

## 5. LOCAL BUS STOP PLACEMENT

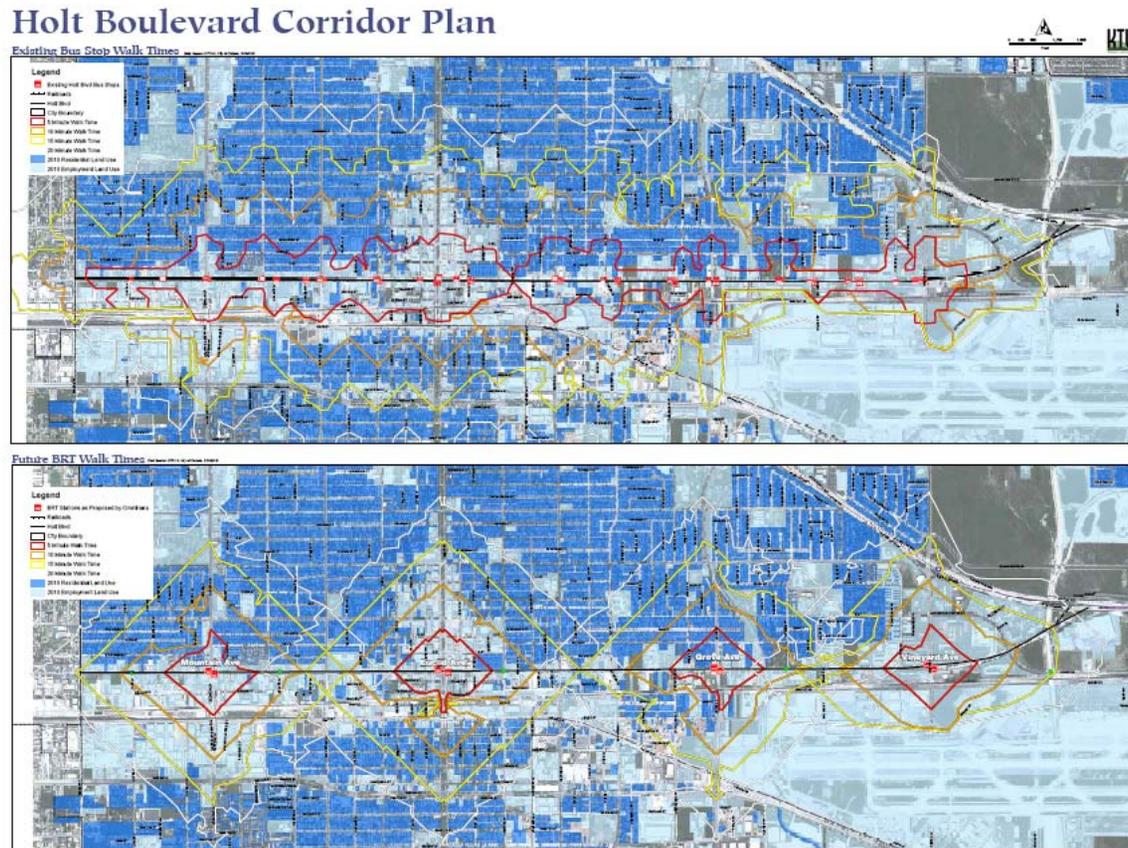
This chapter lays out Omnitrans' policies and guidelines for the placement of bus stops.

Because of the number of factors involved, each new or relocated stop must be examined on a case-by-case basis. However, general guidelines for stop spacing and placement are as follows.

### 5.1 Stop Spacing

The current stop spacing policy is contained in Omnitrans Short Range Transit Plan

(<http://www.omnitrans.org/about/reports/>). The Figure 5-1 below shows how stop spacing can be adjusted to capture the most potential passengers within the ½ mile walk shed.



*Figure 5-1: Stop Spacing and Pedestrian Walk Shed for Holt Boulevard*

Produced for the City of Ontario by KTU+A, Holt Boulevard Corridor Streetscape and Strategic Plan, February 2012 (draft).

## 5.2 Placement of Bus Stops

The proper location of stops is critical to the safety and security of passengers and motorists, and to the proper operation of the transit system. Bus stop locations are recommended by OmniTrans, and approved by the local jurisdictions. Local jurisdictions can suggest bus stop locations at their discretion. It is important to consider the unique circumstances at each intersection when selecting bus stop locations, including:

- Proximity to major trip generators, based on population density and/or specific use (i.e. major employment centers, regional shopping centers, hospitals, etc.);
- Presence of sidewalks and curb ramps leading to trip generators and nearby pedestrian circulation system;
- Availability of adequate right-of-way to ensure that the bus stop meets the Americans with Disabilities Act (ADA) accessibility standards;
- Pedestrian safety and security including access to stop, level pathways leading to and from bus stop areas, firm surface, and free of obstacles;
- Width, placement and condition of sidewalks (sidewalks should be wide enough to accommodate waiting passengers without blocking ADA clear path);
- Protected crossings at signalized or stop controlled intersections, or at crosswalks;
- In general, it is safer to locate the bus stop on the far side of a crosswalk, so that passengers will cross behind, rather than in front of, the bus;
- Convenient passenger transfers to other routes;
- Effect on adjacent property owners;
- Conflict between buses, other traffic, and pedestrians;
- Pedestrian activity through intersections;
- Open and visible spaces for personal security and passenger visibility;
- Street illumination, see sections 8.4 and 12.3 for lighting specifications;
- Ability to restrict parking if needed, feasibility to move or provide parking and truck delivery zones;
- Adequate curb space for the number of buses expected at the stop at any one time;
- Volumes and turning movements of other traffic, including bicycles;
- Proximity and traffic volumes of nearby driveways;
- Street and sidewalk grade;
- Ease for bus re-entering traffic stream;
- Bus route turns;
- Unusual intersection angles or predominant turning movements;
- Proximity to rail crossings or emergency driveways;
- Sight distance at adjacent intersections and driveways;
- Curb clearance – adequate space for buses to stop, and return to the traffic flow;
- Operational effectiveness issues (including relation to the nearest intersection, bus turning requirements, and re-entering the travel lane); and,
- Proximity to other transit such as rail or sbX service;
- Landscaping issues - The presence of trees and bushes at a bus stop may necessitate periodic trimming to prevent

buses from hitting tree branches and bushes from encroaching on sidewalks. Tall bushes are discouraged as they are a potential security problem, and additional lighting should be considered at stops with this issue. Crime Prevention through Environmental Design (CPTED) principles should be looked at for landscaping plans.

- Limited visibility over hills and around curves - Bus stops should not be located over the crest of a hill, immediately after a road curve to the right, or at other locations that limit the visibility of the stopped bus to oncoming traffic. If the bus stops in the travel lane at such locations, it is in danger of being struck from the rear. Even if the bus pulls off the road at such stops, pulling back into the travel lane presents accident potential. If a bus stop must be located at such a location, approaching cars should be warned of the need to be prepared to stop.
- Transfer locations - In locations where transfer activity between routes is heavy, bus stops should be located to minimize street crossings of passengers transferring to other routes.
- Drainage - Areas which tend to accumulate standing water should be avoided or improved. However, bus stops should not be located so that passengers are required to step over catch basins when boarding or alighting from the bus, as this creates a potential tripping hazard.
- Bicycle facilities - To the extent feasible, bus stops should be located so they do not block bicycle travel lanes. Bus stops should also be located so that bicycle racks do not block pedestrian access to the bus boarding and alighting area.
- Consideration of potential safety and security risks:
  - Uneven surfaces, which could result in a fall;
  - Slope of the terrain surrounding the landing area, which can put passengers in danger of falling in an adjacent ravine or into the travel lane;
  - Presence of hazardous objects, such as broken street furniture and jagged edges;
  - Surface traction (for example, stone aggregate can be exceedingly slippery when wet for wheelchair users);
  - 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 in the sidewalk that, in addition to making it inaccessible, force pedestrians to walk in the street; and
  - Design bus stop and surrounding area to discourage vandalism and loitering and provide for a long service life with minimum maintenance under conditions of intensive use.

For more detailed safety and security considerations, please refer to the APTA publication *Bus Stop Design and Placement Security* and other resources in Appendix C for guidance on crime prevention through environmental design.

### 5.2.1 Nearside or Farside Stops

Bus stops are generally located at intersections where they may be placed on the nearside or farside of an intersection. This maximizes pedestrian accessibility from both sides of the street and provides connection to intersecting bus routes.

The placement of bus stops at intersections varies from site to site. Figure 5-2 below shows the general placement options for bus stops along a route. However, general considerations for the placement of bus stops at intersections include:

- Mid-block stops are highly discouraged because they typically place passengers far away from a safe (signalized) crossing and encourage unsafe street crossings.
- When the route alignment requires a left turn, the preferred location for the bus stop is on the farside of the intersection after the left turn is completed.
- If there is a high volume of right turns at an intersection, the preferred location for a stop is on the farside of the intersection after the turn.
- If the transit route turns right at an intersection, the preferred location for a stop is after the bus has turned.
- In circumstances where the accumulation of buses at a farside stop would spill over into the intersection and additional stacking length is not available, the stop should be placed on the nearside of the intersection. This removes the potential for queuing buses to overflow into and block the intersection.
- At complex intersections with multi-phase signals or dual right or left turn lanes, farside stops are preferred because they remove the buses from the area of complicated traffic movements at that intersection.
- When transfer activity between two lines exhibits a strong directional pairing (i.e., heavy volumes from westbound to northbound) placing one stop nearside and one farside can minimize pedestrian activity within the intersection.

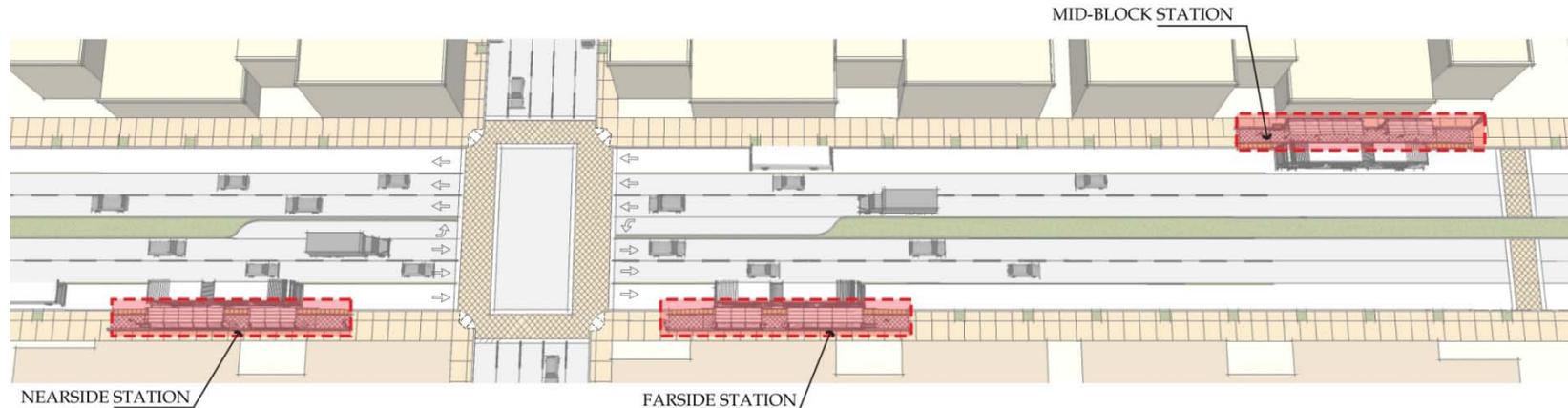


Figure 5-2: Bus Stop Placement

*Table 5-1: Advantages and Disadvantages of Stop Placement Relative to the Nearest Intersection*

Bus Stop Location	Advantages	Disadvantages	Recommended When the Following Location Conditions Exist
<p><b>Nearside</b> Located immediately before an intersection</p>	<ul style="list-style-type: none"> <li>• Less potential conflict with traffic turning onto the bus route street from a side street.</li> <li>• The bus boarding door is close to the crosswalk.</li> <li>• Bus has intersection to merge into traffic.</li> <li>• Bus Driver can see oncoming buses with transfer passengers.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential conflicts with right turning traffic due to cars cutting in front of the bus.</li> <li>• The stopped bus obscures the sight distance of drivers and pedestrians entering from the right.</li> <li>• The stopped bus may block visibility of the stop signs or traffic signals.</li> <li>• At signalized intersections, may result in schedule delays.</li> </ul>	<ul style="list-style-type: none"> <li>• When traffic is heavier on the farside than on the approaching side of the intersection.</li> <li>• When pedestrian access and existing landing area conditions on the nearside are better than on the farside.</li> <li>• When street crossings and other pedestrian movements are safer when the bus stops on the nearside than the farside.</li> <li>• When the bus route goes straight through the intersection.</li> <li>• When adequate sight distance can be achieved at the intersection.</li> </ul>
<p><b>Farside</b> Located immediately after an intersection</p>	<ul style="list-style-type: none"> <li>• Does not conflict with vehicles turning right.</li> <li>• Appropriate after the route has made a turn.</li> <li>• The stopped bus does not obscure sight distance to the left for vehicles entering or crossing from the side street.</li> <li>• At signalized intersections, buses can more easily re-enter traffic.</li> <li>• The stopped bus does not obscure traffic control devices or pedestrian movements at the intersection.</li> </ul>	<ul style="list-style-type: none"> <li>• The stopped bus obscures the sight distance to the right of drivers entering from the cross street to the right of the bus.</li> <li>• If the bus stopping area is of inadequate length, the rear of the stopped bus will block the cross street (especially an issue for stops where more than one bus may be stopped at a time).</li> <li>• If the bus stops in the travel lane, it may result in queued traffic behind it blocking the intersection.</li> </ul>	<ul style="list-style-type: none"> <li>• When traffic is heavier on the nearside than on the farside of the intersection.</li> <li>• At intersections where heavy left or right turns occur.</li> <li>• When pedestrian access and existing landing area conditions on the farside are better than on the nearside.</li> <li>• At intersections where traffic conditions and signal patterns may cause delays.</li> <li>• At intersections with transit signal priority treatments.</li> </ul>

Bus Stop Location	Advantages	Disadvantages	Recommended When the Following Location Conditions Exist
<b>Mid-Block</b> Located 300' or more beyond or before an intersection	<ul style="list-style-type: none"> <li>The stopped bus does not obstruct sight distances at an intersection.</li> <li>May be closer to major activity centers than the nearest intersection.</li> <li>Less conflicts between waiting and walking pedestrians.</li> </ul>	<ul style="list-style-type: none"> <li>In most cases, there is no safe crosswalk available mid-block.</li> <li>May increase customer walking distances if the trip generator is close to an intersection. Length of mid-block stops can vary due to depth of a turn-out and a bus' ability to maneuver in/out of traffic lanes.</li> <li>Requires most curb clearance of the three options (unless a mid-block sidewalk extension or bus bulb is built).</li> </ul>	<ul style="list-style-type: none"> <li>When there is a safe, well-marked crossing or signalized crossing (such as a HAWK signal) adjacent to the stop.</li> </ul>

### 5.3 Curb Clearance for Bus Stopping Zones

The preferred minimum requirements for curb clearance for one 40' or one 60' bus are indicated in Figures 5-3 to 5-5. It must be noted that these clearances are not always feasible in the urban environment, but should be aimed for wherever possible to ensure that buses have room to serve the stop parallel to the curb with comfortable space to exit and re-enter the travel lane. At an absolute minimum, an additional 25' would be needed for pulling in and pulling out (totaling 50' for both), plus the length of the vehicle (totaling 90' for a 40' bus at a mid-block stop. Where the parking lane is over 8' in width, or where turnouts are used, additional space is needed for the bus to reenter the traffic flow, thus the clearance area must be increased a corresponding amount.

For bus stops at which more than one bus may be stopped at a given time, additional curb clearance is needed. A general rule of thumb is to add one bus length plus 10' for each additional bus to be accommodated at the stop at the same time. Curb clearances for multiple buses are shown in Figure 5-6. Additional curb clearance will be needed for stops following right-hand route turns and may also be needed following left-hand turns.

Along high-ridership routes or major arterials, 60' articulated vehicles may be used in the future instead of 40' vehicles as demand warrants. As such, 60' vehicles will be needed to accommodate at a stop, with additional room for a minimum of 25' for pulling in and pulling out. Room for two 60' sbX vehicles may be desirable based on demand at stops, with 10' of separation between vehicles.

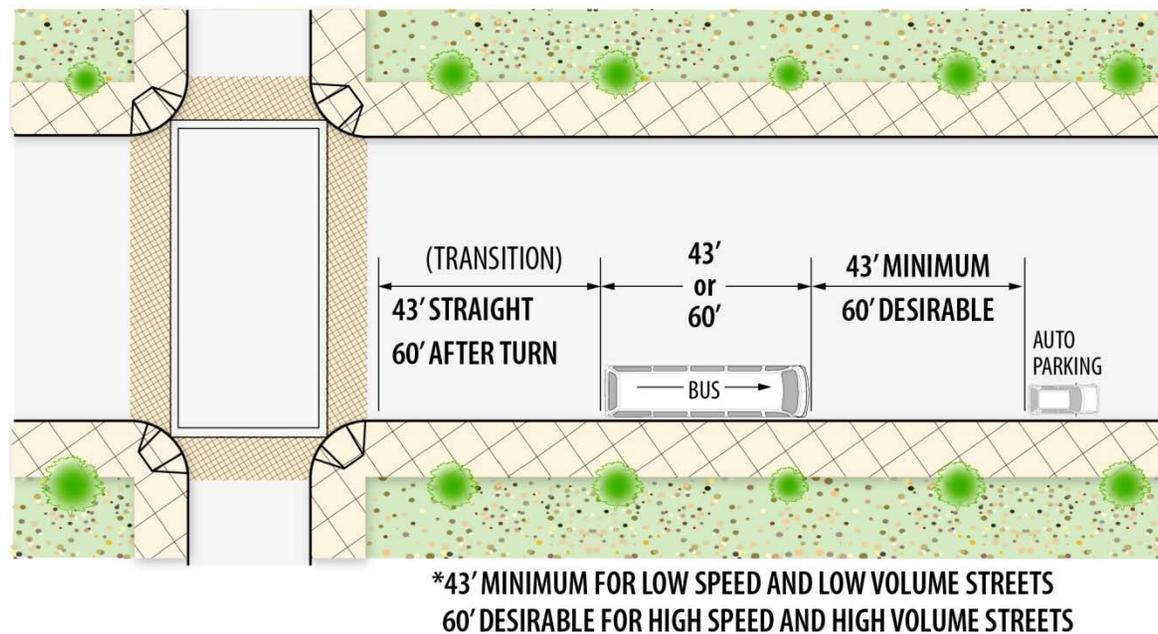
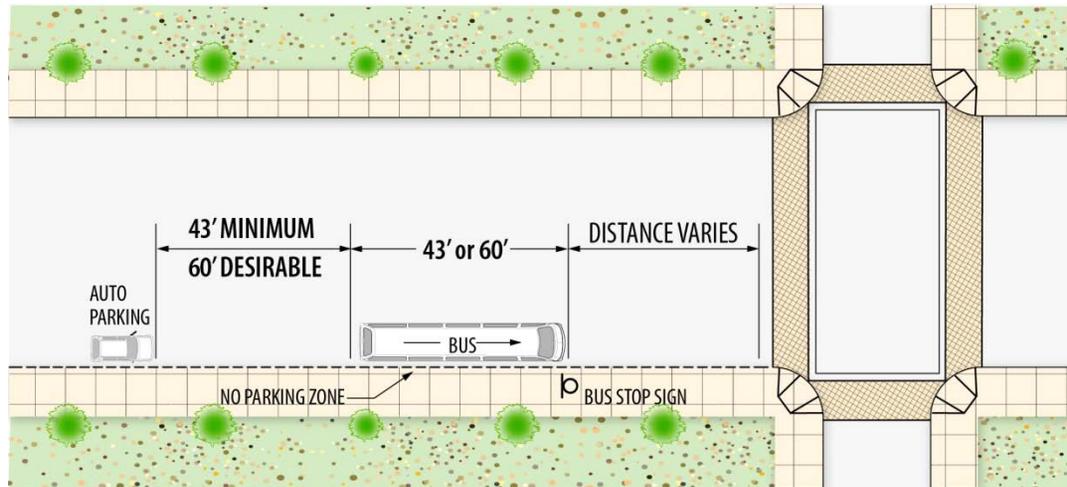
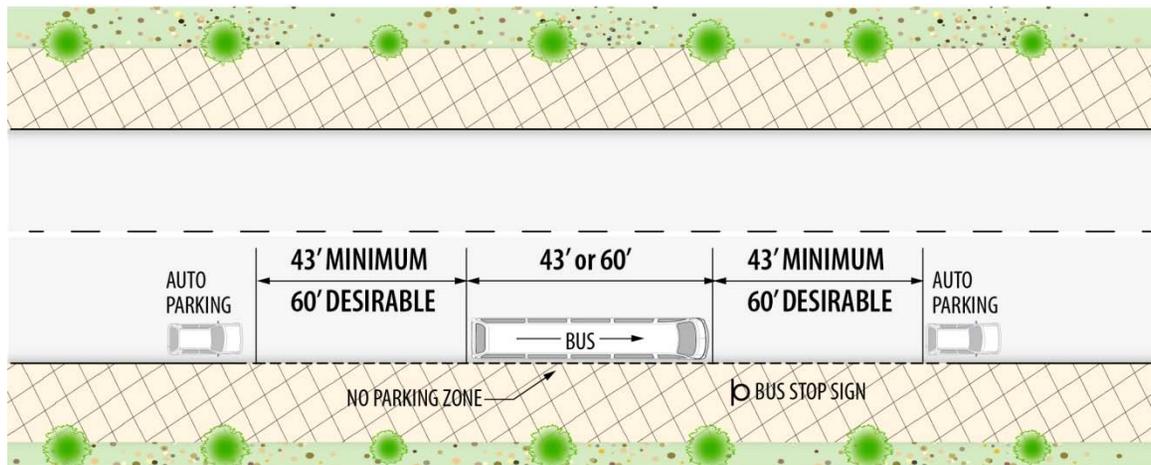


Figure 5-3: Typical Dimensions for Farside Stops



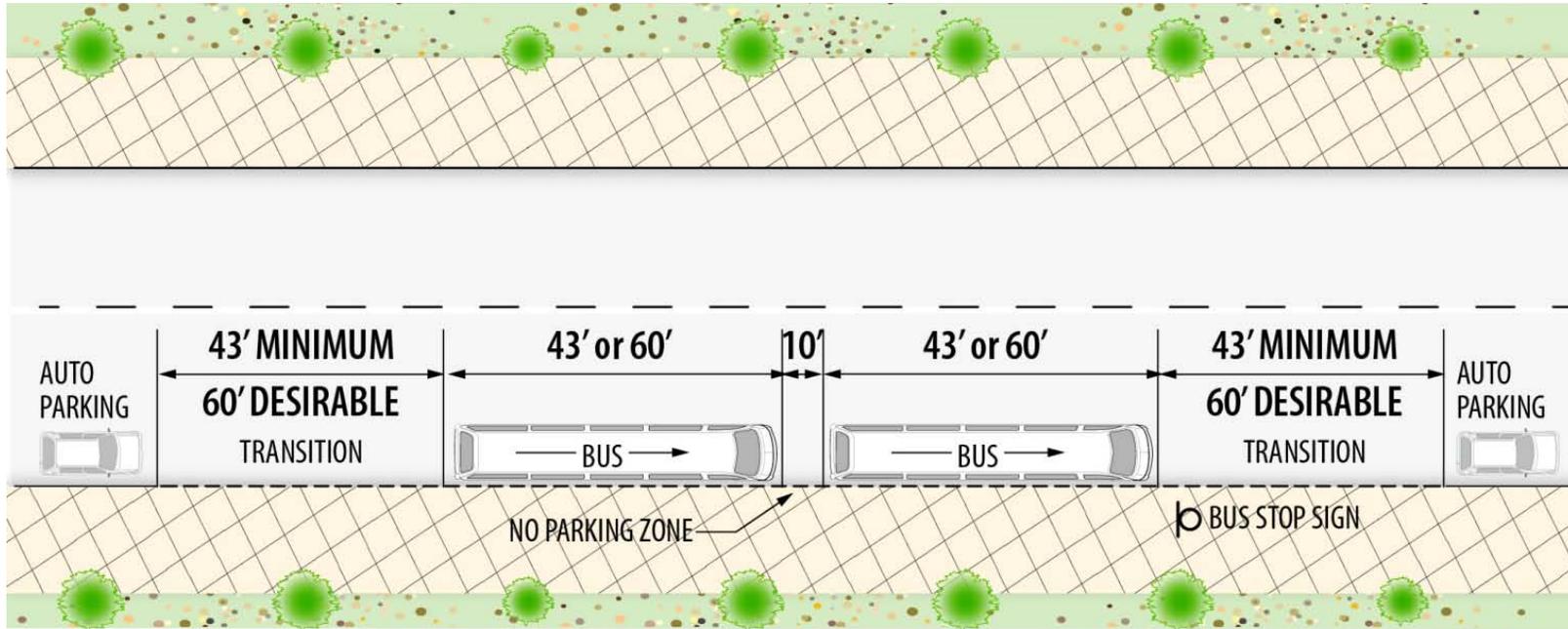
**\*43' MINIMUM FOR LOW SPEED AND LOW VOLUME STREETS  
60' DESIRABLE FOR HIGH SPEED AND HIGH VOLUME STREETS**

*Figure 5-4: Typical Dimensions for Nearside Stops*



**\*43' MINIMUM FOR LOW SPEED AND LOW VOLUME STREETS  
60' DESIRABLE FOR HIGH SPEED AND HIGH VOLUME STREETS**

*Figure 5-5: Typical Dimensions for Midblock Stops*



**\*43' MINIMUM FOR LOW SPEED AND LOW VOLUME STREETS  
 60' DESIRABLE FOR HIGH SPEED AND HIGH VOLUME STREETS**

*Figure 5-6: Typical Dimensions for Multiple Bus Stops*

## 5.4 Abutting Property Owners / Tenants

Some commercial establishments are interested in having a bus stop placed in front of their establishment, while residents may object to the presence of a bus stop in front of their home, especially if the stop is used for layovers. All efforts should be taken to minimize the impact to each property owner, but vehicle and pedestrian safety and security should be the over-riding factor in determining the final bus stop location.

Bus stops should also be located adjacent to shop windows and entrances, to allow businesses to be visible from the street, as necessary.

## 5.5 Parking Restrictions at Bus Stops

Parking restrictions (either red curb or “No Parking” signs) shall be placed at bus zones when parking is expected to impact bus operations, in accordance with the California Vehicle Code Section 22500 (i). The lack of parking restrictions could impact bus operations, traffic movement, safe sight distance, and passenger access.

It is also recommended to paint “BUS ONLY” on the pavement at bus zones. Potential issues include:

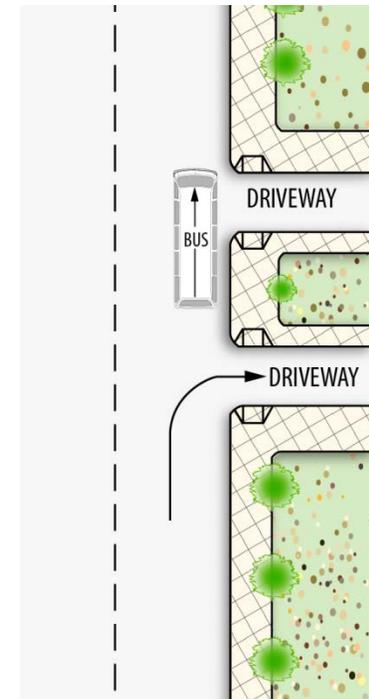
- The bus may have to double park when serving a stop, which would interfere with traffic movements.
- Passengers would have to maneuver between parked vehicles when entering or exiting the bus, which can endanger the passengers.
- The bus would lack access to the curb/sidewalk area for boarding or alighting passengers in wheelchairs.

It is important that these parking regulations are enforced in a consistent and expedient manner by the appropriate local jurisdiction.

## 5.6 Bus Stops and Driveways

Whenever possible, bus stops should not be placed within 25’ of a driveway. However, if placing a bus stop near a driveway is unavoidable, the following guidelines can be followed:

- Attempt to keep at least one exit and entrance open to vehicles accessing the property while a bus is loading or unloading passengers, as shown in Figure 5-7. 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 squeeze by the bus in a situation with reduced sight distance;
- Locate bus stops to allow good visibility for vehicles leaving the property and to minimize vehicle/bus conflicts. This is best accomplished by placing bus stops where driveways are behind the stopped bus; and
- Ensure that passengers have a safe area to wait when loading must occur in or adjacent to a driveway.



*Figure 5-7: Bus driveway conflicts*