent residences and businesses. Whenever possible, and within the above criteria, stops should be located in unused areas along property lines, as opposed to near building doors and windows. These stops should also avoid blocking private signs. Care should be taken to minimize the impact to each property owner, but vehicle and pedestrian safety should be the overriding factor in determining the final bus stop location.

Bus Stops and Driveways

Whenever possible, bus stops should not be placed near a driveway. However, if a placement near a driveway is unavoidable:

- Attempt to keep at least one exit and entrance open to vehicles accessing the property while a bus is loading or unloading customers. When there are two driveways to a parcel on the same street, the upstream driveway should be blocked, forcing vehicles to turn behind the bus to access the driveway.
- It is preferable to fully rather than partially block a driveway to prevent vehicles from attempting to maneuver by the bus in a situation with reduced sight distance.
- Locate bus stops to allow visibility for vehicles leaving the property and to minimize vehicle/bus conflicts. This is typically best accomplished by placing bus stops where driveways are behind the stopped bus, though this is not always possible.
- Ensure customers have a safe area to wait.

Example of stop near driveway.

Temporary Stops

In locations where bus stops are likely to remain for less than six months, consideration may be given to the placement of temporary stops. When considering a location for a temporary stop, all criteria for permanent stops should be considered. The decision to place a temporary stop should consider the likelihood that a temporary sign may be vandalized, removed, or relocated improperly during the temporary period.

Temporary stops can be installed for reasons including the following:

- Road closures for construction or resurfacing.
- Special events.
- Route deviations.

Bus Bays

A bus bay, sometimes called a bus pullout or bus turnout, is a widened area on a road where buses can pull out of the travel lane. In 2024, GoTriangle performed a holistic look at pullouts in order to determine when they should and should not be used.

Based on that study, GoTriangle's policy is to avoid and discourage bus bays in most situations. This is because they introduce delay into bus operations, as buses often must wait for a gap in traffic in order to reenter the travel lane. In effect, a bay deprioritizes transit relative to individual vehicles. They also increase costs. Capital costs to move a curb are significant. Bays also increase operational costs due to added time to routes.

Example of bus bay.

However, in limited situations, bays may provide safety or other benefits that outweigh these costs. GoTriangle's criteria for when they may be considered include:

- A pattern of rear end collisions at a stop.
- Timepoint stops where buses frequently arrive ahead of schedule.
- Stops with average dwell times of more than 30 seconds on streets with posted speeds of 36 or more miles per hour.
- Stops on streets with posted speeds of 46 or more miles per hour.
- Stops on streets with posted speeds from 36 to 45 miles per hour *and* that have an average daily traffic volume of at least 8,100 per lane *and* where at least eight buses per hour stop.

In particular, GoTriangle strongly discourages bays in high density urban areas, such as in downtowns, near universities, and similar locations. In these areas, speeds are generally low, pedestrian activity is high, and signalized intersections are frequent, meaning the impact of a stopped bus in a travel lane on other road users is minimal.

If a bay is deemed necessary, typical industry practice is that these conditions warrant a turnout, paved shoulder, or other area of adequate curbside clearance at least 12 feet wide. See the Appendix for the details of bus bay designs.

Because those disadvantages are significant, GoTriangle does not create or recommend the creation of bus bays unless the above conditions are met. Few locations in the Triangle meet those conditions, meaning they should be rare.

Section 5

Bus Stop Infrastructure

Bus Stop Infrastructure

For many transit agencies and jurisdictions, resources for providing and maintaining passenger facilities are limited, requiring them to prioritize what and where improvements will be made. These improvements can be for safety, accessibility, and/or comfort and convenience. GoTriangle has specific warrants, or guidelines based on boardings, for various levels of improvements. The "Baseline Stop" is the standard for all stops regardless of usage. Seating is provided at stops with at least 10 daily boardings, and a shelter at a stop with at least 20 boardings. "Safety Stops," which typically include a bus bay or other means of moving the stop out of a travel lane, are provided in special circumstances where additional infrastructure is needed for traffic safety or other reasons.

GoTriangle will improve any stop that is only served by GoTriangle to GoTriangle's warranted specification. Exceptions can apply for specific sites with documentation. This is to ensure that GoTriangle is treating all jurisdictions and riders fairly across the service area. For any stop that shares service with another agency, GoTriangle will scope the stop improvement based on the more stringent standard of the two agencies. Additionally, the ridership for any stop warrant at a shared stop will combine the average daily ridership of all systems serving that stop prior to making a warrant determination.

Table 1: Regional Stop Warrants based on Average Weekday Boardings

System	Seating	Shelter	2-Shelter	Source Document
GoTriangle	10	20		Triangle Transit Bus Stop and Amenities Guidelines
GoDurham	10	25	50	FY 21 GoDurham Bus Stop Improvement Prioritization
GoRaleigh[1]	10	10		RTA Board Member Handbook 2021 rev
GoCary	10	20		Cary Standard Specifications and Details: Amended July 1, 2023
Chapel Hill Transit*	See below			Public Works Engineering Design Manual 2023

Chapel Hill uses a point system that is based on daily boardings but also includes other factors. Stops with six or more points receive a larger-than-typical shelter and other elements. Stops with three to five points receive a shelter. Stops with two points receive a bench.

Stops with 20-29 daily boardings receive three points; 39-49 boardings receive four points, and 50 or more boardings receive five points. Additonal single points are awarded for stops serving minority or low-income areas, where routes intersect, at designated activity centers, and close to large scale mixed-use development.

Table 4 describes specific elements and for GoTriangle bus stop types based on usage and conditions that guide the provision infrastructure for different classes of bus stops. For certain elements, such as lighting, provision is determined by context-specific considerations.

Table 2: GoTriangle Bus Stop Types and Associated Elements

Bus Stop Element	Baseline Stop	Seating Warrant Stop	Shelter Warrant Stop	Safety/Bus Bay Stop
Landing Pad	Yes	Yes	Yes	Yes
Waiting Pad	Yes[4]	Yes	Yes	Yes
Trash Receptacle	Yes	Yes	Yes	Yes
Pedestrian Scale Light	Site Specific	Site Specific	Site Specific	Site Specific
Sidewalk/Crossing	Site Specific	Site Specific	Site Specific	Site Specific
Seating	No	Yes	Yes	Site Specific
Shelter	No	No	Yes	Site Specific
Bike Rack	No	No	Yes	Site Specific
Real Time Sign	No	No	Site Specific	Site Specific
Bus Pull Out	No	No	No	Yes

[4] For Baseline stops, the sidewalk often doubles as the waiting pad.

Section 6

Specific Stop Elements

Specific Stop Elements

The type of stop determines the elements included in that stop. Each element also has design criteria to consider to ensure the stop functions as intended. This section examines the individual parts of a stop, from the landing pad to the shelter and how they contribute to a successful stop.

Customer Landing Pad/Waiting Area

Customer landing areas are valuable from an image standpoint as well as providing access for people with disabilities, parents with strollers, and others with limited mobility. Establishing a bus stop with just a post and sign does not trigger the requirement for landing pad under the ADA, unless other improvements such as shelters are constructed. However, to further increase access to transit service to all, GoTriangle has a goal to install ADA-compliant landing pads at all bus stop locations to the extent feasible. There are two reasons for this goal – the first is to provide a consistent system for all users, and the second is to manage operating costs, since GoTriangle is obligated to offer ADA complementary paratransit for customers who cannot use a stop due to its inaccessibility. Bus stop sites shall be chosen such that, to the maximum extent practicable, lifts, or ramps can be deployed on a firm, stable surface as to permit a person who uses a wheelchair or mobility aid to maneuver safely onto or off the bus and bus stop.

Example of ADA landing pad with sidewalk connection.

To meet ADA requirements, a clear zone pad must be constructed at each new bus stop with dimensions 5’ parallel to the curb and 8’ perpendicular to the curb. This clear zone pad must be paved, clear of all obstructions, on a firm, stable surface with maximum 2% slope perpendicular to the roadway. This pad allows for the lowering of a ramp from the accessible bus fleet and space for a person using a mobility device to board that ramp. No street furniture or other obstructions, including benches and shelters, may be placed within this 5’ by 8’ pad. A sidewalk may, however, run through the pad.

GoTriangle’s standard is to have a 30’ by 8’ landing pad to accommodate both front and rear door operations for a standard 40’ bus. This can be waived on a case by case basis but the

minimum 5’ by 8’ must be provided. The minimum landing area requirement for a bus stop (the area from which customers board the bus and onto which customers alight from the bus) is:

- A continuous, unobstructed solid area contiguous to the curb that measures at least 5’ parallel to the street and at least 8’ perpendicular to the street at the front door.
- At least 10’ parallel to the street and at least 8’ perpendicular to the street at the back door.
- The distance between the front and rear boarding is typically 18 feet.

These are the minimum dimensions needed to deploy a lift or ramp and allow a customer in a wheelchair to board or alight the vehicle:

- Slope: The slope of the landing area must be parallel to the slope of the roadway in order for the bus wheelchair lift or ramp to be effectively deployed. The slope should not exceed 1 foot vertical over 50 feet horizontal (2%).
- Surface material: The landing area should be firm, stable, and slip-resistant. Concrete is the preferred surface for the landing area. It is possible for the lift or ramp to span an area of another material, such as a grass or soil in a planter strip between the curb and the sidewalk. However, for the safety of ambulatory customers who may stumble on an uneven surface, it is strongly recommended to construct a continuous concrete pad. In newer developments where a new bus stop will be placed, a continuous surface from the curb and the sidewalk should be provided for the purposes of deploying a bus ramp or lift for wheelchairs or other mobility devices. In uncurbed areas, the landing are may be constructed of asphalt.
- Height relative to the street: The landing area should be elevated above the street level for pedestrian safety. For stops served by low-floor, ramp equipped buses a standard curb provides an acceptable ramp slope.
- Clearances: A horizontal clearance between obstructions of 48 inches, and a vertical clearance of a minimum of 80 inches should be maintained in the boarding area.

The **clear zone** is an unobstructed, traversable area adjacent to the travel lane, designed to allow errant vehicles to regain control or safely stop before hitting obstacles. It applies to both NCDOT and Municipal Streets.

Street furniture placed within NCDOT roadways or rights-of-way must comply with **clear zone** requirements as defined by **AASHTO** (American Association of State Highway and Transportation Officials) and adopted by NCDOT.

Street Furniture subject to NCDOT clear zone restrictions:

Street Furniture Type	Clear Zone Consideration
Benches	Must be outside clear zone or breakaway if within
Trash receptacles	Must be movable or breakaway
Bike racks	Must be outside clear zone or frangible design
Street lighting	Must be breakaway if within clear zone
Bus shelters	Must be placed outside clear zone, usually behind sidewalk
Signage (non-traffic)	Subject to setback; breakaway if within zone
Planters	Should not be placed in clear zone unless movable
Public art/statues	Not allowed in clear zone unless fully evaluated by NCDOT

Clear Zones

The unobstructed traversable area provided beyond the edge of the traveled way is termed the clear zone. This area is used for the recovery of errant vehicles and includes shoulders, bike lanes, and auxiliary lanes. The desired minimum width is dependent upon traffic volumes, speeds, and roadside geometry. Use a reduced clear zone width in urban areas when right of way constraints may prohibit a full-width clear zone. (NCDOT Roadway Design Guidelines May 2023)

Trash Receptacles

Trash receptacles can help to control litter and maintain a stop's cleanliness. It is important to properly maintain the receptacles and the trash collection. Trash receptacles should be provided at all bus stops. Operationally the small trash bins on board the bus are for the operator's use and quickly reach capacity with passengers discarding food or drink as required by policy. This creates an operational issue for the drivers and so trash receptacles are included at every stop unless there are extenuating circumstances that prevent it.

Benches

GoTriangle policy is that benches are warranted at bus stops when there are at least 10 boardings a day. Bench installation also depends on available space for a pad large enough to accommodate the bench without impeding the pedestrian travelway. Locations adjacent to sensitive uses will receive consideration for a bus bench despite lower-than-normal boarding counts. Sensitive uses include schools, hospitals, senior centers, social service agencies and facilities, and medical facilities.

Example of stop with pad and bench

These locations should be considered for the installation of a bench subject to the following guidelines:

- The bench must be able to be safely located without obstructing ADA access.
- The bus bench must not be located where an existing shelter or bench is located, unless additional seating capacity is required.
- The benefits to the customers must be considered relative to other bus stop improvement priorities.

Benches are typically 6' or 8' wide. More information on common models is available in the standard stop details document. Finally, existing bench locations with a defective or vandalized bench will receive priority for a replacement bus bench.

Shelters

Stop with shelter and trash receptacle.

Transit shelters are installed at selected bus stops to provide weather protection, as well as seating for waiting customers. GoTriangle policy is that shelters are warranted at bus stops when there are at least 20 boardings a day respectively. Meeting this threshold does not guarantee shelter installation. Existing site conditions and pedestrian infrastructure, public right-of-way availability, accessibility and safety issues, and other concerns must be reviewed and addressed before future bus shelter placements are confirmed. The design and placement of passenger shelters need to ensure adequate access and maneuverability for those with mobility limitations.

Each request would be evaluated to determine if applicable. The installation passenger shelters are subject to the following constraints:

- The shelter must be able to be safely sited;
- The location and site plan must receive the approval of the participating municipality and the other governing authorities as required.

As with benches, bus stops adjacent to sensitive uses will receive consideration for a bus shelter despite lower boardings than the above standard. Possible examples include Park and Ride Lots and transfer points identified in partner transit plans.

Signs

Each bus stop should be marked with a sign indicating GoTriangle service. Stops that are shared with other service providers in the region should be marked with shared bus stop signs. Bus stop signs indicate to customers and operators where buses stop, as well as publicize the availability of the service. The sign should be securely mounted, on its own post, at an angle perpendicular to the street. Bus stops should not be installed or mounted on public utility poles. The sign should be easily visible to the approaching bus operator. The bus stop sign should neither block, nor be blocked, by other jurisdictional signs. To prevent the sign from being struck by the buses, mirrors, signs should be placed preferably 2’ to 4’ from the face of the curb. The bus stop sign is the point at which the front of the bus

should be aligned when the bus is stopped to let customers on and off the bus, and thus should be placed approximately two feet beyond the far side of the landing area.

Bus stop signs should be installed to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG), requiring a height of the bottom of the sign of at least 84 inches from the ground. (NOTE: Signs mounted on bus shelters should also have a space of 84" to 98" from the base of the sign to the ground.) ADAAG requirements for information related to accessibility include:

- Non-glare finish for characters and background.
- Characters contrasted with background or dark characters on a light a background.
- Fonts must be appropriate size and proportion.

Typical GoTriangle bus stop sign

The recommended bus stop sign should contain the names of routes that service the stop, as well as the telephone number to call for more information, and the location or landmark for the name of the route. To meet ADA minimum specifications for signs posted at 84 inches, the words "Bus Stop" and the route numbers should be at least 3" high. The ADA standards further specify that the characters have a width-to-height ratio between 1:15 and 1:10. These standards make signage accessible to people with low vision. These requirements do not apply to other route and schedule information posted at bus stops.

GoLive is a free automated tool providing public transportation riders with real-time arrival predictions for GoTriangle. It allows riders to send a text to obtain information about when the next bus will arrive. Signs include information about how to use the system.

Intelligent Transportation Systems (ITS) Deployment at Shelters

GoTriangle is introducing advanced computer and communications technologies, known as Intelligent Transportation Systems (ITS) for a variety of relatively new services that improve convenience and safety. Transit ITS includes Automated Vehicle Location (AVL) technologies to track the location of vehicles. These services can provide valuable information to riders who may not have a smartphone or wish to download an app.

Geographic Positioning Systems (GPS), processing supports real-time electronic "next vehicle" displays at designated bus stops and stations. Installation of ITS features is recommended to be in place to enhance the transit service and provide optimal services.

Real time information at Raleigh Union Station Bus Facility

It is recommended that communication conduits with at least two electrical feeds be provided at selected designated shelters. One of the feeds can be used for future lighting improvements and the other can be used for ancillaries. Although there is a cost involved with the provision of communication conduits, in the long term, the provision of this equipment saves time and money and prevents the bus stop being reconstructed in the future.

Solar power is an option, particularly if a wired connection is infeasible or expensive. Initially, solar may cost more but should pay for itself over a longer period of time. An electrical connection can be cheaper to install if power is readily available, but it would be a reoccurring cost associated with this type of connection. A drawback for solar lighting is that it is dependent on access to sunlight, which limits locations which can take best advantage of it.

Lighting

Lighting is important because it allows the operator to see if someone is waiting at a stop or a shelter. Where feasible, bus stops should be located such that they are illuminated by existing streetlights or other outside facility lighting. If a shelter is present, both interior and area lighting are recommended for the safety of customers. Street lighting should be provided along bus routes and safety lighting at intersections to promote safety and security for transit riders at the bus stops.

Bus stop light fixtures or shelter illumination should be between 2.0 to 5.0 foot-candles if possible. However, shelter lighting should be on the lower range as to not create a spotlight effect, where it's difficult for customers waiting inside the shelter to see outside. In

situations where there is insufficient street lighting and the stop doesn't warrant a shelter, GoTriangle will work with the relevant municipality to mitigate.

In areas with insufficient ambient lighting, GoTriangle will include a pedestrian-scale light activated by the waiting passenger. This not only provides a sense of personal security for the passenger, but also signals to the bus driver that a passenger is waiting. These lights may be installed solely for this operational purpose in places where operators or passengers identify a problem location for detecting waiting passengers outside of daylight hours.

Safety and Security

The reality and perception of safety are both critical for transit. Customers have the right to a safe experience. Concerns about safety can also negatively affect transit ridership.

Crime Prevention Through Environmental Design (CPTED)

In recent decades, awareness has grown of the impact of the design of the built environment on safety. CPTED recognizes that places can be designed to better provide a sense of comfort and to make criminal activity less likely. This includes lighting, clear sight lines, and regular maintenance to make it clear that places are cared for and regularly visited.

These concepts apply to public and other spaces in general, not specifically to transit. However, they are important considerations for bus stops and other transit facilities, and GoTriangle works to incorporate them into new and upgraded facilities.

The American Public Transit Association highlights four main elements:

- Natural surveillance: The design of an environment with clear sight lines to maximize visibility and observation.
- Natural access control: Controlling access to a site through the strategic design of streets, sidewalks, building entrances and landscaping.
- Territorial reinforcement: The use of physical attributes that express ownership and notify users and non-users of the boundaries of a space or facility.
- Maintenance and activity support: Care and upkeep demonstrate ownership and intolerance for disorder.

Traffic safety is addressed in the sections above that describe stop location and design and safe pedestrian connections to stops. However, other elements of safety are important to address as well.

In addition to the CPTED principles above, several other safety considerations are important for identifying stops in need of improvement and for specific upgrades. These include:

- Location of storm drains and catch basins, which put customers at risk when boarding or alighting the bus.
- Uneven surfaces, which could result in falls.
- Presence of hazardous objects, such as broken street furniture.
- Surface traction (for example, stone aggregate can be exceedingly slippery when wet).
- Water accumulation areas, which can also result in muddy and slippery surfaces.
- Overgrown bushes, which could potentially present a security hazard as well as encroach on the sidewalk and landing area.
- Other obstacles on the sidewalk that, in addition to making it inaccessible, force pedestrians to walk in the street.
- Inadequate area lighting.

Appendix

North Carolina Department of Transportation Coordination

NCDOT requires site plans to be submitted along with the encroachment agreement request form, as well as any supporting documents and calculations. Packages are submitted to the NCDOT District Engineer's office, Division 5 for Durham and Wake County and Division 7 for Orange County.

Below are additional NCDOT requirements for bus stop projects within agency right-of-way:

- The posted speed limit must be 45 miles per hour or less.
- The proposed shelter is on a street with NCDOT standard curb and gutter and sidewalk. The proposed shelter is located behind an existing sidewalk and as close to the right-of-way line as possible.
- The proposed shelter is pre-approved by NCDOT's Project Services.
- The encroaching party includes a statement signed and sealed by a North Carolina Licensed Professional Engineer to the effect that the proposed shelter is outside of the clear recovery zone, as defined by the most current version of the AASHTO Roadside Design Guide; or the proposed shelter will not adversely obstruct sight distances, nor create an increased safety hazard within the clear recovery zone to a greater extent than existing above ground obstacles (utility poles, trees, etc.), which are in close proximity to the proposed shelter.
- An Encroachment Agreement form 16.1A shall be required. Encroachment agreements for the bus shelters can only be approved for municipalities or other government agencies.
- No commercial advertising is allowed on bus shelters within NCDOT right-of-way.
- NCDOT has the right to remove a shelter found to be a hazard to the traveling public.

GoTriangle Real Estate Acquisition Process

Generally, GoTriangle seeks to work within the existing right of way. However, in some cases it is not physically possible to fit needed stop elements without acquiring additional property. In those cases, GoTriangle works through a set process as follows.

Initiation of Project

GoTriangle's real estate team will conduct early property coordination and work with the design engineer to develop approved right-of-way plans. GoTriangle will use the approved design plans to acquire the right-of-way for the bus stop improvements. Depending on site conditions, GoTriangle will typically need to acquire between 50 and 500 square feet of transit and temporary construction easements per bus stop.

Working with Property Owners

A GoTriangle agent will contact affected property owners to explain the impacts of the improvements. Before the initiation of negotiations, the property interest to be acquired will be appraised, unless the owner is donating the property and releases GoTriangle from the appraisal obligation, or GoTriangle determines that an appraisal is unnecessary because the valuation is uncomplicated and the fair market value is estimated at $10,000 or less, based on a review of available data.

If an appraisal is required, the appraisal and an appraisal review will be conducted consistent with 49 CFR Part 24 (the Uniform Act). There will be no residential displacements or business relocations resulting from the improvements.

Negotiation Process

After a determination of just compensation, GoTriangle's agent will begin negotiations with the property owner:

- A minimum of three attempts to settle with each property owner will be made.
- GoTriangle's agent will keep a detailed negotiation diary and all other information regarding the attempted settlement.
- GoTriangle will give the property owner 60 days to either accept its offer or present a counteroffer.
- Once a signed Offer to Purchase is secured, the agent will deliver the original documents to GoTriangle to review and process payment.
- In the event a property owner refuses to settle or negotiations reach an impasse, the property acquisition will be referred to the municipality in which the stop is planned in the case it is decided to use eminent domain powers for the acquisition needed for the improvement.

Standard Design Details

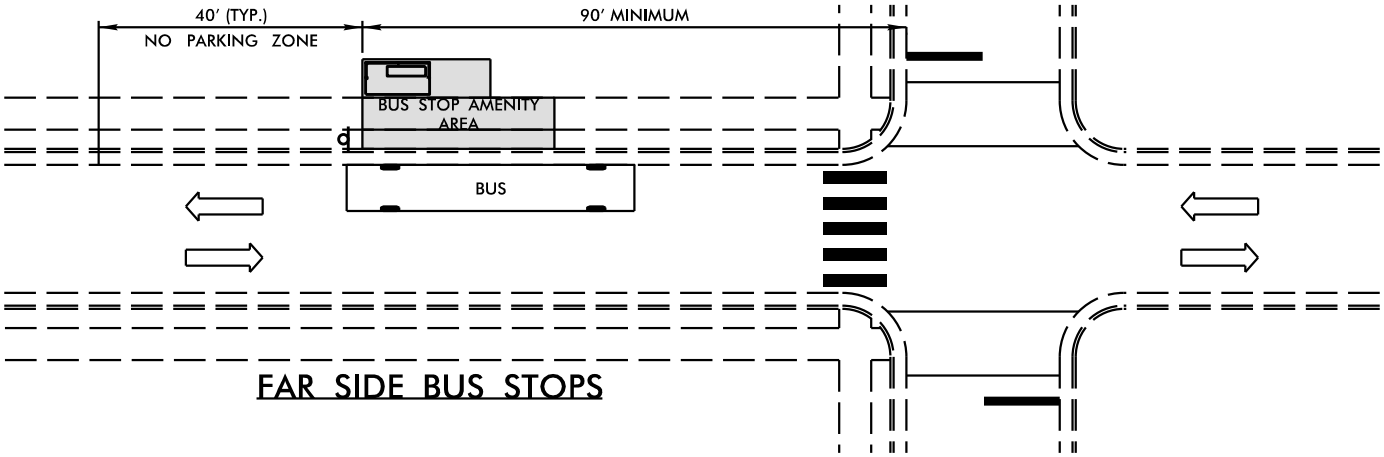
In order to establish standardized designs for various stop improvements, GoTriangle has developed a set of standard design details. These include specific diagrams that address overall stop and bus bay design and for the location and type of improvements such as benches, shelters, bicycle racks, and handrails.

These ensure a standard, recognizable design for transit facilities, reduce design costs for each stop, and provide information for stops developed by other entities, such as private developers.

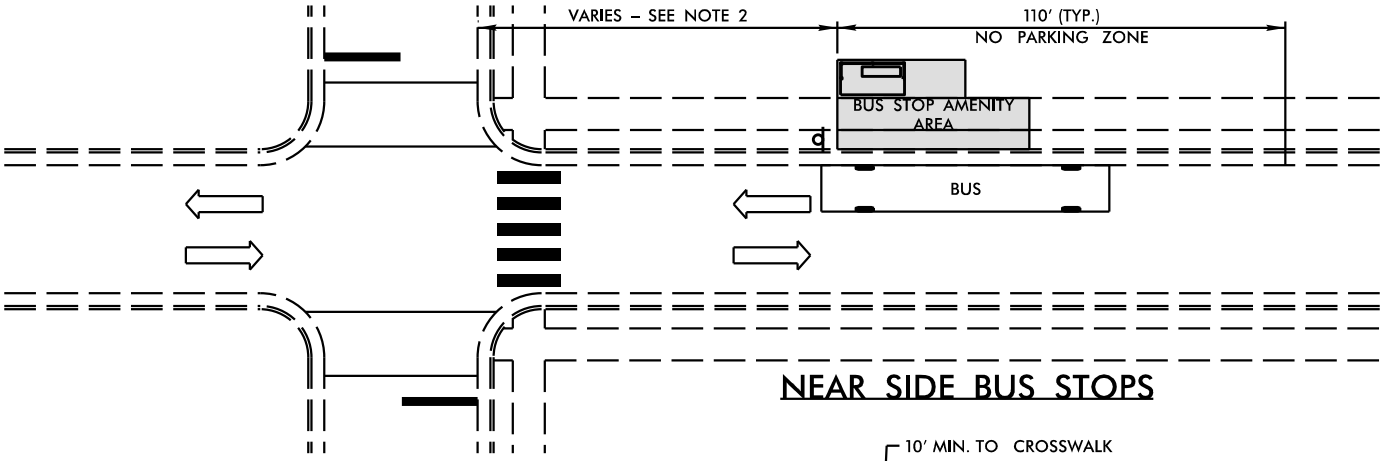
The full set of details are found on the following pages.

TRANSIT STANDARD DETAILS

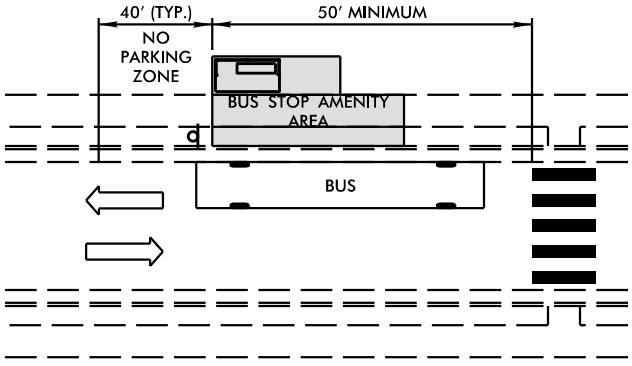
INDEX OF SHEETS



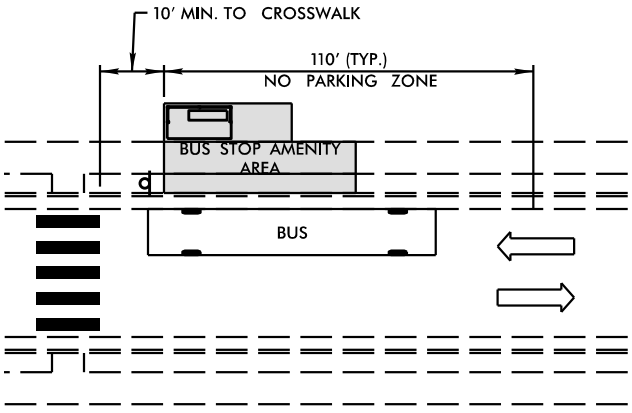
FAR SIDE BUS STOPS



NEAR SIDE BUS STOPS



MID BLOCK BUS STOP
(CROSSING BEHIND BUS)



MID BLOCK BUS STOP
(CROSSING IN FRONT OF BUS)

NOTES:

1. BUS STOP LOCATIONS ARE TO BE COORDINATED WITH GOTRIANGLE TO ENSURE SUFFICIENT OPERATION OF BUSES.
2. NEAR SIDE BUS STOPS ARE TO BE LOCATED OUTSIDE ANY TURN LANES AND TURN LANE TAPERS UNLESS OTHERWISE APPROVED BY GOTRIANGLE. IF NO TURN LANES ARE IMPACTED, THE BUS STOP IS TO BE LOCATED A MINIMUM 100' FROM THE NEAREST EDGE OF TRAVEL OF THE INTERSECTING ROAD.
3. BUS STOPS LOCATED ON NEAR SIDE OF SIGNALIZED INTERSECTIONS SHOULD BE EVALUATED FOR SIGNAL PRIORITY AND/OR QUEUE JUMPS.
4. FAR SIDE BUS STOPS ARE PREFERRED IN MOST CIRCUMSTANCES TO REDUCE IMPACTS TO SIGNALIZED INTERSECTIONS AND MINIMIZE SIGHT LINE CONFLICTS FOR THE INTERSECTION.
5. ALL STOP LOCATIONS SHOULD BE EVALUATED FOR ANY SIGHT LINE OBSTRUCTIONS AND DESIGNED TO PROVIDE STOPPING SIGHT DISTANCE LINES FROM THE BUS TO PASSENGERS AT THE BUS STOP.
6. BUS BAYS MAY BE REQUIRED AT SPECIFIC LOCATIONS TO BE DETERMINED BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT, AS APPLICABLE. SEE DETAIL BUS–01.20 FOR TYPICAL BUS BAY LAYOUTS.
7. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.

REV. DATE 10–14–2024

NOT TO SCALE

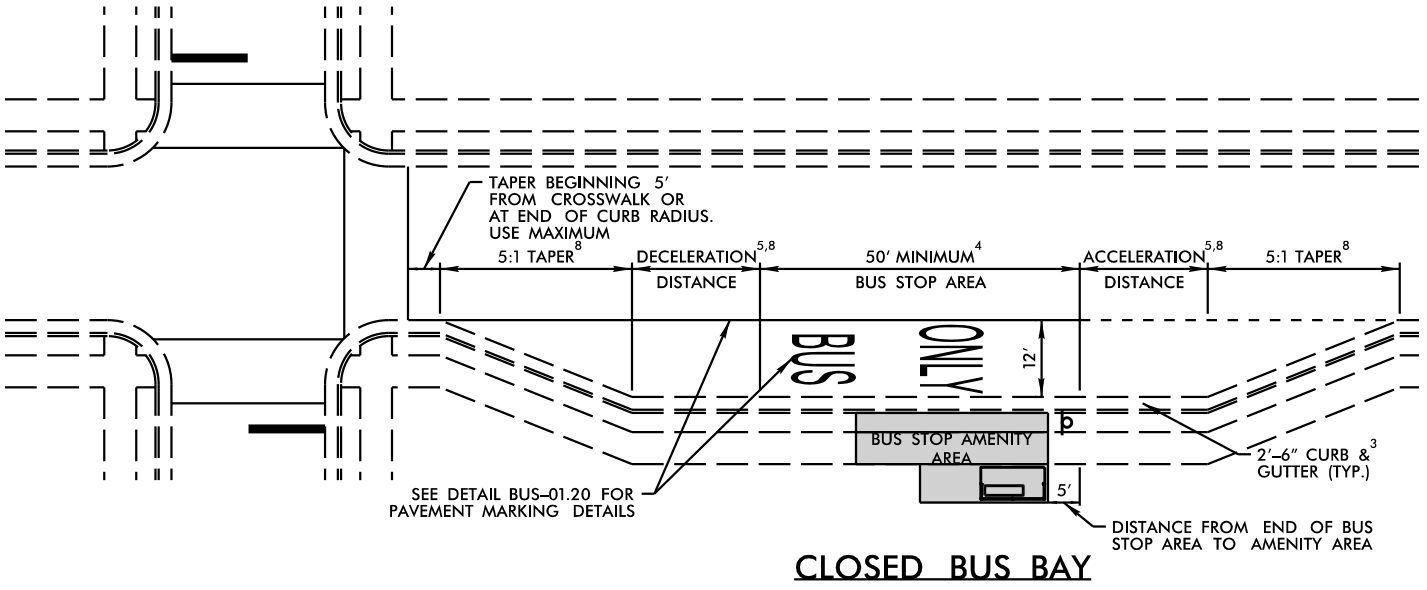
GO Triangle

TYPICAL BUS STOP LOCATIONS

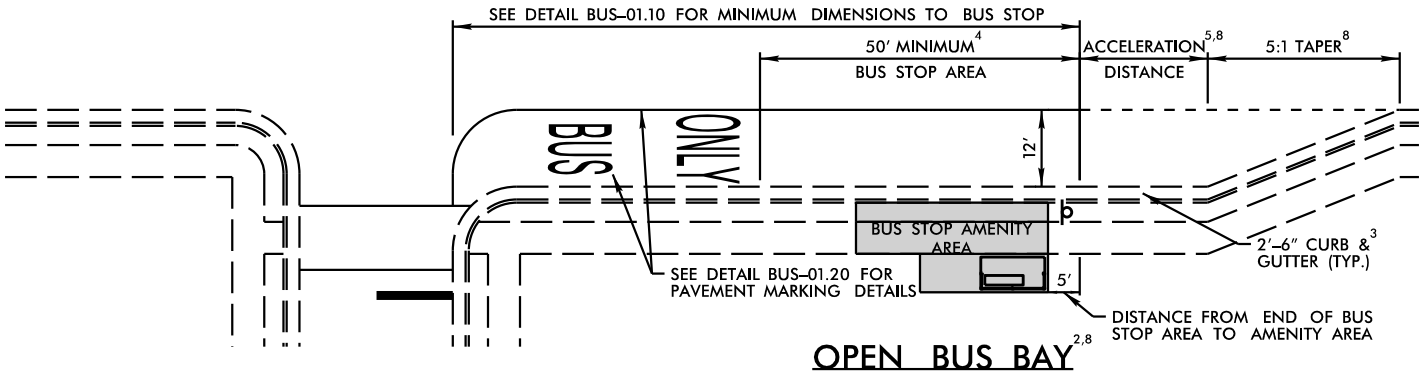
DETAIL # BUS–01.10

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP



CLOSED BUS BAY



OPEN BUS BAY[2,8]

NOTES:

1. BUS STOP LOCATIONS ARE TO BE COORDINATED WITH GOTRIANGLE TO ENSURE SUFFICIENT OPERATION OF BUSES.
2. OPEN BUS BAYS ARE NOT RECOMMENDED AT LOCATIONS WHERE A PEDESTRIAN CROSSING WOULD CROSS THE BUS BAY.
3. BUS BAYS WITH NO CURB & GUTTER WILL BE CONSIDERED ON A CASE–BY–CASE BASIS.
4. 50' MINIMUM STOPPING AREA IS REQUIRED FOR ALL BUS BAYS. WHERE MORE THAN 1 BUS IS ANTICIPATED TO STOP IN THE BAY WITHIN THE SAME TIME FRAME, AN ADDITIONAL 50' WILL BE REQUIRED FOR EACH ADDITIONAL BUS. STOPS USED BY ARTICULATED BUSES WILL REQUIRE ADDITIONAL LENGTH. STOPS IDENTIFIED AS "TIME POINTS" FOR BUS OPERATIONS MAY REQUIRE ADDITIONAL LENGTH OR OTHER DESIGN CONSIDERATIONS.
5. TRAFFIC AND SITE CONDITIONS AT EACH LOCATION ARE TO BE EVALUATED TO DETERMINE APPROPRIATE ACCELERATION/DECELERATION DISTANCES TO ENSURE BUS OPERATIONS ARE NOT IMPEDED BY ADJACENT TRAFFIC.
6. FAR SIDE BUS BAYS ARE PREFERRED IN MOST CIRCUMSTANCES.
7. NEAR SIDE OPEN BUS BAYS WILL NOT BE PERMITTED UNLESS ABLE TO UTILIZE A SIGNALIZED QUEUE JUMP. QUEUE JUMPS MAY BE CONSIDERED ON A CASE–BY–CASE BASIS WITH APPROVAL FROM GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
8. REFER TO AASHTO'S 'GUIDE FOR GEOMETRIC DESIGN OF TRANSIT FACILITIES ON HIGHWAYS AND STREETS' FOR ADDITIONAL GUIDANCE.
9. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.
10. THE USE OF RED BUS LANE MARKINGS IS TO BE COORDINATED WITH LOCAL REVIEW AGENCIES AND NCDOT AS APPLICABLE.

REV. DATE 10–14–2024

NOT TO SCALE

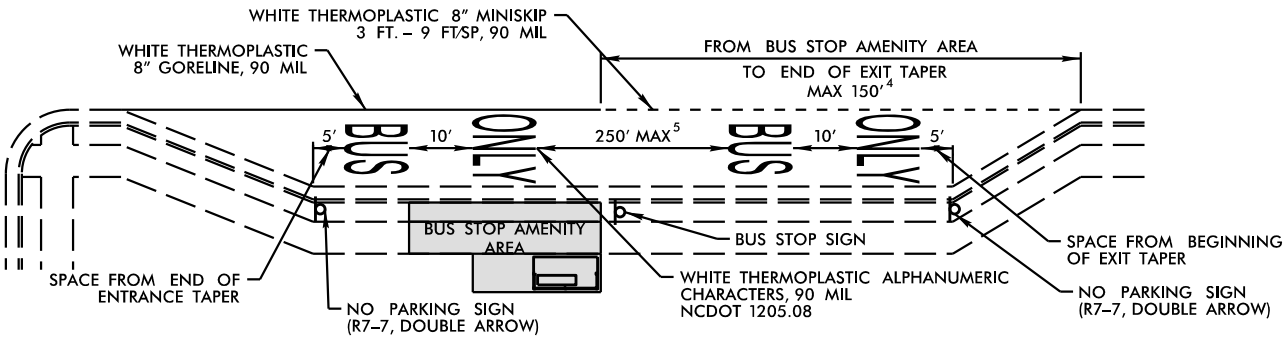
GO Triangle

BUS STOP LAYOUT – TYPICAL BUS BAYS

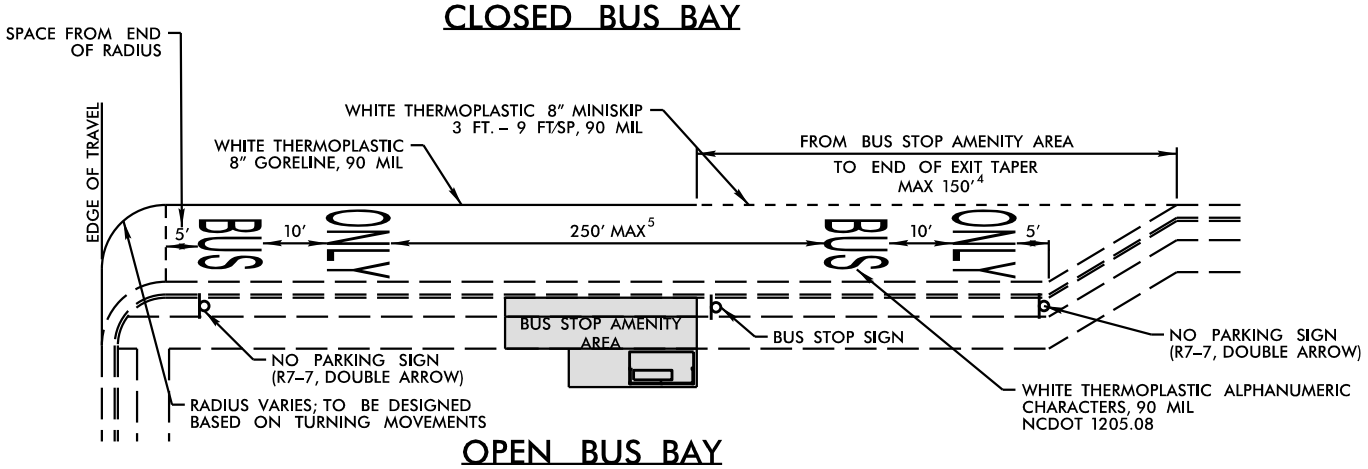
DETAIL # BUS–01.20

SHEET # 1 OF 2

DETAILS PROVIDED BY DRMP



CLOSED BUS BAY



OPEN BUS BAY

NOTES:

1. SEE DETAIL BUS–01.20 FOR TYPICAL BUS BAY LAYOUTS, DIMENSIONS, AND NOTES.
2. ALL PAVEMENT MARKING & SIGNAGE ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. REQUIRED PAVEMENT MARKINGS MAY VARY BASED ON BUS STOP CONDITIONS AND TRAFFIC OPERATIONS. ALL PAVEMENT MARKING & SIGNAGE IS TO BE APPROVED BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
4. MINISKIP LINES ARE NOT TO EXTEND FURTHER THAN BUS STOP AMENITY PAD OR 150', WHICHEVER IS SHORTER.
5. REPEAT 'BUS ONLY' MARKINGS IF FULL WIDTH BUS BAY IS 150' LONG OR GREATER. MAXIMUM SPACING BETWEEN REPEATED MARKINGS SHALL BE 250'.
6. THE USE OF RED BUS LANE MARKINGS IS TO BE COORDINATED WITH LOCAL REVIEW AGENCIES AND NCDOT AS APPLICABLE.

REV. DATE 10–14–2024

NOT TO SCALE

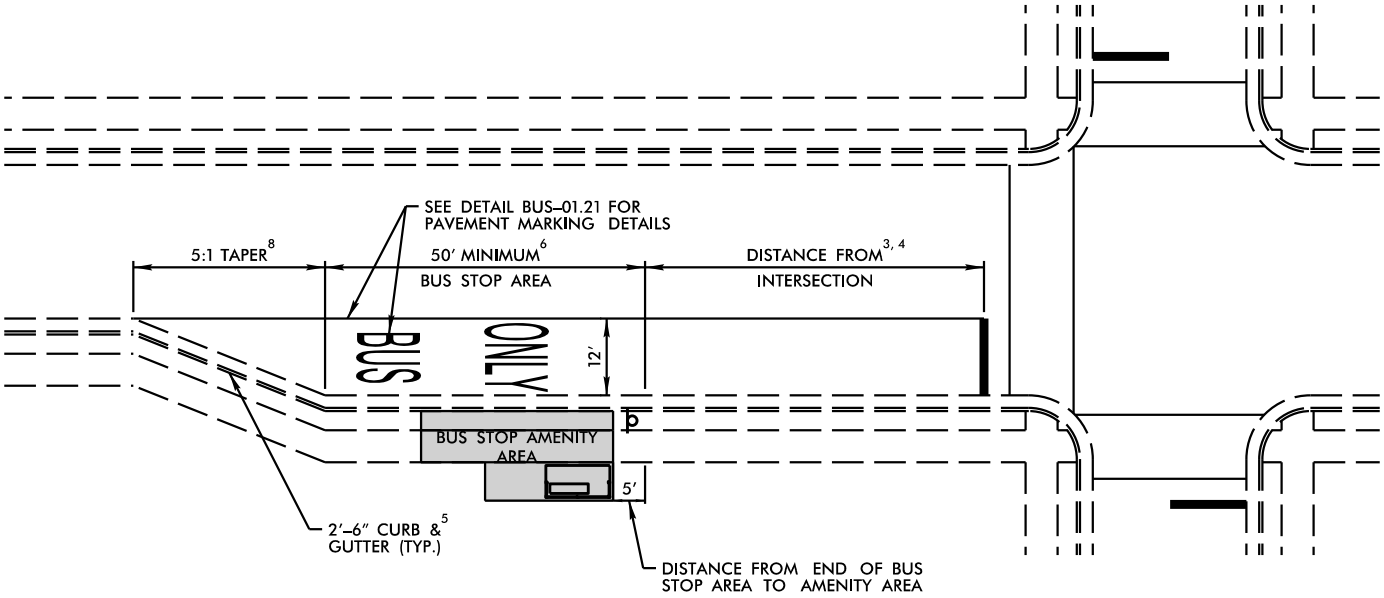
GO Triangle

BUS BAY PAVEMENT MARKINGS & SIGNAGE

DETAIL # BUS–01.20

SHEET # 2 OF 2

DETAILS PROVIDED BY DRMP



NEAR SIDE BUS BAY

NOTES:

1. BUS STOP LOCATIONS ARE TO BE COORDINATED WITH GOTRIANGLE TO ENSURE SUFFICIENT OPERATION OF BUSES.
2. NEAR SIDE OPEN BUS BAYS WILL NOT BE PERMITTED UNLESS ABLE TO UTILIZE A SIGNALIZED QUEUE JUMP. QUEUE JUMPS MAY BE CONSIDERED ON A CASE–BY–CASE BASIS WITH APPROVAL FROM GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
3. TRAFFIC AND SITE CONDITIONS AT EACH LOCATION ARE TO BE EVALUATED TO DETERMINE APPROPRIATE LAYOUT OF QUEUE JUMP. TRAFFIC STUDIES SHOULD BE PERFORMED TO DETERMINE APPROPRIATE VEHICLE MOVEMENTS. QUEUE JUMP LAYOUT CAN VARY BASED ON INTERSECTION TYPE AND VEHICLE MOVEMENTS REFER TO NACTO'S 'TRANSIT STREET DESIGN GUIDE' FOR ADDITIONAL GUIDANCE ON QUEUE JUMP LAYOUTS.
4. COORDINATE WITH SIGNAL DESIGNER WHEN DETERMINING DESIRED DISTANCE FROM INTERSECTION TO LOCATE THE BUS STOP AREA TO ENSURE QUEUE JUMP DETECTION CAN BE INSTALLED.
5. BUS BAYS WITH NO CURB & GUTTER WILL BE CONSIDERED ON A CASE–BY–CASE BASIS.
6. 50′ MINIMUM STOPPING AREA IS REQUIRED FOR ALL BUS BAYS. WHERE MORE THAN 1 BUS IS ANTICIPATED TO STOP IN THE BAY WITHIN THE SAME TIME FRAME, AN ADDITIONAL 50′ WILL BE REQUIRED FOR EACH ADDITIONAL BUS. STOPS USED BY ARTICULATED BUSES WILL REQUIRE ADDITIONAL LENGTH. STOPS IDENTIFIED AS "TIME POINTS" FOR BUS OPERATIONS MAY REQUIRE ADDITIONAL LENGTH OR OTHER DESIGN CONSIDERATIONS.
7. TRAFFIC AND SITE CONDITIONS AT EACH LOCATION ARE TO BE EVALUATED TO DETERMINE APPROPRIATE ACCELERATION/DECELERATION DISTANCES TO ENSURE BUS OPERATIONS ARE NOT IMPEDED BY ADJACENT TRAFFIC.
8. REFER TO AASHTO'S 'GUIDE FOR GEOMETRIC DESIGN OF TRANSIT FACILITIES ON HIGHWAYS AND STREETS' FOR ADDITIONAL GUIDANCE.
9. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.
10. THE USE OF RED BUS LANE MARKINGS IS TO BE COORDINATED WITH LOCAL REVIEW AGENCIES AND NCDOT AS APPLICABLE.

REV. DATE 10–14–2024

NOT TO SCALE

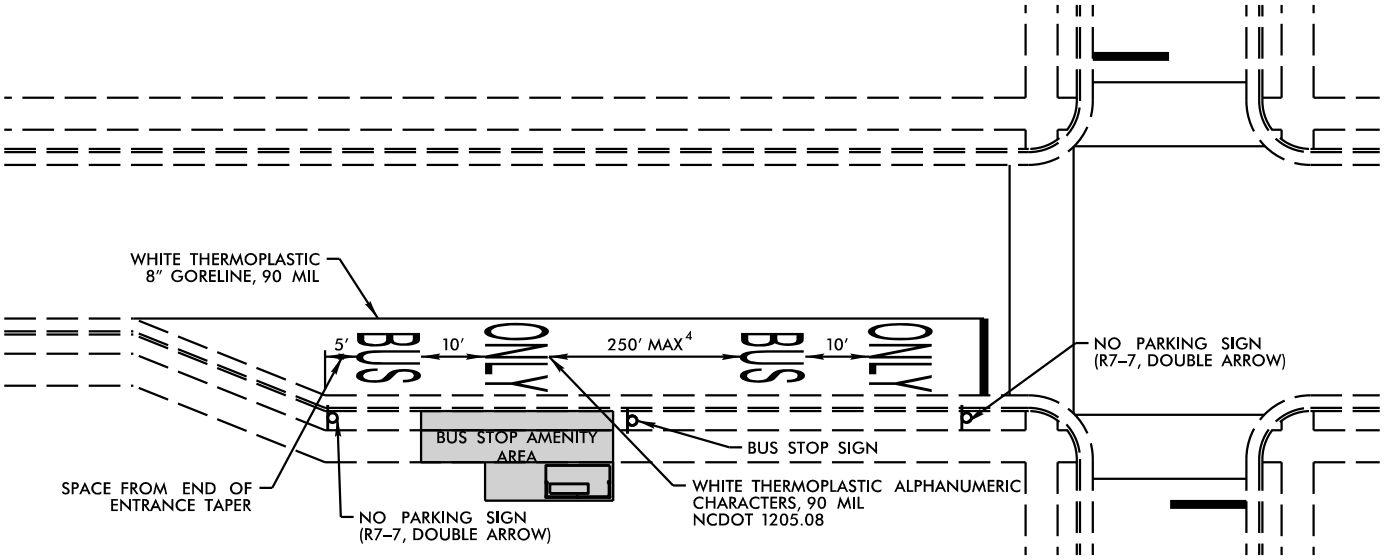
GO Triangle

BUS STOP LAYOUT – TYPICAL NEAR SIDE BUS BAY

DETAIL # BUS–01.21

SHEET # 1 OF 2

DETAILS PROVIDED BY DRMP



NEAR SIDE BUS BAY

NOTES:

1. SEE DETAIL BUS-01.21 FOR TYPICAL NEAR SIDE BUS BAY LAYOUTS, DIMENSIONS, AND NOTES.
2. ALL PAVEMENT MARKING & SIGNAGE ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. REQUIRED PAVEMENT MARKINGS MAY VARY BASED ON BUS STOP CONDITIONS AND TRAFFIC OPERATIONS. ALL PAVEMENT MARKING & SIGNAGE IS TO BE APPROVED BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
4. REPEAT 'BUS ONLY' MARKINGS IF FULL WIDTH BUS BAY IS 150' LONG OR GREATER. MAXIMUM SPACING BETWEEN REPEATED MARKINGS SHALL BE 250'.
5. THE USE OF RED BUS LANE MARKINGS IS TO BE COORDINATED WITH LOCAL REVIEW AGENCIES AND NCDOT AS APPLICABLE.

REV. DATE 10-14-2024

NOT TO SCALE

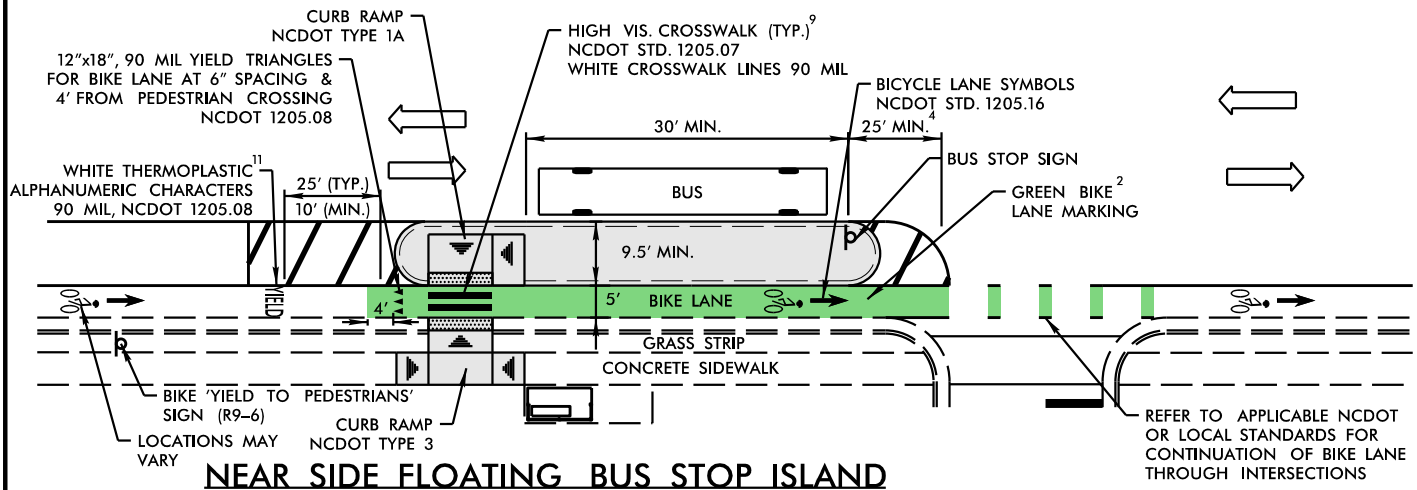
GO Triangle

NEAR SIDE BUS BAY PAVEMENT MARKINGS & SIGNAGE

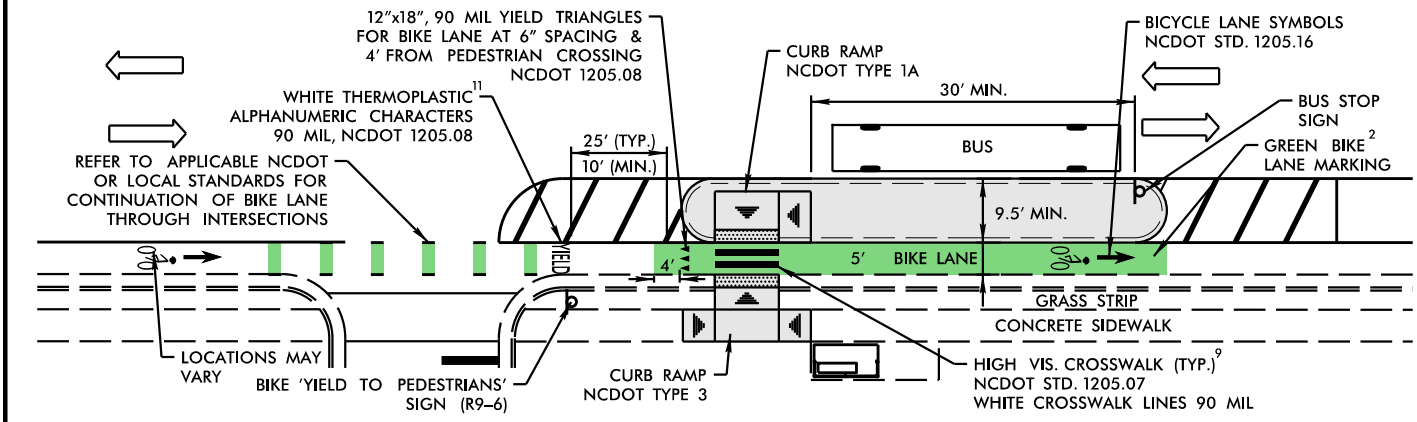
DETAIL # BUS-01.21

SHEET # 2 OF 2

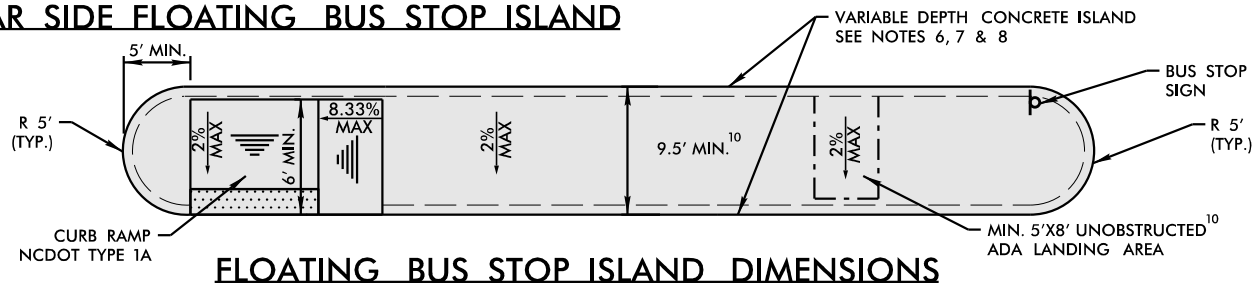
DETAILS PROVIDED BY DRMP



NEAR SIDE FLOATING BUS STOP ISLAND



FAR SIDE FLOATING BUS STOP ISLAND



FLOATING BUS STOP ISLAND DIMENSIONS

NOTES:

1. SEE BUS-01.10 FOR GUIDANCE FOR TYPICAL BUS STOP LOCATIONS.
2. ALL PAVEMENT MARKING & SIGNAGE ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). GREEN PAVEMENT MARKING SHALL MEET REQUIREMENTS ESTABLISHED IN MUTCD IA-14 DATED APRIL 15, 2011 AND ANY FURTHER AMENDMENTS ISSUED AS PART OF THE INTERIM APPROVAL. COORDINATE GREEN PAVEMENT MARKING TYPE WITH GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
3. ALL STOP LOCATIONS SHOULD BE EVALUATED FOR ANY SIGHT LINE OBSTRUCTIONS AND DESIGNED TO PROVIDE STOPPING SIGHT DISTANCE LINES FROM THE BUS TO PASSENGERS AT THE BUS STOP AND FROM ADJACENT TRAFFIC TO CYCLIST TRAFFIC.
4. BOARDING PLATFORMS SHOULD BE TERMINATED AT LEAST 25' FROM INTERSECTION. DISTANCES AND SHAPE OF ISLAND MAY VARY TO ENSURE BICYCLISTS ARE WELL POSITIONED IN VIEW OF TURNING VEHICLES AND ALLOW TYPICAL VEHICLES TO TURN WITHOUT CONFLICTING WITH THE CONCRETE ISLAND.
5. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919-485-7557 TO SCHEDULE A REVIEW.
6. ALL AMENITIES ARE TO MEET CLEARZONE AND BREAKAWAY REQUIREMENTS. SHELTERS AND OTHER AMENITIES WITHIN THE FLOATING BUS STOP ISLAND MAY BE CONSIDERED ON A CASE-BY-CASE BASIS BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
7. CONCRETE ISLAND SHOULD BE INSTALLED ON EXISTING ASPHALT VIA TYPICAL NCDOT METHODS OR BY REMOVING EXISTING PAVEMENT AND INSTALLING A NEW PAVEMENT SECTION FOR APPROVAL BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE. MINIMUM OF 5" THICK CONCRETE SECTION REQUIRED.
8. EDGES OF CONCRETE ISLAND SHOULD MATCH NCDOT 852.01 ISLAND SHAPE WHEN ADJACENT TO VEHICLE LANES. OTHER EDGE SHAPES MAY VARY.
9. MINIMUM WIDTH OF CROSSWALK LINES IS 6'. IT IS RECOMMENDED FOR WIDTH OF CROSSWALK TO COVER EXTENTS OF CURB RAMPS. THICKNESS OF LINES MAY VARY TO ENSURE AT LEAST 2 LINES ARE PROVIDED WITH 2' BETWEEN THE LINE EDGES. MAXIMUM THICKNESS OF LINES IS 2'.
10. NARROWER ISLANDS MAY BE PERMITTED IF DIMENSIONS OF EDGE OF ISLAND ARE DETAILED TO PROVIDE THE MINIMUM UNOBSTRUCTED ADA LANDING AREA ON A SURFACE SLOPED 2% OR LESS.
11. SCALE ALPHANUMERIC CHARACTERS TO FIT WITHIN DESIGNATED LANE LINES.
12. DRAINAGE CONSIDERATIONS AND GUTTER SPREAD CALCULATIONS TO BE DETERMINED BY ENGINEER AND APPROVED BY LOCAL REVIEW AGENCIES AND NCDOT AS APPLICABLE.

REV. DATE 10-14-2024

NOT TO SCALE

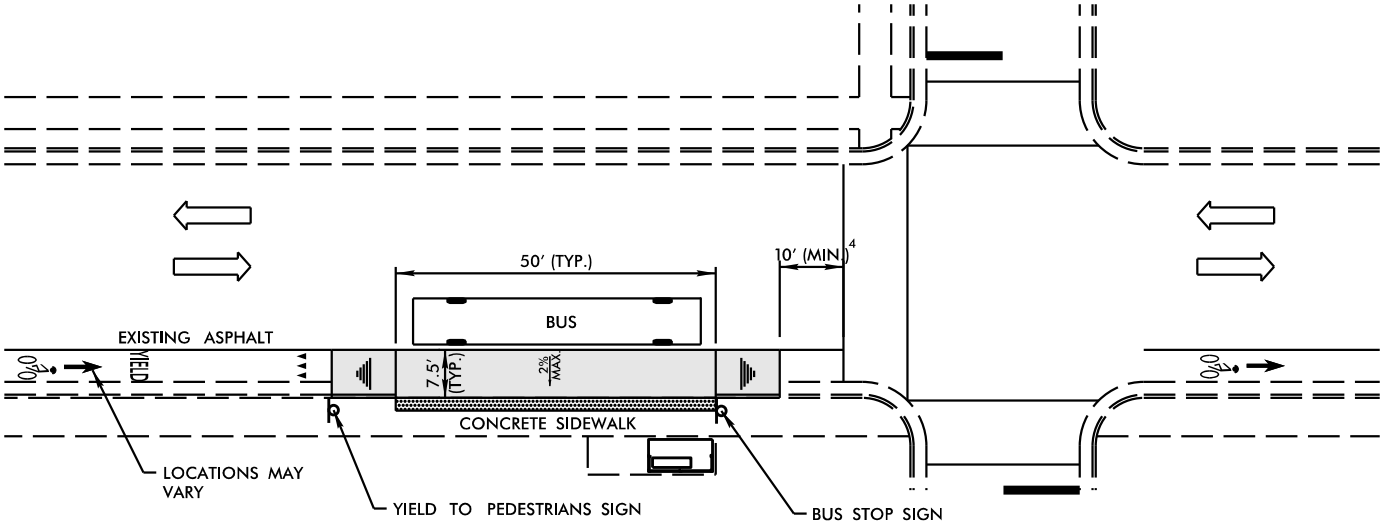
GO Triangle

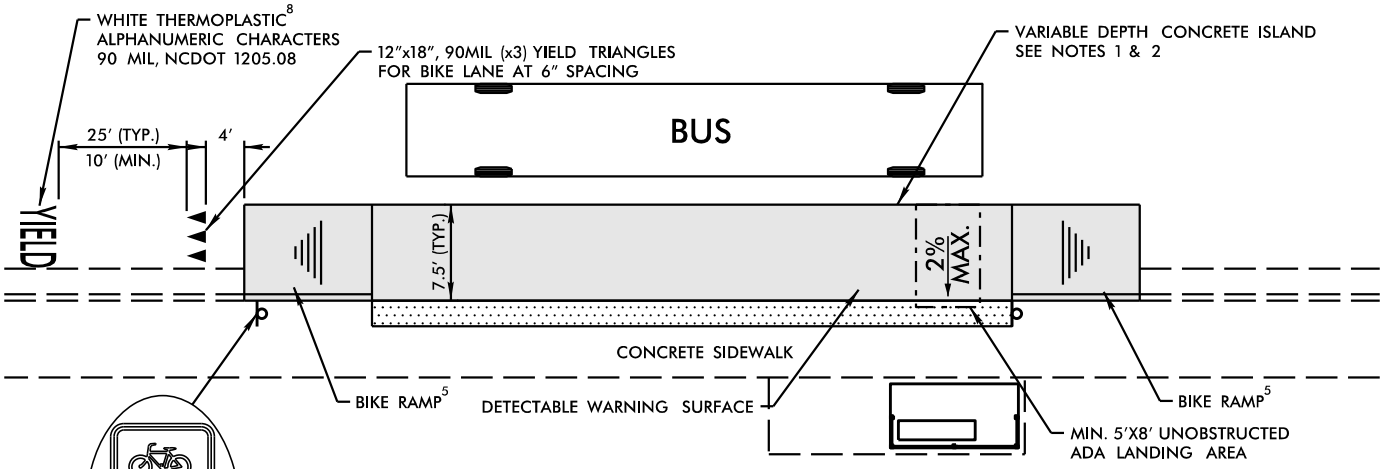
BUS STOP LAYOUT – TYP. FLOATING BUS STOP ISLAND

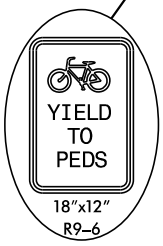
DETAIL # BUS-01.30

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP







SHARED CYCLE TRACK BUS STOP

NOTES:

1. CONCRETE ISLAND SHOULD BE INSTALLED ON EXISTING ASPHALT VIA TYPICAL NCDOT METHODS OR BY REMOVING EXISTING PAVEMENT AND INSTALLING A NEW PAVEMENT SECTION FOR APPROVAL BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE. MINIMUM OF 5″ THICK CONCRETE SECTION REQUIRED.
2. EDGES OF CONCRETE ISLAND SHOULD MATCH NCDOT 852.01 ISLAND SHAPE WHEN ADJACENT TO VEHICLE LANES. OTHER EDGE SHAPES MAY VARY.
3. ALL PAVEMENT MARKING & SIGNAGE ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). GREEN PAVEMENT MARKING SHALL MEET REQUIREMENTS ESTABLISHED IN MUTCD IA–14 DATED APRIL 15, 2011 AND ANY FURTHER AMENDMENTS ISSUED AS PART OF THE INTERIM APPROVAL. COORDINATE GREEN PAVEMENT MARKING TYPE WITH GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
4. BOARDING PLATFORMS AND RAMPS SHOULD BE TERMINATED AT LEAST 10′ FROM INTERSECTION. DISTANCE MAY VARY TO ENSURE BICYCLISTS ARE WELL POSITIONED IN VIEW OF TURNING VEHICLES AND ALLOW TYPICAL VEHICLES TO TURN WITHOUT CONFLICTING WITH THE CONCRETE ISLAND.
5. SLOPE OF BIKE RAMP NOT TO EXCEED 10% UNLESS OTHERWISE APPROVED BY LOCAL REVIEW AGENCIES OR NCDOT AS APPLICABLE.
6. DRAINAGE CONSIDERATIONS AND GUTTER SPREAD CALCULATIONS ARE TO BE DETERMINED BY ENGINEER AND APPROVED BY THE LOCAL REVIEW AGENCIES AND NCDOT AS APPLICABLE.
7. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.
8. SCALE ALPHANUMERIC CHARACTERS TO FIT WITHIN DESIGNATED LANE LINES.

REV. DATE 10–14–2024

NOT TO SCALE

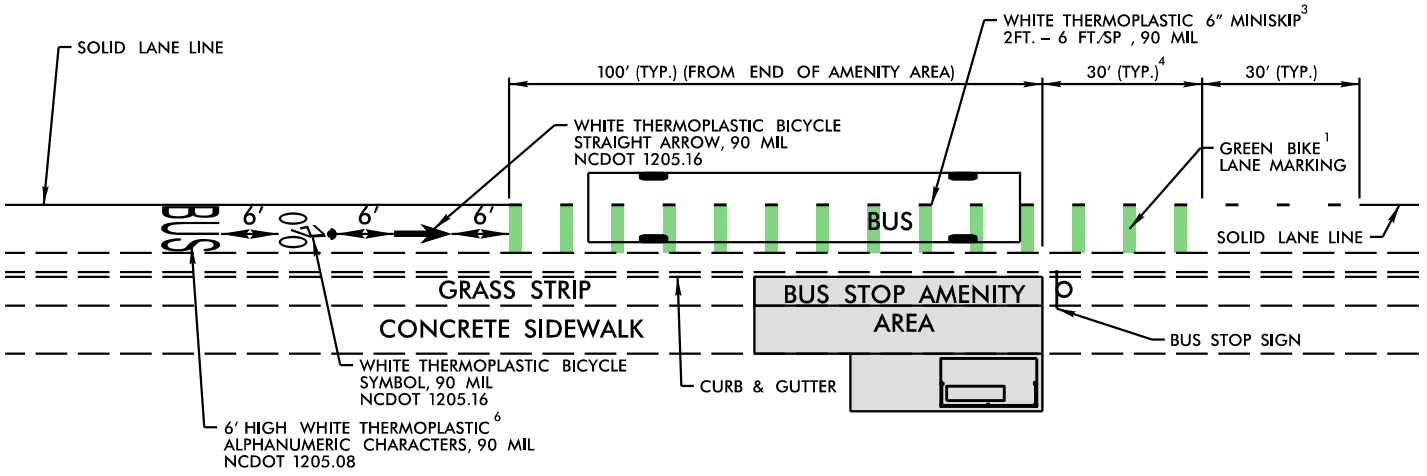
GO Triangle

BUS STOP LAYOUT – TYPICAL SHARED CYCLE TRACK

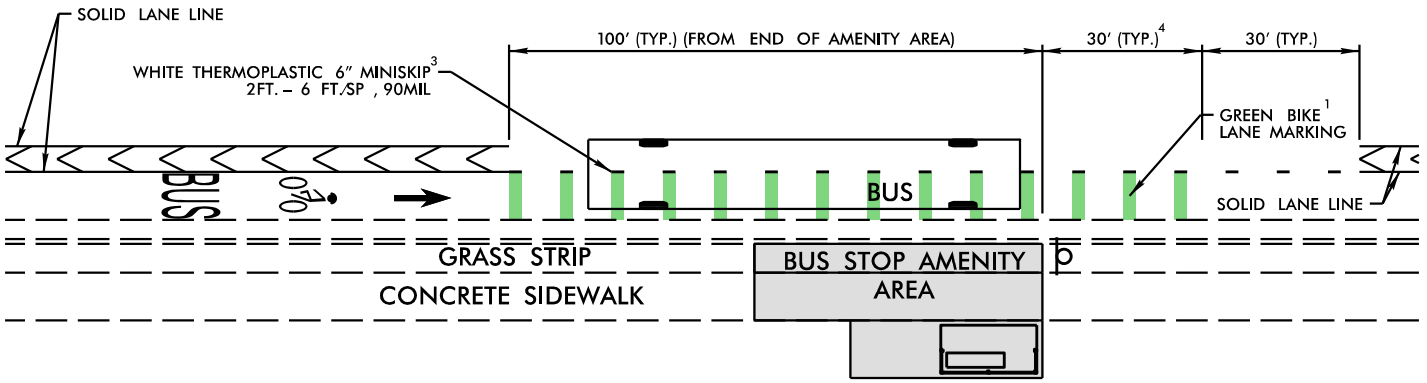
DETAIL # BUS–01.40

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP

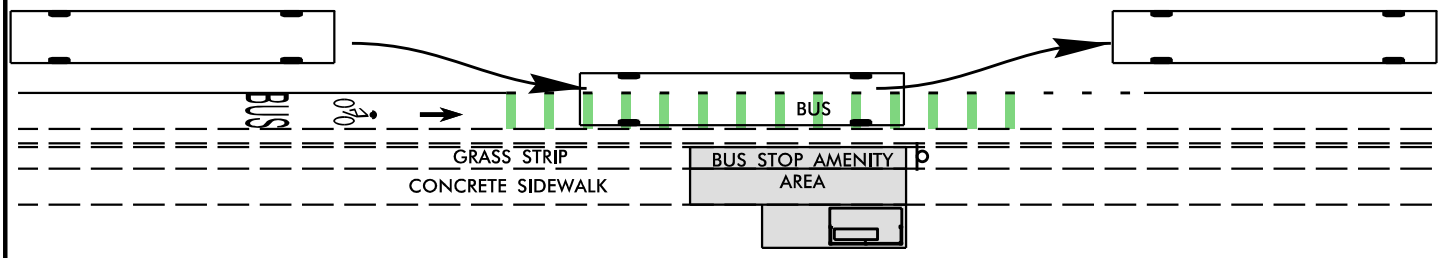


BUS STOP IN BIKE LANE PAVEMENT MARKING DETAIL (NO BUFFER)



BUS STOP IN BIKE LANE PAVEMENT MARKING DETAIL (WITH BUFFER)

SAME DIMENSIONS AS 'NO BUFFER'



BUS MANEUVER DETAIL

NOTES:

1. ALL PAVEMENT MARKING & SIGNAGE ARE TO BE IN ACCORDANCE WITH THE LATEST VERSION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). GREEN PAVEMENT MARKING SHALL MEET REQUIREMENTS ESTABLISHED IN MUTCD IA–14 DATED APRIL 15, 2011 AND ANY FURTHER AMENDMENTS ISSUED AS PART OF THE INTERIM APPROVAL. COORDINATE GREEN PAVEMENT MARKING TYPE WITH GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT AS APPLICABLE.
2. REQUIRED PAVEMENT MARKINGS MAY VARY BASED ON BUS STOP CONDITIONS AND TRAFFIC OPERATIONS. ALL PAVEMENT MARKING & SIGNAGE IS TO BE APPROVED BY GOTRIANGLE, LOCAL REVIEW AGENCIES, AND NCDOT, AS APPLICABLE.
3. IF BIKE LANE IS A BUFFERED BIKE LANE, BOTH LANE LINES ARE TO BE MINISKIP LINES FOR THE ENTIRE DURATION OF THE GREEN BIKE LANE MARKING, PLUS 30' (TYP.) BEYOND THE GREEN BIKE LANE MARKING.
4. IF BUS STOP IS LOCATED IN CLOSE PROXIMITY TO AN INTERSECTION, GREEN BIKE LANE MARKING IS TO EXTEND TO THE END OF THE INTERSECTION RADIUS. SEE LOCAL GUIDANCE FOR OTHER BIKE LANE PAVEMENT MARKING STANDARDS.
5. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.
6. SCALE ALPHANUMERIC CHARACTERS TO FIT WITHIN DESIGNATED LANE LINES.

REV. DATE 10–14–2024

NOT TO SCALE

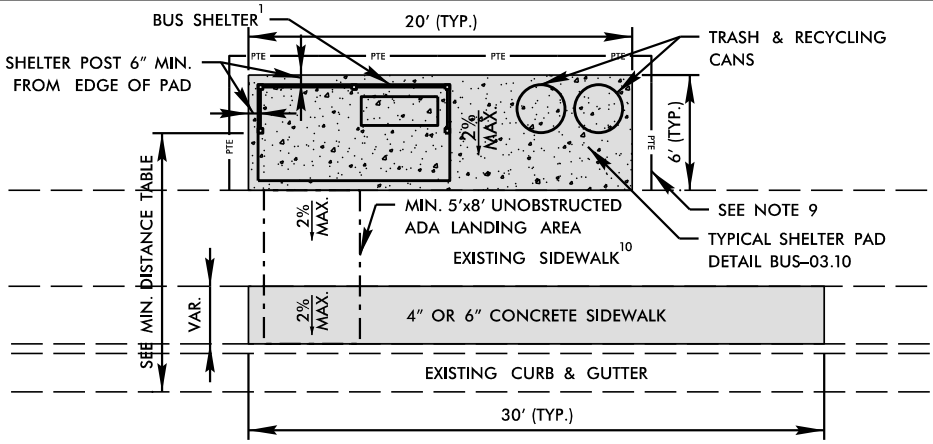
GO Triangle

BUS STOP IN BIKE LANE PAVEMENT MARKINGS AND SIGNAGE

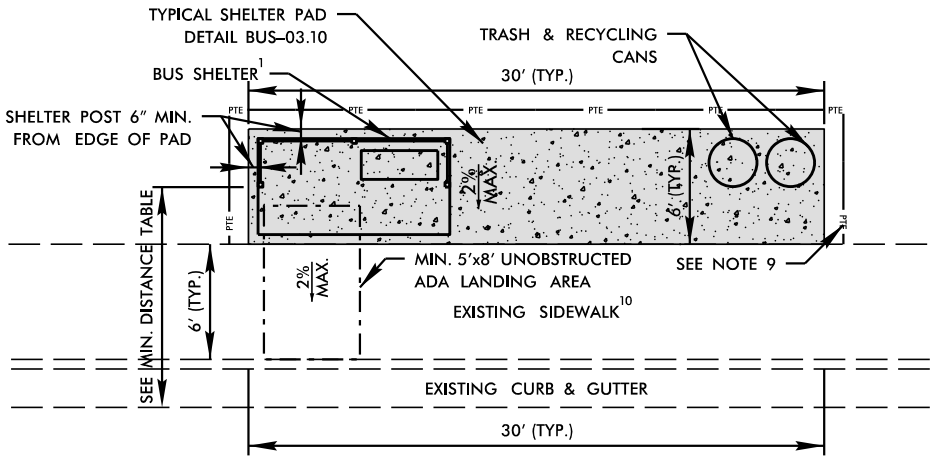
DETAIL # BUS–01.50

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP



SHELTER WITH SIDEWALK AND UTILITY STRIP



SHELTER WITH SIDEWALK AT BACK OF CURB

MINIMUM DISTANCES FROM[2] STRUCTURE ANCHOR TO EDGE OF PAVEMENT	
(BASED ON POSTED SPEED LIMIT)	
25 MPH	8'
35 MPH	10'
45 MPH	12'

COMMON BUS SHELTER MANUFACTURERS & MODELS

BRASCO ECLIPSE-ARCHED ROOF WITH (CANTILEVERED OR FULL) WALLS & WITH CLEAR POLYCARBONATE PANELS & (BLACK OR WHITE ALUMINUM) FINISH

BRASCO SLIMLINE-ARCHED ROOF WITH (CANTILEVERED OR FULL) WALLS & WITH CLEAR POLYCARBONATE PANELS & (BLACK OR WHITE ALUMINUM) FINISH

TOLAR EURO SERIES WITH (CANTILEVERED OR FULL) WALLS & WITH CLEAR POLYCARBONATE WALLS & (BLACK OR WHITE ALUMINUM) FINISH

COMMON AMENITIES TO[1] BE INCLUDED IN AMENITY AREA

- BUS SHELTER
- LEAN BAR IN SHELTER
- BUS SHELTER BENCH
- FREE STANDING BENCH
- SIMME-SEAT
- BIKE RACK
- POST MOUNTED SECURITY LIGHT SYSTEM
- REAL-TIME DISPLAY SIGNAGE
- SHELTER SOLAR LIGHTING
- TRASH & RECYCLING CANS
- ELECTRICAL CONNECTIONS FOR AMENITIES

BUS STOP SHELTER & AMENITY NOTES:

1. COORDINATE WITH GOTRIANGLE FOR AMENITIES REQUIRED AT EACH BUS STOP LOCATION. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919-485-7557 TO DETERMINE AMENITY MANUFACTURERS, MODELS, AND FINISH COLORS REQUIRED AT EACH LOCATION. SEE LISTS ON THIS SHEET FOR COMMON SHELTER MODELS AND MANUFACTURERS AND COMMON AMENITIES INCLUDED AT BUS STOP LOCATIONS.
2. MINIMUM DISTANCE REQUIREMENTS ARE BASED ON DISTANCES REFERENCED IN 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' DATED FEBRUARY 3, 2017 OR LATEST VERSION.
3. BUS STOP LOCATIONS WITH NO CURB & GUTTER REQUIRE PROPOSED SHELTERS TO BE LOCATED OUTSIDE THE CLEAR RECOVERY AREA AS DEFINED BY THE LATEST VERSION OF THE AASHTO ROADSIDE DESIGN GUIDE.
4. ANY CUSTOM AMENITIES PROPOSED WILL REQUIRE REVIEW AND APPROVAL BY GOTRIANGLE & LOCAL REVIEW AGENCIES, AS APPLICABLE. IF A CUSTOM SHELTER IS PROPOSED WITHIN NCDOT RIGHT-OF-WAY, THE SHELTER MUST BE ADDED TO NCDOT'S APPROVED PRODUCTS LIST PRIOR TO INSTALLATION.
5. ANY REQUIRED STRUCTURAL CALCULATIONS FOR CUSTOM SHELTERS ARE TO BE PROVIDED TO GOTRIANGLE PRIOR TO APPROVAL.
6. BUS SHELTERS SHALL BE LOCATED A MINIMUM OF 15' FROM FIRE HYDRANTS AND UTILITY POLES. ANY EXCEPTIONS ARE TO BE APPROVED BY GOTRIANGLE & LOCAL REVIEW AGENCIES, AS APPLICABLE.
7. BUS SHELTERS AT NEAR SIDE STOPS ARE TO BE LOCATED ON NEAREST SIDE OF AMENITY PAD TO ENSURE MAXIMUM SIGHT DISTANCES ARE MAINTAINED.
8. A MINIMUM 6' PEDESTRIAN PATH IS TO BE RETAINED BETWEEN THE BACK OF CURB AND ANY AMENITIES AT ALL LOCATIONS.

GENERAL BUS STOP IMPROVEMENTS NOTES:

9. A PERMANENT TRANSIT EASEMENT (PTE) OR PERMANENT PUBLIC RIGHT-OF-WAY IS TO BE PROVIDED FOR THE AMENITY AREA, IF LOCATED OUTSIDE OF EXISTING RIGHT-OF-WAY, AT A MINIMUM 1' OFFSET FROM THE AMENITY AREA. COORDINATE WITH GOTRIANGLE FOR ANY REQUIRED EASEMENT LANGUAGE.
10. ANY EXISTING SIDEWALK IN VICINITY IS TO BE EVALUATED FOR ADA COMPLIANCE. IF EXISTING SIDEWALK CROSS SLOPES EXCEED 2% OR HAS ABRUPT SURFACE TRANSITIONS THE SIDEWALK WILL BE REQUIRED TO BE REMOVED AND REPLACED AT A MAXIMUM CROSS SLOPE OF 2% TO PROVIDE AN ADA ACCESSBILE AREA FOR THE LENGTH OF THE BUS STOP AREA (30' TYP.)
11. A FLAT, CLEARED AREA OF A MINIMUM OF 1' IS TO BE PROVIDED AROUND THE AMENITY AREA FOR MAINTENANCE.
12. STORMWATER RUNOFF IS TO BE DIVERTED AWAY FROM THE AMENITY AREA.
13. REFER TO THE LATEST VERSION 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' FOR MORE INFORMATION. THE FEBRUARY 3, 2017 UPDATE CAN BE FOUND AT THE FOLLOWING WEB ADDRESS: https://connect.ncdot.gov/business/Transit/Documents/2017%20NCDOT%20Bus%20Shelter%20&%20Bus%20Stop%20Guidelines.pdf

REV. DATE 10-14-2024

NOT TO SCALE

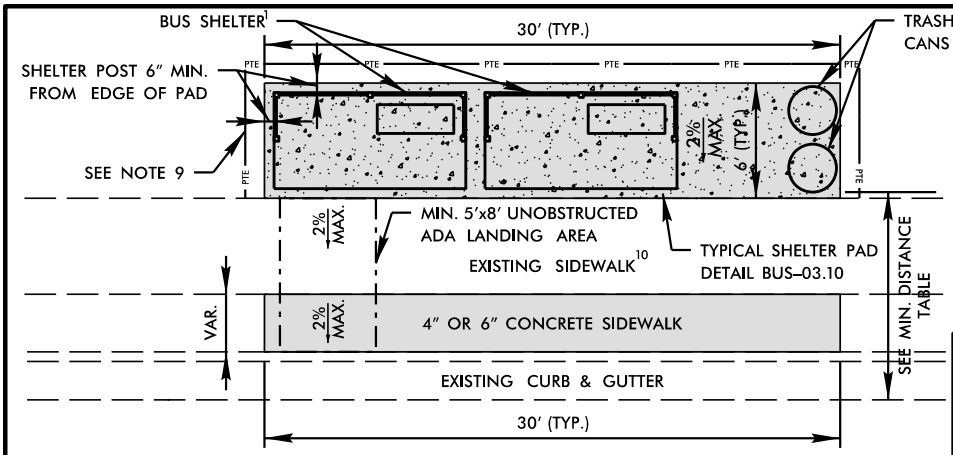
GO Triangle

BUS STOP AMENITY AREA – TYPICAL SHELTER LAYOUT

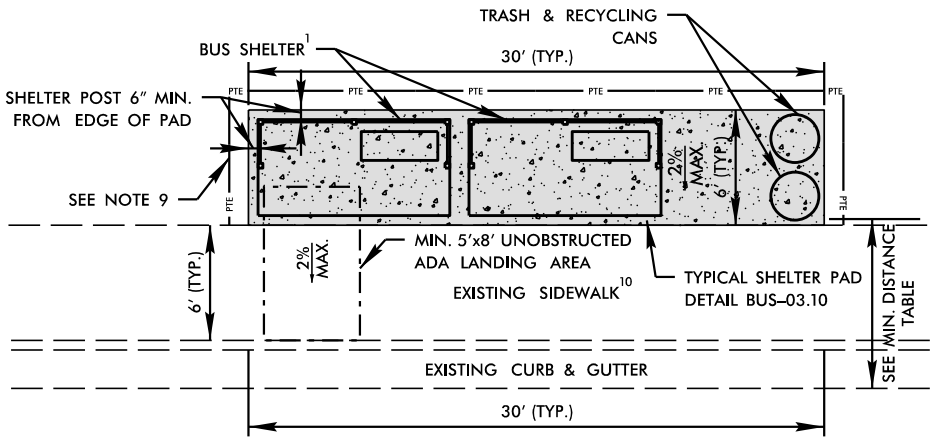
DETAIL # BUS-02.10

SHEET # 1 OF 3

DETAILS PROVIDED BY DRMP



SHELTER WITH SIDEWALK AND UTILITY STRIP



SHELTER WITH SIDEWALK AT BACK OF CURB

MINIMUM DISTANCES FROM[2] STRUCTURE ANCHOR TO EDGE OF PAVEMENT (BASED ON POSTED SPEED LIMIT)	
25 MPH	8'
35 MPH	10'
45 MPH	12'

COMMON BUS SHELTER MANUFACTURERS & MODELS

BRASCO ECLIPSE-ARCHED ROOF WITH (CANTILEVERED OR FULL) WALLS & WITH CLEAR POLYCARBONATE PANELS & (BLACK OR WHITE ALUMINUM) FINISH

BRASCO SLIMLINE-ARCHED ROOF WITH (CANTILEVERED OR FULL) WALLS & WITH CLEAR POLYCARBONATE PANELS & (BLACK OR WHITE ALUMINUM) FINISH

TOLAR EURO SERIES WITH (CANTILEVERED OR FULL) WALLS & WITH CLEAR POLYCARBONATE WALLS & (BLACK OR WHITE ALUMINUM) FINISH

COMMON AMENITIES TO BE INCLUDED IN AMENITY AREA[1]

- BUS SHELTERS
- LEAN BAR IN SHELTERS
- BUS SHELTER BENCHES
- FREE STANDING BENCHES
- SIMME-SEATS
- BIKE RACKS
- POST MOUNTED SECURITY LIGHT SYSTEM
- REAL-TIME DISPLAY SIGNAGE
- SHELTER SOLAR LIGHTING
- TRASH & RECYCLING CANS
- ELECTRICAL CONNECTIONS FOR AMENITIES

BUS STOP SHELTER & AMENITY NOTES:

1. COORDINATE WITH GOTRIANGLE FOR AMENITIES REQUIRED AT EACH BUS STOP LOCATION. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919-485-7557 TO DETERMINE AMENITY MANUFACTURERS, MODELS, AND FINISH COLORS REQUIRED AT EACH LOCATION. SEE LISTS ON THIS SHEET FOR COMMON SHELTER MODELS AND MANUFACTURERS AND COMMON AMENITIES INCLUDED AT BUS STOP LOCATIONS.
2. MINIMUM DISTANCE REQUIREMENTS ARE BASED ON DISTANCES REFERENCED IN 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' DATED FEBRUARY 3, 2017 OR LATEST VERSION.
3. BUS STOP LOCATIONS WITH NO CURB & GUTTER REQUIRE PROPOSED SHELTERS TO BE LOCATED OUTSIDE THE CLEAR RECOVERY AREA AS DEFINED BY THE LATEST VERSION OF THE AASHTO ROADSIDE DESIGN GUIDE.
4. ANY CUSTOM AMENITIES PROPOSED WILL REQUIRE REVIEW AND APPROVAL BY GOTRIANGLE & LOCAL REVIEW AGENCIES, AS APPLICABLE. IF A CUSTOM SHELTER IS PROPOSED WITHIN NCDOT RIGHT-OF-WAY, THE SHELTER MUST BE ADDED TO NCDOT'S APPROVED PRODUCTS LIST PRIOR TO INSTALLATION.
5. ANY REQUIRED STRUCTURAL CALCULATIONS FOR CUSTOM SHELTERS ARE TO BE PROVIDED TO GOTRIANGLE PRIOR TO APPROVAL.
6. BUS SHELTERS SHALL BE LOCATED A MINIMUM OF 15' FROM FIRE HYDRANTS AND UTILITY POLES. ANY EXCEPTIONS ARE TO BE APPROVED BY GOTRIANGLE & LOCAL REVIEW AGENCIES, AS APPLICABLE.
7. BUS SHELTERS AT NEAR SIDE STOPS ARE TO BE LOCATED ON NEAREST SIDE OF AMENITY PAD TO ENSURE MAXIMUM SIGHT DISTANCES ARE MAINTAINED.
8. A MINIMUM 6' PEDESTRIAN PATH IS TO BE RETAINED BETWEEN THE BACK OF CURB AND ANY AMENITIES AT ALL LOCATIONS.

GENERAL BUS STOP IMPROVEMENTS NOTES:

9. A PERMANENT TRANSIT EASEMENT (PTE) OR PERMANENT PUBLIC RIGHT-OF-WAY IS TO BE PROVIDED FOR THE AMENITY AREA, IF LOCATED OUTSIDE OF EXISTING RIGHT-OF-WAY, AT A MINIMUM 1' OFFSET FROM THE AMENITY AREA. COORDINATE WITH GOTRIANGLE FOR ANY REQUIRED EASEMENT LANGUAGE.
10. ANY EXISTING SIDEWALK IN VICINITY IS TO BE EVALUATED FOR ADA COMPLIANCE. IF EXISTING SIDEWALK CROSS SLOPES EXCEED 2% OR HAS ABRUPT SURFACE TRANSITIONS THE SIDEWALK WILL BE REQUIRED TO BE REMOVED AND REPLACED AT A MAXIMUM CROSS SLOPE OF 2% TO PROVIDE AN ADA ACCESSBILE AREA FOR THE LENGTH OF THE BUS STOP AREA (30' TYP.)
11. A FLAT, CLEARED AREA OF A MINIMUM OF 1' IS TO BE PROVIDED AROUND THE AMENITY AREA FOR MAINTENANCE.
12. STORMWATER RUNOFF IS TO BE DIVERTED AWAY FROM THE AMENITY AREA.
13. REFER TO THE LATEST VERSION 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' FOR MORE INFORMATION. THE FEBRUARY 3, 2017 UPDATE CAN BE FOUND AT THE FOLLOWING WEB ADDRESS: https://connect.ncdot.gov/business/Transit/Documents/2017%20NCDOT%20Bus%20Shelter%20&%20Bus%20Stop%20Guidelines.pdf

REV. DATE 10-14-2024

NOT TO SCALE

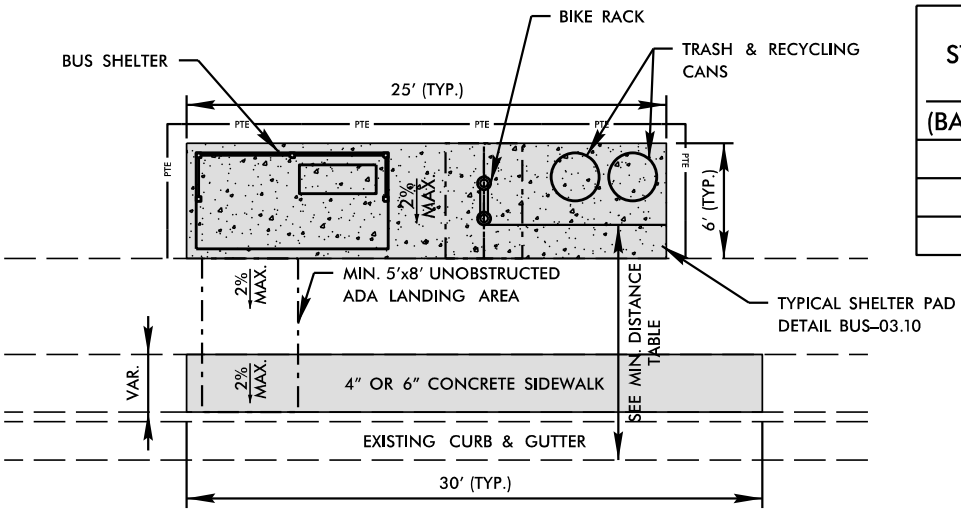
GO Triangle

BUS STOP AMENITY AREA – TYPICAL MULTI-SHELTER LAYOUT

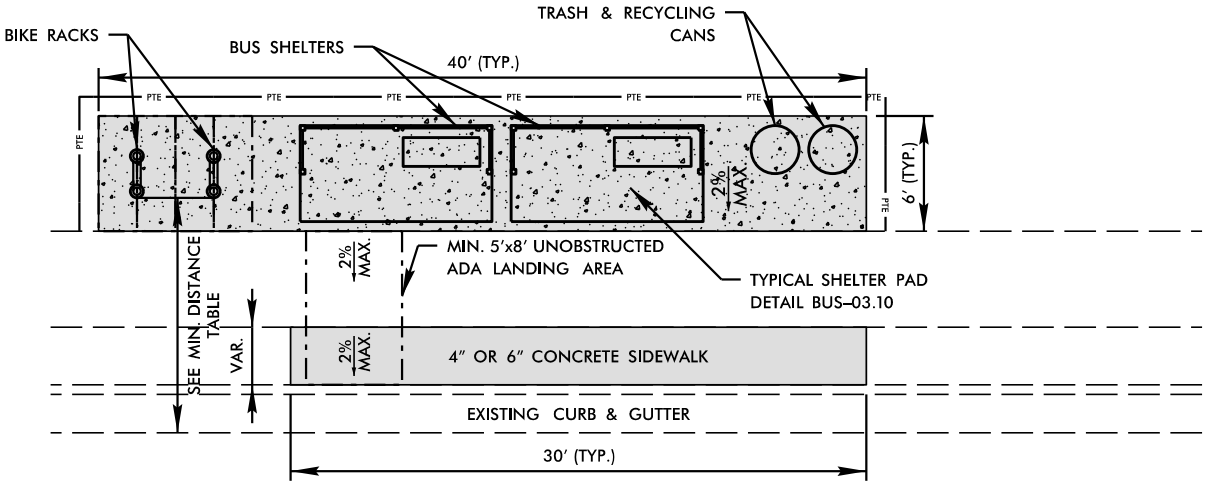
DETAIL # BUS-02.10

SHEET # 2 OF 3

DETAILS PROVIDED BY DRMP



SINGLE SHELTER BIKE RACK LAYOUT



MULTI–SHELTER BIKE RACK LAYOUT

MINIMUM DISTANCES FROM[2] STRUCTURE ANCHOR TO EDGE OF PAVEMENT	
(BASED ON POSTED SPEED LIMIT)	
25 MPH	8'
35 MPH	10'
45 MPH	12'

NOTES:
1. COORDINATE WITH GOTRIANGLE FOR AMENITIES REQUIRED AT EACH BUS STOP LOCATION. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO DETERMINE AMENITY MANUFACTURERS, MODELS, AND FINISH COLORS REQUIRED AT EACH LOCATION. SEE LISTS ON SHEET BUS–2.10 FOR COMMON SHELTER MODELS AND MANUFACTURERS AND COMMON AMENITIES INCLUDED AT BUS STOP LOCATIONS.
2. MINIMUM DISTANCE REQUIREMENTS ARE BASED ON DISTANCES REFERENCED IN 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' DATED FEBRUARY 3, 2017 OR LATEST VERSION.
3. SEE SHEET BUS–2.10 FOR GUIDANCE ON AMENITY LAYOUTS AND ADDITIONAL NOTES.
4. SEE SHEET BUS–4.10 FOR GUIDANCE ON BIKE RACK INSTALLATION AND SPACING.

REV. DATE 10–14–2024

NOT TO SCALE

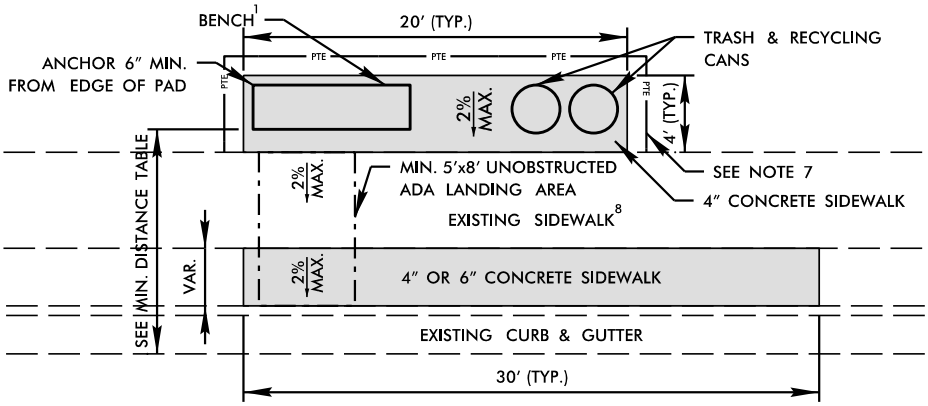
GO Triangle

BUS STOP AMENITY AREA – TYPICAL BIKE RACK LAYOUT

DETAIL # BUS–02.10

SHEET # 3 OF 3

DETAILS PROVIDED BY DRMP



BENCH WITH SIDEWALK AND UTILITY STRIP

MINIMUM DISTANCES FROM[2] STRUCTURE ANCHOR TO EDGE OF PAVEMENT	
(BASED ON POSTED SPEED LIMIT)	
25 MPH	8'
35 MPH	10'
45 MPH	12'

COMMON FREE-STANDING BENCH MANUFACTURERS & MODELS

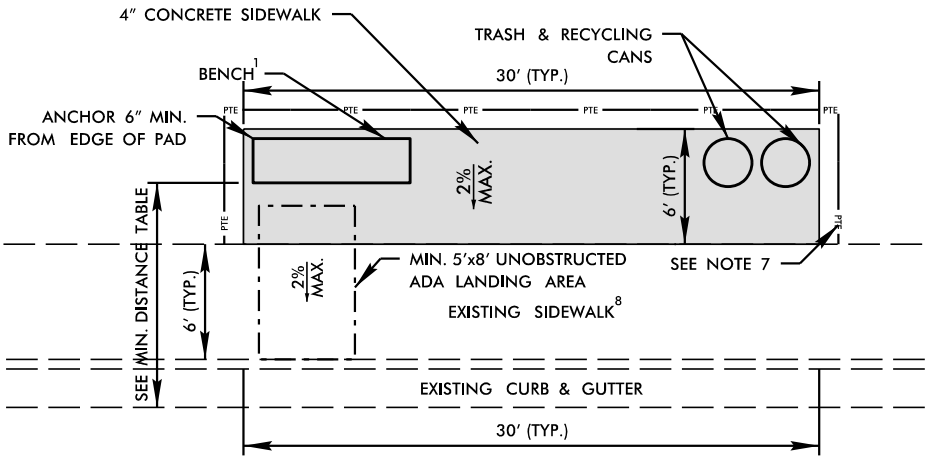
DUMOR 58 SERIES-3AR (6 FOOT)

DUMOR 92 SERIES (6 FOOT)

TOLAR SFBEN-07 (6 FOOT)

TOLAR SFBEN-18 (6 FOOT)

TOLAR SFBEN-25 (8 FOOT)



BENCH WITH SIDEWALK AT BACK OF CURB

COMMON AMENITIES TO[1] BE INCLUDED IN AMENITY AREA

BUS SHELTER
LEAN BAR IN SHELTER
BUS SHELTER BENCH
FREE STANDING BENCH
SIMME-SEAT
BIKE RACK
POST MOUNTED SECURITY LIGHT SYSTEM
REAL-TIME DISPLAY SIGNAGE
SHELTER SOLAR LIGHTING
TRASH & RECYCLING CANS
ELECTRICAL CONNECTIONS FOR AMENITIES

BUS STOP BENCH & AMENITY NOTES:

1. COORDINATE WITH GOTRIANGLE FOR AMENITIES REQUIRED AT EACH BUS STOP LOCATION. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919-485-7557 TO DETERMINE AMENITY MANUFACTURERS, MODELS, AND FINISH COLORS REQUIRED AT EACH LOCATION. SEE LISTS ON THIS SHEET FOR COMMON SHELTER MODELS AND MANUFACTURERS AND COMMON AMENITIES INCLUDED AT BUS STOP LOCATIONS.
2. MINIMUM DISTANCE REQUIREMENTS ARE BASED ON DISTANCES REFERENCED IN 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' DATED FEBRUARY 3, 2017 OR LATEST VERSION.
3. BUS STOP LOCATIONS WITH NO CURB & GUTTER REQUIRE PROPOSED AMENITIES TO BE LOCATED OUTSIDE THE CLEAR RECOVERY AREA AS DEFINED BY THE LATEST VERSION OF THE AASHTO ROADSIDE DESIGN GUIDE.
4. ANY CUSTOM AMENITIES PROPOSED WILL REQUIRE REVIEW AND APPROVAL BY GOTRIANGLE & LOCAL REVIEW AGENCIES, AS APPLICBLE. IF A CUSTOM AMENITY IS PROPOSED WITHIN NCDOT RIGHT-OF-WAY, THE AMENITY MUST BE ADDED TO NCDOT'S APPROVED PRODUCTS LIST PRIOR TO INSTALLATION.
5. BUS SHELTERS AT NEAR SIDE STOPS ARE TO BE LOCATED ON NEAREST SIDE OF AMENITY PAD TO ENSURE MAXIMUM SIGHT DISTANCES ARE MAINTAINED.
6. A MINIMUM 6' PEDESTRIAN PATH IS TO BE RETAINED BETWEEN THE BACK OF CURB AND ANY AMENITIES AT ALL LOCATIONS.

GENERAL BUS STOP IMPROVEMENTS NOTES:

7. A PERMANENT TRANSIT EASEMENT (PTE) OR PERMANENT PUBLIC RIGHT-OF-WAY IS TO BE PROVIDED FOR THE AMENITY AREA, IF LOCATED OUTSIDE OF EXISTING RIGHT-OF-WAY, AT A MINIMUM 1' OFFSET FROM THE AMENITY AREA. COORDINATE WITH GOTRIANGLE FOR ANY REQUIRED EASEMENT LANGUAGE.
8. ANY EXISTING SIDEWALK IN VICINITY IS TO BE EVALUATED FOR ADA COMPLIANCE. IF EXISTING SIDEWALK CROSS SLOPES EXCEED 2% OR HAS ABRUPT SURFACE TRANSITIONS THE SIDEWALK WILL BE REQUIRED TO BE REMOVED AND REPLACED AT A MAXIMUM CROSS SLOPE OF 2% TO PROVIDE AN ADA ACCESSBILE AREA FOR THE LENGTH OF THE BUS STOP AREA (30' TYP.)
9. A FLAT, CLEARED AREA OF A MINIMUM OF 1' IS TO BE PROVIDED AROUND THE AMENITY AREA FOR MAINTENANCE.
10. STORMWATER RUNOFF IS TO BE DIVERTED AWAY FROM THE AMENITY AREA.
11. REFER TO THE LATEST VERSION 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' FOR MORE INFORMATION. THE FEBRUARY 3, 2017 UPDATE CAN BE FOUND AT THE FOLLOWING WEB ADDRESS: https://connect.ncdot.gov/business/Transit/Documents/2017%20NCDOT%20Bus%20Shelter%20&%20Bus%20Stop%20Guidelines.pdf

REV. DATE 10-14-2024

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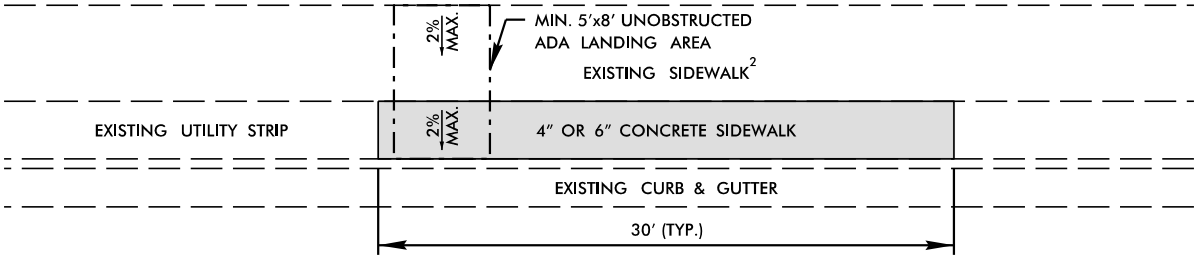
GO Triangle

BUS STOP AMENITY AREA - TYPICAL BENCH LAYOUT

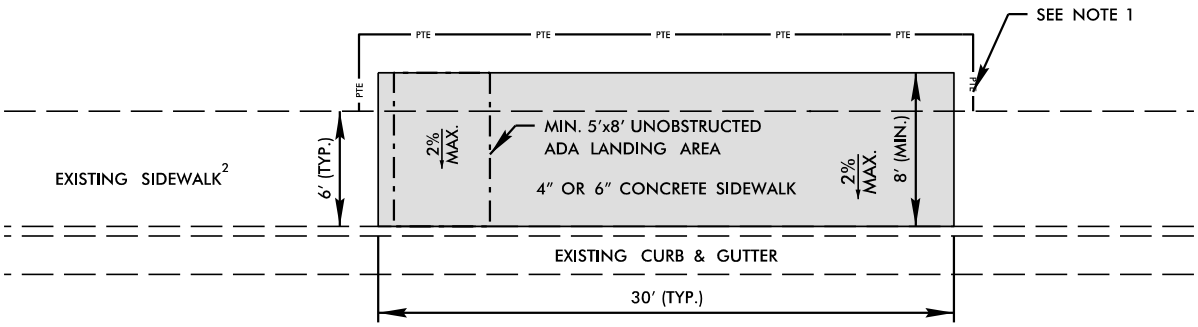
DETAIL # BUS-02.20

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP



LANDING AREA WITH BACK OF SIDEWALK MIN. 8' FROM BACK OF CURB



LANDING AREA WITH BACK OF SIDEWALK < 8' FROM BACK OF CURB

GENERAL BUS STOP IMPROVEMENTS NOTES:

1. A PERMANENT TRANSIT EASEMENT (PTE) OR PERMANENT PUBLIC RIGHT–OF–WAY IS TO BE PROVIDED FOR THE AMENITY/LANDING AREA, IF LOCATED OUTSIDE OF EXISTING RIGHT–OF–WAY, AT A MINIMUM 1' OFFSET FROM THE AMENITY AREA. COORDINATE WITH GOTRIANGLE FOR ANY REQUIRED EASEMENT LANGUAGE.
2. ANY EXISTING SIDEWALK IN VICINITY IS TO BE EVALUATED FOR ADA COMPLIANCE. IF EXISTING SIDEWALK CROSS SLOPES EXCEED 2% OR HAS ABRUPT SURFACE TRANSITIONS THE SIDEWALK WILL BE REQUIRED TO BE REMOVED AND REPLACED AT A MAXIMUM CROSS SLOPE OF 2% TO PROVIDE AN ADA ACCESSBILE AREA FOR THE LENGTH OF THE BUS STOP AREA (30' TYP.)
3. A FLAT, CLEARED AREA OF A MINIMUM OF 1' IS TO BE PROVIDED AROUND THE AMENITY/LANDING AREA FOR MAINTENANCE.
4. STORMWATER RUNOFF IS TO BE DIVERTED AWAY FROM THE AMENITY AREA.
5. REFER TO THE LATEST VERSION 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' FOR MORE INFORMATION. THE FEBRUARY 3, 2017 UPDATE CAN BE FOUND AT THE FOLLOWING WEB ADDRESS: https://connect.ncdot.gov/business/Transit/Documents/2017%20NCDOT%20Bus%20Shelter%20&%20Bus%20Stop%20Guidelines.pdf

REV. DATE 10–14–2024

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GO Triangle

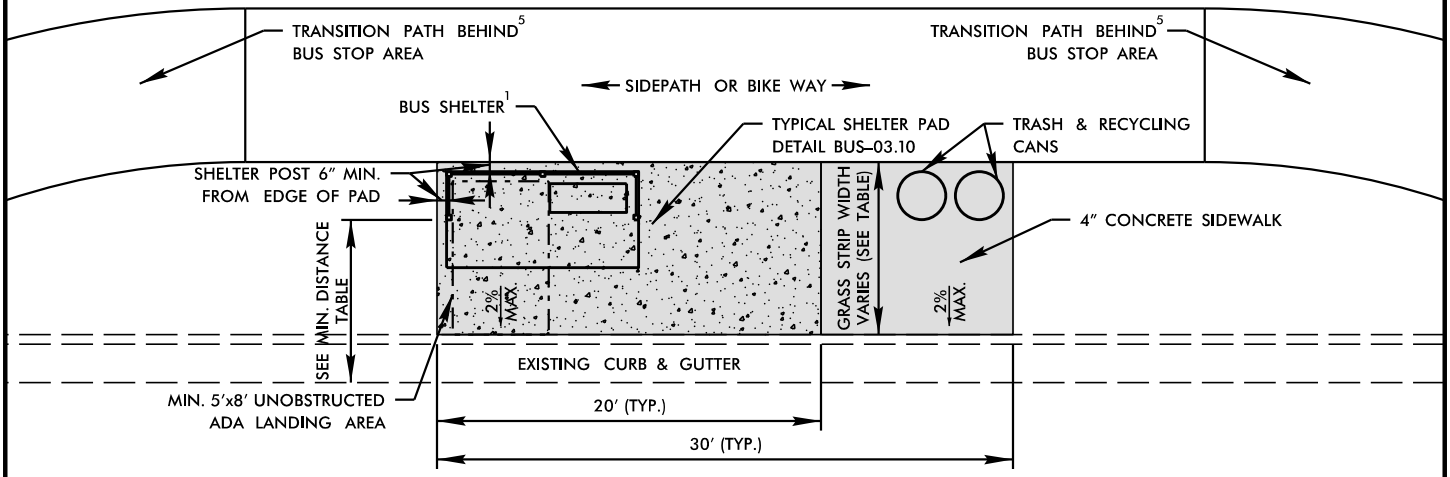
BUS STOP AMENITY AREA – TYPICAL LANDING AREA LAYOUT

DETAIL # BUS–02.30

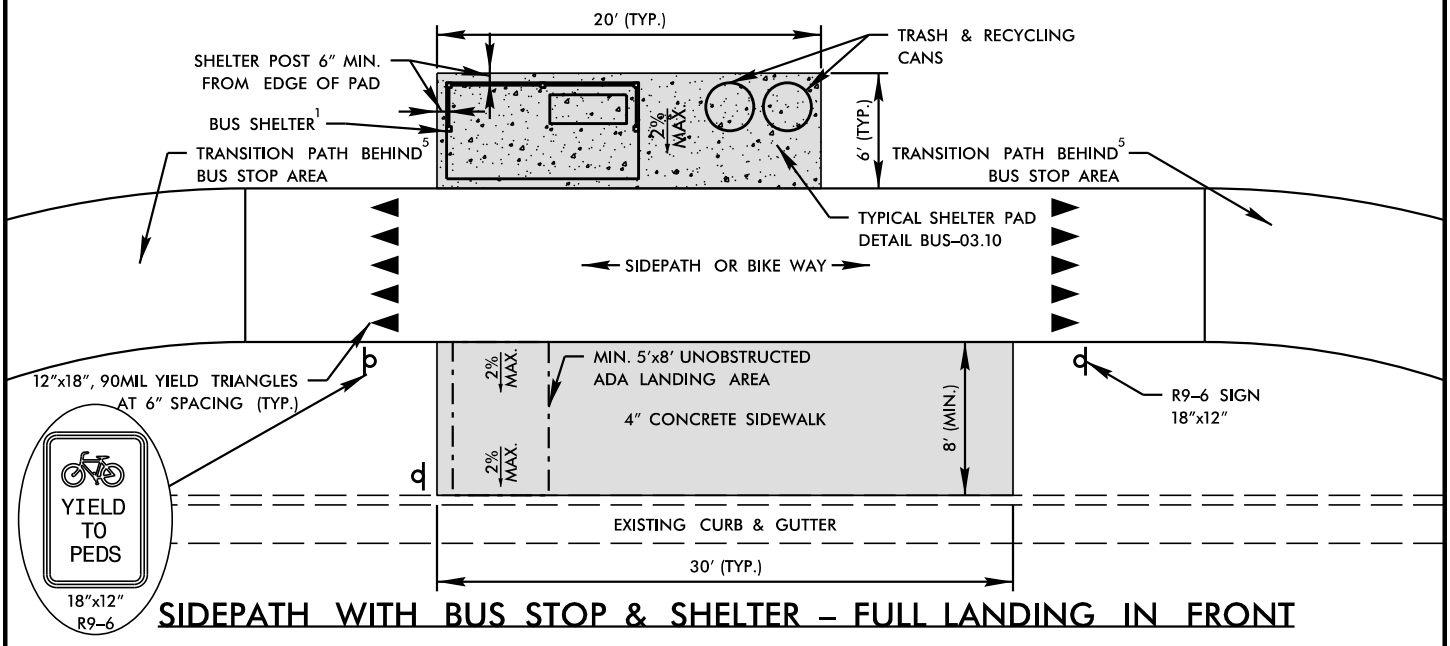
SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP

MINIMUM DISTANCES FROM[2] STRUCTURE ANCHOR TO EDGE OF PAVEMENT (BASED ON POSTED SPEED LIMIT)		TYPICAL GRASS STRIP WIDTH REQUIRED
25 MPH	8′	9′
35 MPH	10′	11′
45 MPH	12′	13′



SIDEPATH WITH BUS STOP & SHELTER – SHELTER IN FRONT



SIDEPATH WITH BUS STOP & SHELTER – FULL LANDING IN FRONT

NOTES:

1. COORDINATE WITH GOTRIANGLE FOR AMENITIES REQUIRED AT EACH BUS STOP LOCATION. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO DETERMINE AMENITY MANUFACTURERS, MODELS, AND FINISH COLORS REQUIRED AT EACH LOCATION. SEE LISTS ON DETAIL BUS–2.10 FOR COMMON SHELTER MODELS AND MANUFACTURERS AND COMMON AMENITIES INCLUDED AT BUS STOP LOCATIONS.
2. MINIMUM DISTANCE REQUIREMENTS ARE BASED ON DISTANCES REFERENCED IN 'NCDOT BUS SHELTER & BUS STOP GUIDELINES' DATED FEBRUARY 3, 2017 OR LATEST VERSION.
3. BUS STOP LOCATIONS WITH NO CURB & GUTTER REQUIRE PROPOSED SHELTERS TO BE LOCATED OUTSIDE THE CLEAR RECOVERY AREA AS DEFINED BY THE LATEST VERSION OF THE AASHTO ROADSIDE DESIGN GUIDE.
4. SEE TYPICAL SHELTER LAYOUT DETAIL BUS–02.10 FOR ADDITIONAL INFORMATION.
5. THE SIDEPATH OR BIKE WAY IS TO BE ADJUSTED TO RUN BEHIND THE PROPSOED BUS STOP AREA WHERE POSSIBLE. TRANSITIONS SHOULD BE DESIGNED BASED ON LOCAL GUIDANCE AND STANDARDS AND BASED ON THE ACTUAL SITE CONDITIONS.

REV. DATE 10–14–2024

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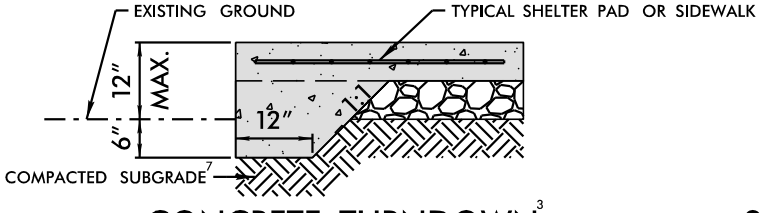
BUS STOP AMENITY AREA – TYPICAL SIDEPATH LAYOUT

DETAIL # BUS–02.40

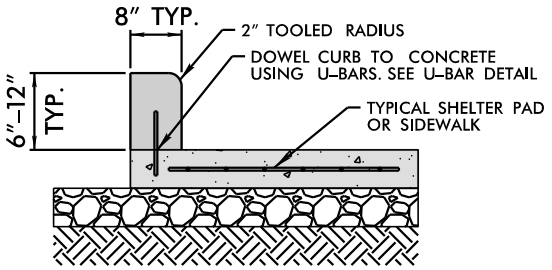
SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP



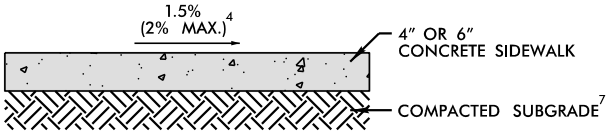
CONCRETE TURNDOWN[3]

APPLICABLE FOR USE ADJACENT TO PAVED AREAS

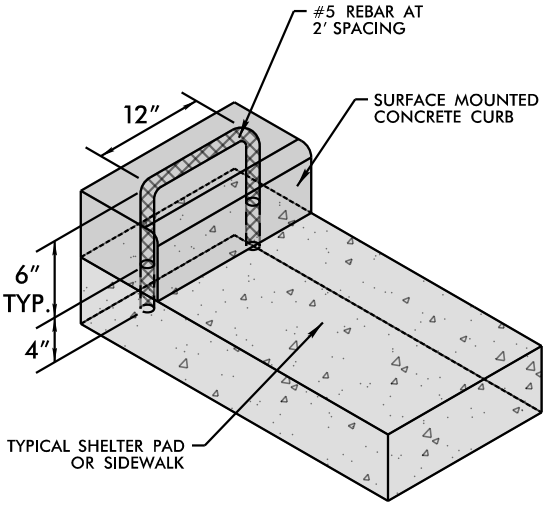


SURFACE MOUNTED CONCRETE CURB

HEIGHT & WIDTH MAY VARY BASED ON FIELD CONDITIONS. SPECIFY ON PLANS

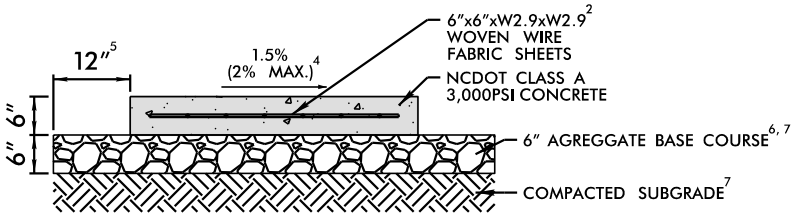


CONCRETE SIDEWALK[1]



U-BAR DETAIL

ADJUST U-BAR HEIGHT TO PROVIDE MINIMUM 2" COVER WHERE CURB HEIGHT VARIES



SHELTER PAD

USE FOR AMENITY AREAS WHERE[4] SHELTERS ARE TO BE INSTALLED

NOTES:

1. SIDEWALKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH NCDOT STD. 848.01 – CONCRETE SIDEWALKS OF THE LATEST VERSION OF THE NCDOT ROADWAY STANDARD DRAWINGS OR IN ACCORDANCE WITH LOCAL STANDARDS FOR CONCRETE SIDEWALKS, AS APPLICABLE.
2. REINFORCE SHELTER PAD WITH WOVEN WIRE FABRIC SHEETS. WOVEN WIRE FABRIC SHEETS SHALL HAVE MINIMUM 6" OVERLAPS AND PLACED WITHIN 3" ON ALL SIDES.
3. CONCRETE TURNDOWN IS TO PROVIDE A 12" WIDE CONCRETE SECTION TO EXTEND A MINIMUM 6" BELOW THE EXISTING ADJACENT GROUND WITH A 45 DEGREE SECTION TO BRING BACK TO THE STANDARD 6" THICKNESS. SPECIFY LOCATIONS FOR USE ON THE PLANS.
4. CROSS SLOPE OF AMENITY AREA PAVEMENTS SHALL BE 1.5% RECOMMENDED, 1% MINIMUM, 2% MAXIMUM UNLESS OTHERWISE APPROVED BY GOTRIANGLE.
5. EXTEND AGGREGATE BASE COURSE 12" BEYOND EDGE OF PAD IN ALL DIRECTIONS EXCEPT WHERE BORDERED BY EXISTING PAVEMENTS.
6. AGGREGATE BASE COURSE SHALL MEET NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
7. SUBGRADE AND AGGREGATE BASE COURSE SHALL BE PROPERLY COMPACTED WITH PLATE TAMPERS PRIOR TO PLACING CONCRETE.
8. WHERE HANDRAIL IS PROPOSED WITHIN LIMITS OF CONCRETE PAD, INCREASE PAD THICKNESS AS SHOWN ON DETAIL BUS-04.20. TO INSTALL HANDRAIL.
9. TYPICAL SHELTER PAD IS MINIMUM DESIGN STANDARD FOR ALL SHELTERS TO BE INSTALLED FOR ALL GOTRIANGLE BUS STOPS. SHELTER PAD DESIGN MAY REQUIRE ADDITIONAL THICKNESS, REINFORCEMENT, OR SUBGRADE BASED ON SHELTER MODEL TO BE INSTALLED. VERIFY REQUIREMENTS WITH THE SHELTER MANUFACTURER.
10. ALL NEW PAVEMENTS SHALL BE FLUSH WITH EXISTING SIDEWALKS AND OTHER PAVEMENTS TO PREVENT TRIPPING HAZARDS AND TO ENSURE THE BUS STOP LANDING MEETS CURRENT ADA REQUIREMENTS.
11. ANY PROPOSED CONCRETE ABUTTING EXISTING CONCRETE IS TO HAVE AN EXPANSION JOINT (SEE NCDOT STD. 848.01).
12. COMPACTION OF SUBGRADE SHALL BE CHECKED BY A TECHNICIAN UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER; PRIOR TO POURING CONCRETE BY USING A PROBE ROD OR TESTING THE SOIL IF NECESSARY.
13. QUALITY OF CONCRETE SHALL BE CHECKED PER ASTM STANDARDS TO ENSURE PROPER MIX DESIGN AND SPECIFICATIONS. TESTING SHALL BE PERFORMED BY A TECHNICIAN UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL.
14. A FINAL REPORT WITH SUBGRADE AND CONCRETE TEST RESULTS AND VERFICATION OF FINAL PAD/SIDEWALK GRADE MUST BE PROVIDED TO GOTRIANGLE FOR FINAL APPROVAL.

REV. DATE 10-14-2024

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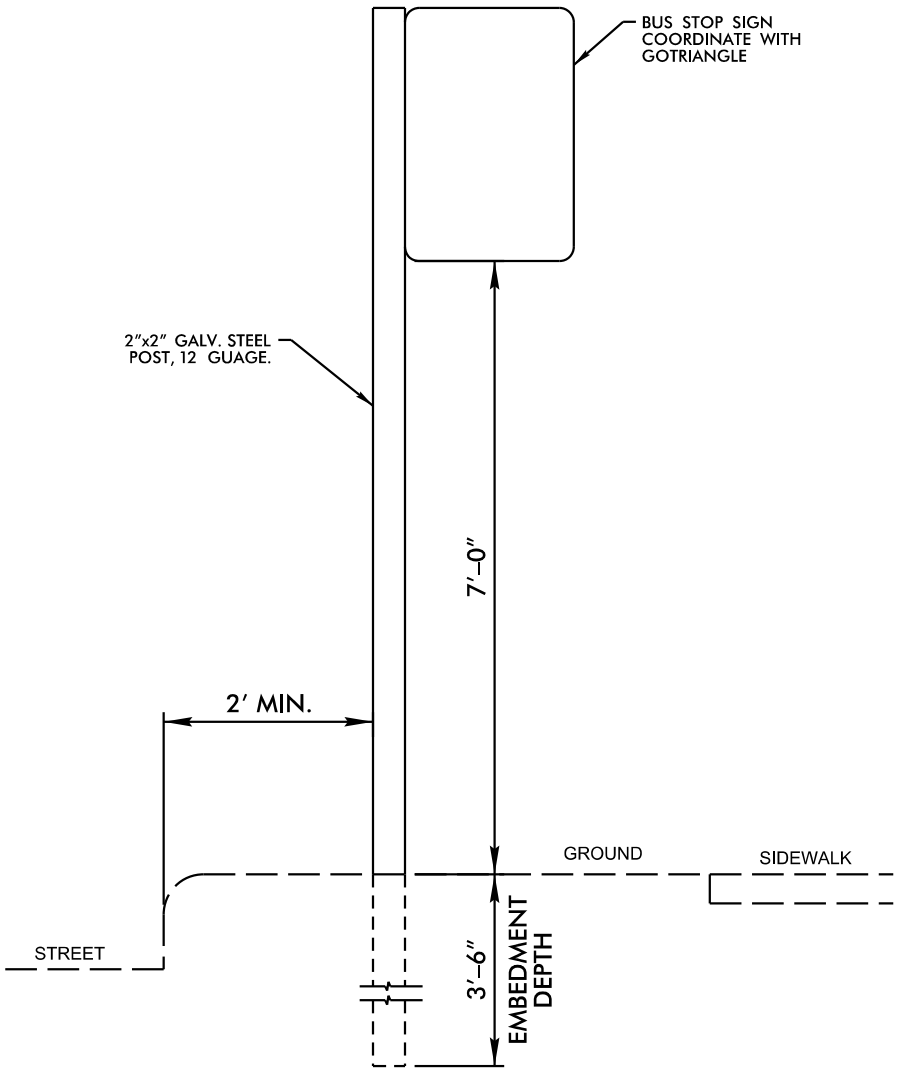
GO Triangle

CONCRETE INFRASTRUCTURE

DETAIL # BUS-03.10

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP



NOTES:

1. INSTALL SIGN 2' AHEAD OF BUS STOP LANDING AREA, WITHIN THE UTILITY STRIP. IF NO UTILITY STRIP IS PRESENT OR IF UTILITY STRIP IS PAVED CORE 12" DIAMETER HOLE FOR SIGN INSTALLATION.
2. CALL 811 FOR UNDERGROUND UTILITY LOCATION PRIOR TO INSTALLATION.
3. POST MOUNTED LIGHTING SYSTEMS, REAL TIME DISPLAYS, AND OTHER POST MOUNTED SYSTEMS SHOULD BE INSTALLED ON SEPERATE SIGN POSTS AND COMPLY WITH THE MINIMUM DISTANCE REQUIREMENTS, AS APPLICABLE. BUS STOP SIGN SHOULD NOT BE MOUNTED ON SIGN POSTS OR NCDOT PEDESTALS WITH WARNING SIGNAGE OR WARNING SIGNALS.
4. SIGN POST LOCATION SHOULD BE ADJUSTED TO ENSURE BUS STOP SIGNAGE DOES NOT OBSTRUCT OTHER ROADWAY SIGNAGE.

REV. DATE 10–14–2024

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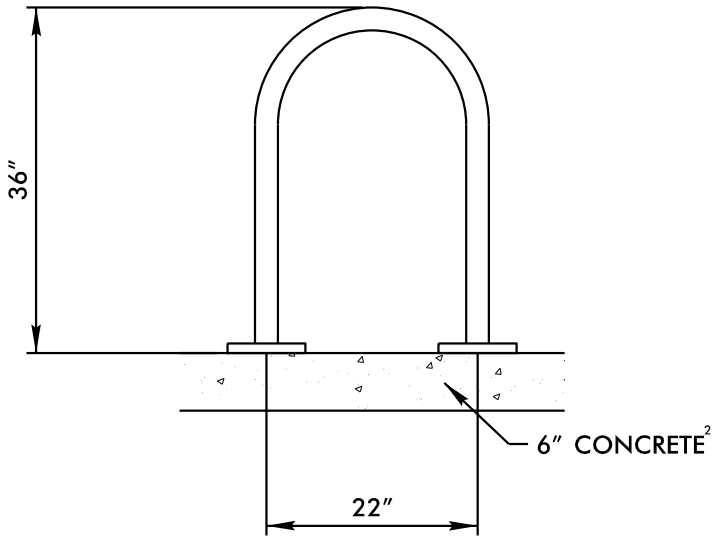
SIGN POST INSTALLATION

DETAIL # BUS–3.20

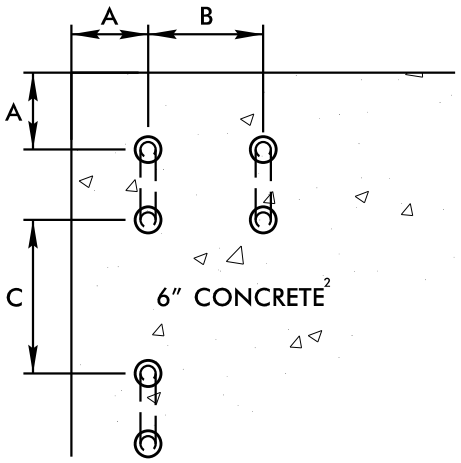
SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP

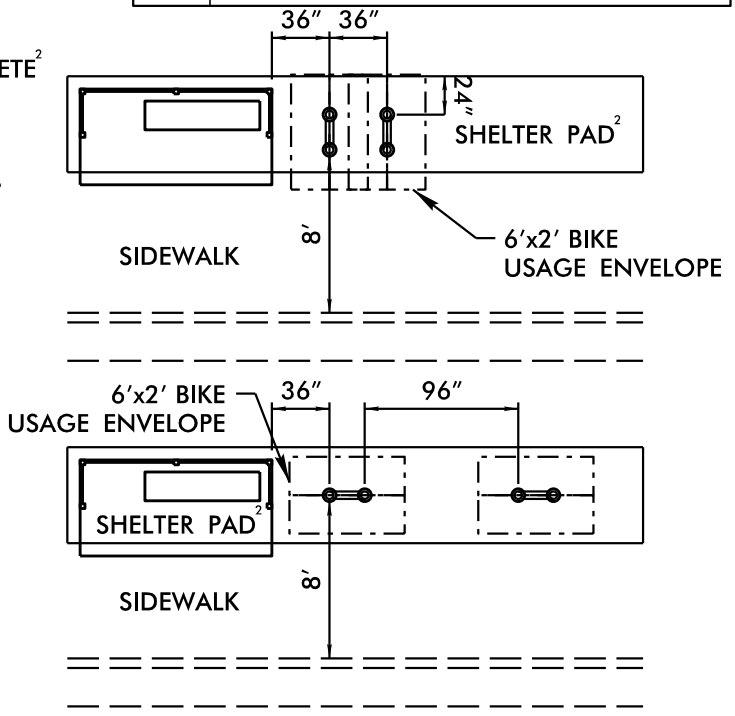
LEGEND	
A	DISTANCE FROM EDGE OF CONCRETE TO CENTER OF MOUNT
	36″ RECOMMENDED 24″ MIN.
	36″ MIN. IF ADJACENT TO VERTICAL OBSTRUCTION (WALL, SHELTER, CURB, ETC.)
B	DISTANCE BETWEEN RACKS (PARALLEL)
	36″ MIN.
C	DIST. BETWEEN RACKS (LATERAL)
	96″ MIN.



SURFACE MOUNTED 'U' RACK[3,6]



MINIMUM DIMENSIONS (SEE LEGEND)



BIKE RACK LAYOUTS

NOTES:
1. COORDINATE WITH GOTRIANGLE TO DETERMINE THE QUANTITY OF BIKE RACKS REQUIRED AT EACH BUS STOP LOCATION.
2. SEE DETAIL BUS–02.10, DETAIL BUS–02.20, & DETAIL BUS–03.10 FOR BUS STOP AMENITY AREA LAYOUTS AND CONCRETE INFRASTRUCTURE REQUIREMENTS.
3. BIKE RACKS ARE TO BE SURFACE MOUNTED UNLESS OTHERWISE APPROVED BY GOTRIANGLE.
4. MATERIAL & COLOR OF BIKE RACK IS TO BE APPROVED BY GOTRIANGLE & LOCAL REVIEW AGENCIES, AS APPLICABLE.
5. PROVIDE MANUFACTURER SPECIFICATIONS & DETAILS FOR GOTRIANGLE REVIEW.
6. BIKE RACKS ARE TO MEET ALL REQUIREMENTS OF THE LOCAL GUIDELINES WHERE APPLICABLE.

REV. DATE 10–14–2024 NOT TO SCALE

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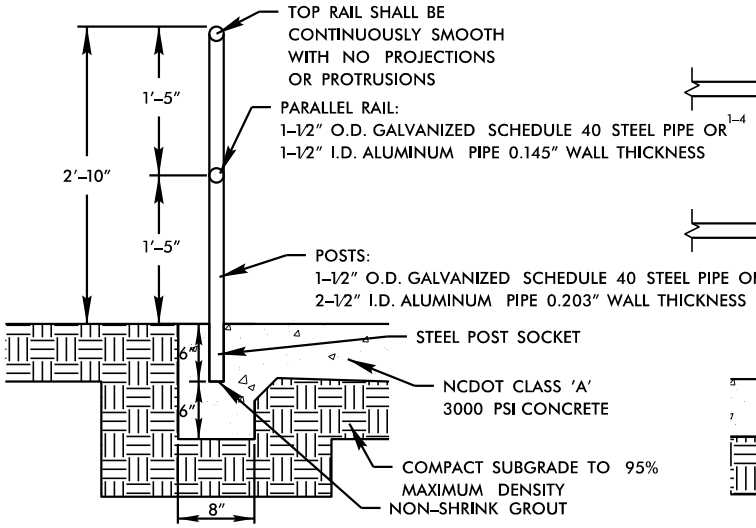
TYPICAL BIKE RACKS & SPACING

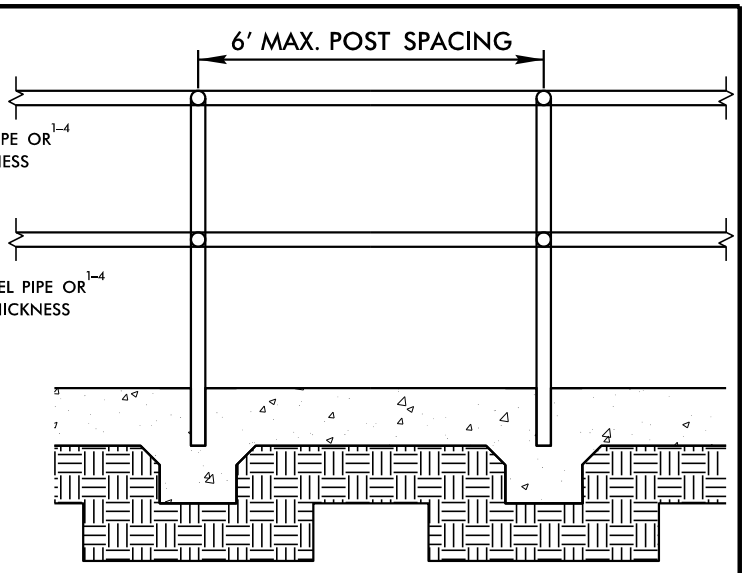
DETAIL # BUS–04.10

SHEET # 1 OF 1

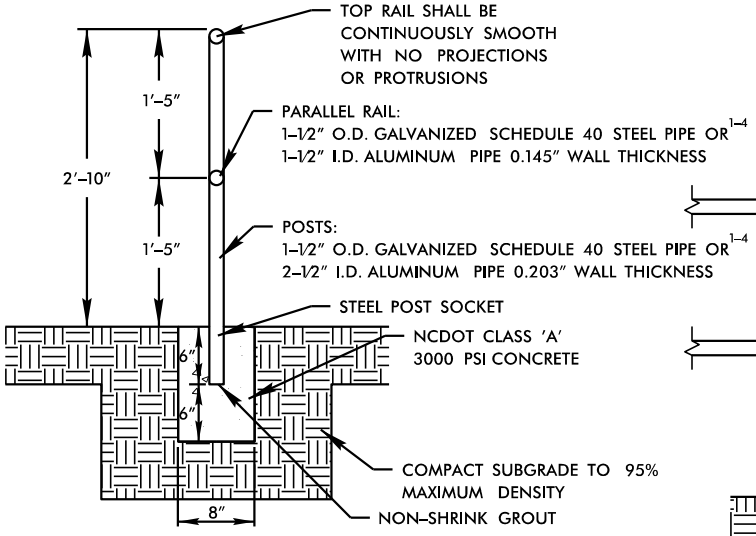
DETAILS PROVIDED BY DRMP



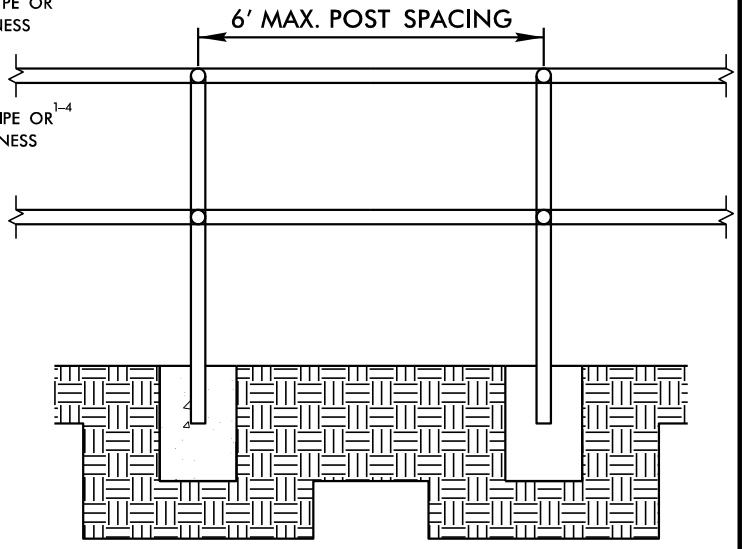
SECTION VIEW (METHOD A)



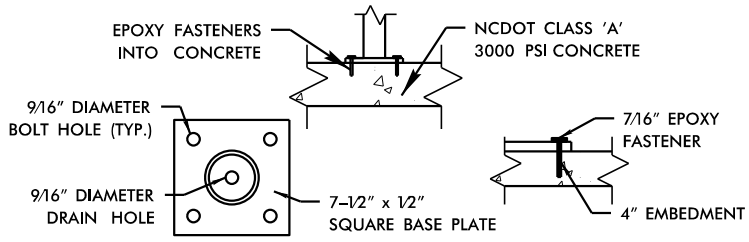
HORIZONTAL VIEW (METHOD A)



SECTION VIEW (METHOD B)



HORIZONTAL VIEW (METHOD B)



ALUMINUM POST MOUNT (METHOD C)

NOTES:

1. CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1.5" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING REQUIREMENTS OF ASTM A53.
2. REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.
3. PAINT, IF REQUIRED BY ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE NCDOT SPECIFICATIONS.
4. WELD IN ACCORDANCE WITH ARTICLE 1072–18 OF THE NCDOT STANDARD SPECIFICATIONS.
5. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.
6. SHOP DRAWINGS OF PEDESTRIAN HANDRAIL ARE TO BE PROVIDED TO GOTRIANGLE FOR REVIEW PRIOR TO APPROVAL.
7. PREFERRED METHOD OF INSTALLATION IS TO BE DETERMINED BY GOTRIANGLE.
8. HANDRAIL IS NOT ADEQUATE FOR PROVIDING FALL PROTECTION. AT LOCATIONS WHERE FALL PROTECTION IS NEEDED REFER TO DETAIL BUS–4.30 FOR PEDESTRIAN SAFETY RAIL.

REV. DATE 10–14–2024

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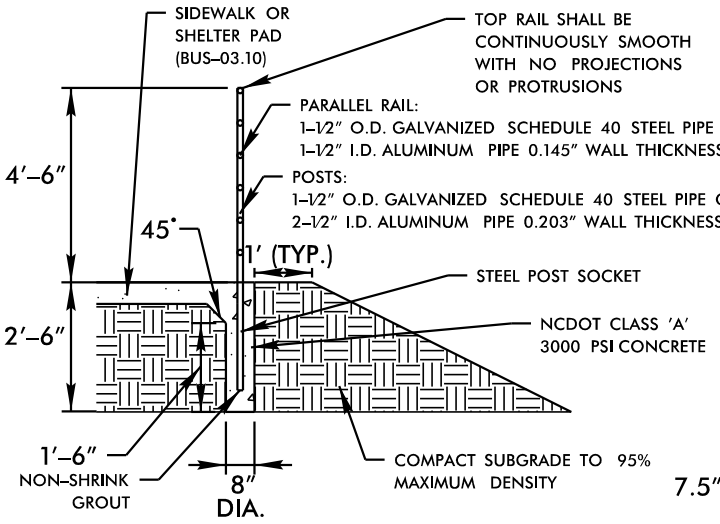
GO Triangle

PEDESTRIAN HANDRAIL (RAMPS AND STAIRS)

DETAIL # BUS–04.20

SHEET # 1 OF 1

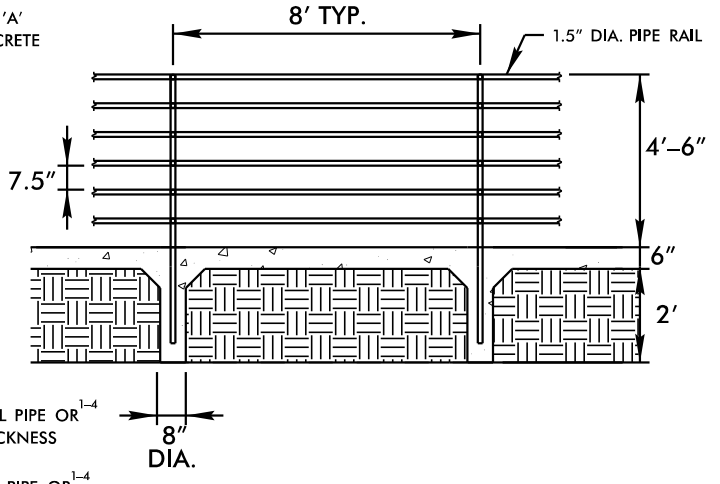
DETAILS PROVIDED BY DRMP



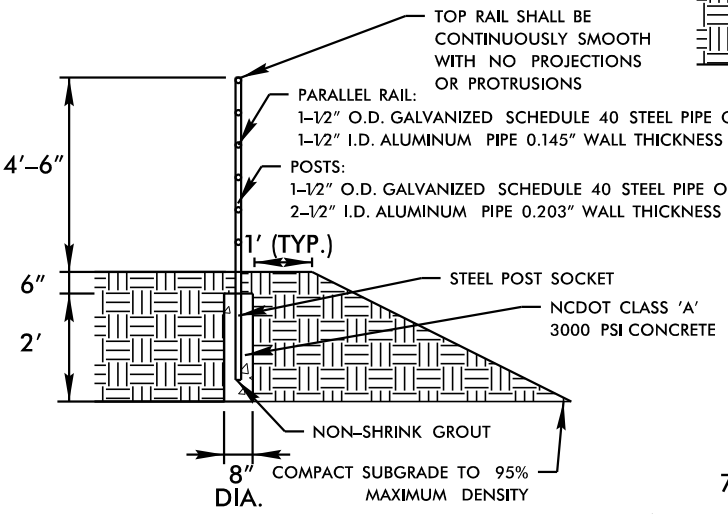
SECTION VIEW (METHOD A)[10]

SAFETY RAIL REQUIREMENTS:[9]

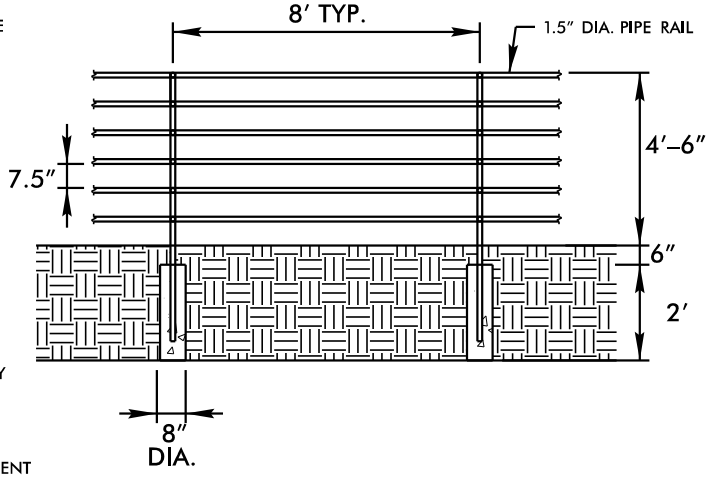
1. SLOPES 3:1 OR STEEPER WITHIN 4' OF THE BUS STOP AREA WITH A TOTAL ELEVATION CHANGE OF 6' OR GREATER.
2. SLOPES 2:1 OR STEEPER WITHIN 4' OF THE BUS STOP AREA WITH A TOTAL ELEVATION CHANGE OF 4' OR GREATER.
3. SLOPE 1:1 OR STEEPER WITHIN 4' OF THE BUS STOP AREA WITH A TOTAL ELEVATION CHANGE OF 2.5' OR GREATER.
4. SLOPE 1:1 OR STEEPER WITHIN 2' OF THE BUS STOP AREA WITH A TOTAL ELEVATION CHANGE OF 1' OR GREATER.
5. ANY LOCATIONS DETERMINED BY GOTRIANGLE'S SAFETY AND SECURITY REVIEW TO REQUIRE PEDESTRIAN SAFETY RAIL.



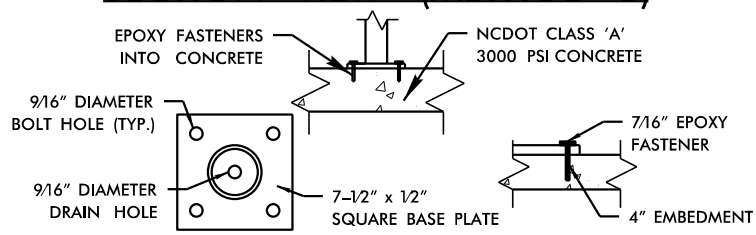
HORIZONTAL VIEW (METHOD A)[10]



SECTION VIEW (METHOD B)[10]



HORIZONTAL VIEW (METHOD B)



ALUMINUM POST MOUNT (METHOD C)

NOTES:

1. CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1.5" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING REQUIREMENTS OF ASTM A53.
2. REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.
3. PAINT, IF REQUIRED BY ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE NCDOT SPECIFICATIONS.
4. WELD IN ACCORDANCE WITH ARTICLE 1072–18 OF THE NCDOT STANDARD SPECIFICATIONS.
5. GOTRIANGLE WILL BE REQUIRED TO PERFORM A SAFETY AND SECURITY REVIEW FOR ALL BUS STOP LOCATIONS. CONTACT GOTRIANGLE'S PLANNING & CAPITAL DEVELOPMENT STAFF AT 919–485–7557 TO SCHEDULE A REVIEW.
6. SHOP DRAWINGS OF PEDESTRIAN SAFETY RAIL ARE TO BE PROVIDED TO GOTRIANGLE FOR REVIEW PRIOR TO APPROVAL.
7. EARTH SLOPES STEEPER THAN 2:1 ADJACENT TO TRANSIT PASSENGER AREAS ARE NOT RECOMMENDED AND WOULD REQUIRE SUPPORTING CALCULATIONS AND APPROVAL BY GOTRIANGLE.
8. PLACEMENT OF SAFETY RAIL IN RELATION TO SHOULDER BREAK POINT AND SIDEWALK MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.
9. EXCEPTIONS TO THE REQUIREMENTS STATED MAY BE CONSIDERED ON A CASE–BY–CASE BASIS WITH DOCUMENTATION BY THE ENGINEER AND APPROVAL BY GOTRIANGLE.
10. PREFERRED METHOD OF INSTALLATION IS TO BE DETERMINED BY GOTRIANGLE.

REV. DATE 10–14–2024

NOT TO SCALE

GO Triangle

PEDESTRIAN SAFETY RAIL (FALL PROTECTION)

DETAIL # BUS–04.30

SHEET # 1 OF 1

DETAILS PROVIDED BY DRMP