

64-1129

ESTABLISHMENT OF BUS STOPS AND ZONES

POLICY & CRITERIA

S.C.R.T.D.
Transportation Department
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242137

POLICY FOR THE ESTABLISHMENT OF BUS STOPS AND ZONES

1. It is the policy of the Southern California Rapid Transit District, in the matter of establishing bus stops and zones, to confer with the appropriate city officials or officials of the governmental entity having jurisdiction in order to locate and properly identify such zones in a manner mutually acceptable to the District and the city or other jurisdiction.
2. Stops shall generally be established according to the following:
 - (a) In built-up or residential areas, stops will be located from one (1) block to 1/4 mile apart depending upon the population densities and transit dependency.
 - (b) Stops will be located at locations where passenger travel patterns converge and where public transportation routes cross each other. These stops will be located as close to the transfer points as possible.
 - (c) Stops will be located convenient to activity centers with every attempt made to locate within one (1) block of the major activity generator.
 - (d) In rural or lightly developed areas, stops will be located from 1/4 to 1/2 mile of each other.
 - (e) Where buses of municipal carriers utilize the same streets as the District, every effort will be made to utilize joint stops where practical.
3. In locating stops, the following criteria will be taken into consideration in priority as listed:
 - (a) Passenger safety
 - (b) Vehicle safety
 - (c) Affect on traffic
 - (d) Affect on adjacent property owner
 - (e) Convenience to passengers

The detailed guidance for location and configuration of bus stops are contained in Transportation Department publication, "Criteria for Location of Bus Stops", dated April, 1976. This publication is in concert with, and elaborates on, the policy stated herein.

4. Local jurisdiction will be requested to post established bus zones with appropriate "No Parking" signs and/or paint the curb red.

5. In the event that the consent of a city should not be given, after all efforts to obtain city approval have been exhausted, and it has been determined through review at Department Head level that the stop is operationally necessary under the policy contained herein, the matter will be brought to the Board of Directors of the District for review and decision.

CRITERIA FOR LOCATION OF BUS STOPS

1. Stop Locations with Reference to Through-Bus Movement

- (a) With normal traffic flow, or a light right turning movement with no special turn indication:
 - (1) Locate bus stop at farside of intersection. (Fig. 2)
 - (2) If physical curb treatment renders a farside impractical, move across intersection to nearside. (Fig. 1A)
 - (3) If nearside is impractical, move to midblock. (Fig. 3)

2. Stop Locations with Reference to Turning Bus Movements

(a) Bus Turns - Right

- (1) Establish nearside stop prior to turn. (Fig 1A). If right turns are an appreciable factor, locate bus stop some distance prior to intersection. (Fig. 1C or Fig. 3). If right turns are very heavy, stop may have to be located farside after turn (Fig. 2), or midblock (Fig 3).

(b) Bus Turns - Left

- (1) Establish farside stop after turn (Fig. 2).
- (2) If impossible, establish midblock stop after turn (Fig 3). A midblock stop prior to turn may be feasible if traffic is sufficiently light and block long enough to allow bus to move from stop to left turn position without traffic conflict.

3. Midblock as a Special Case

(a) Midblock stops are established under the following conditions:

- (1) Where traffic or physical street characteristics prohibit near or farside stop and/or
- (2) Where large factory or commercial house exists and heavy loading dictates location, and
- (3) Where midblock curb parking is prohibited and enforced for at least 105 feet for a single bus stop. If additional buses are to be accommodated simultaneously, parking must be cleared for the space sufficient to be occupied by the additional buses.

4. Interchange Points

(a) Through-Bus Movements - East and West, North and South (Fig. 4).

- (1) If heavy transfer between North and West movements, establish farside stop for North movement, nearside for West movement.
- (2) If heavy transfer between North and East movements, establish farside for East movement, nearside for North movement.
- (3) If heavy transfer between South and West movements, establish farside for West movement, nearside for South movement.
- (4) If heavy transfer between South and East movements, establish farside for South movement, nearside for East movement.
- (5) Or combinations of 1 through 4 above as the transfer movements dictate.

(b) Turning Bus Movements at Interchange Point

- (1) If a heavy transfer exists between a straight through-bus movement and a right turn, both of which operate on the same street in the block preceding the turning movement, establish the stop in the midblock before the turning movement. If one of the movements involves a left turn, interchange point should be located at least one (1) block prior to left turn unless traffic is sufficiently light and the block long enough to allow bus to move from stop to left turn position without traffic conflict.
- (2) If (1) above applies after turning movement, establish stop according to 2 (a) and (b).

5. Special Application to One-Way Streets

The foregoing statements apply generally to one-way streets. Usually stops should be located where they do not constitute an impediment to right turning movements. Occasionally, consideration may have to be given to left turns as well where street width is narrow or turning movements are heavy. Normally, less interference is occasioned by nearside stop where traffic on cross street approaches from the right. However, bus stop should be located at sufficient distance from intersection to prevent undue reduction in sight distance at the intersection. When traffic on cross street approaches from the left, a farside stop may be preferable unless bus stop is placed far enough in advance of intersection to allow freedom of movement to traffic making a right turn. (See Fig. 5).

Where bus movements are exceptionally heavy and one-way streets are wide enough to permit the establishment of loading zones thereon, the use of an additional lane for buses has been suggested as a means of reducing traffic delays caused by heavy transit bus movement.

6. Stop Locations Near Points of Traffic Convergence

At intersections where right turns, left turns, and straight forward movements converge to form a heavy flow of traffic, the farside stop tends to interfere with traffic movements, particularly at those locations where the farside stop is on the throat carrying a major flow of traffic away from the intersection where convergence occurs. Nearside or midblock stops, located before the point of convergence, reduce delays to other bus routes that converge as well as other traffic. However, for obvious reasons, a nearside stop should not be made at intersections where bus makes left turn.

7. Stop Locations Near Points of Traffic Divergence

At intersections where bus routes and heavy traffic movements diverge, a farside stop can be used to advantage since it is located beyond the point of divergence. (Farside or midblock stop locations reduce the interference and delays for following buses and for all other traffic.)

8. Location of Stops with Reference to Traffic Signal Installations

In selecting stop locations at signalized intersections it is desirable to select a location which will not require the bus to make a double stop - one for a traffic signal delay and one for bus loading. Consideration should also be given to the effect that bus loading delays will have on traffic movements when the bus normally arrives during a green signal period. If the bus stop is located at an intersection which is within a coordinated signal system, the selection of the stop location may depend entirely upon the signal aspect displayed when the bus arrives; i.e., if bus normally arrives during green phase, a farside stop is indicated, and conversely, normal arrival on red signal would indicate nearside stop.

At isolated traffic signal installations, where the signal operates on a fixed cycle, the number of bus arrivals during either a green or red period will depend upon the proportionate amount of time allotted to the respective signal aspects. At isolated locations, all other factors shall be considered in addition to the presence of the traffic signal installation.

9. Location of Stops in Relationship to Adjacent Establishments

In order to promote good public relations, it is desirable that bus stops be installed at locations where they will cause least annoyance to the adjacent residents or property owners. Some commercial establishments are interested in having bus stops in front of their business establishments. Many residents object to bus stops in front of their homes. Patrons may object to stops being located adjacent to objectionable activities.

10. Consideration of Physical Features Affecting Patrons

For the convenience and protection of bus patrons, consideration should be given to the proximity of shelter and adequate street lighting, the existence of traffic control features which provide for their safety, boarding and alighting surfaces and areas, etc.

11. Enforcement of Parking Regulations

Automobile drivers are accustomed to the standard parking regulations existing on all sides of an intersection. For this reason, parking restrictions at nearside or farside stops can be enforced with comparatively less difficulty. The midblock bus stop requires a parking regulation at a location where drivers are accustomed to parking privileges and it is more difficult to enforce.

Unless parking regulations are strictly enforced at stop locations, the bus is required to double park in a position which interferes with all traffic movements on the street and seriously endangers transit patrons.

12. Location Check List

Since many considerations normally enter into the selection of the proper location for a bus stop, the following check list should be for correlation of the factors involved:

	Near Side	Far Side	Mid- Block
<u>I. Bus Movements</u>			
1. Bus thru movement	_____	_____	_____
2. Bus right turn	_____	_____	_____
3. Bus left turn		_____	_____
<u>II. Traffic Movement</u>			
1. Light right turn	_____		
2. Heavy right turn		_____	_____
3. Converging traffic	_____		
4. Diverging traffic		_____	_____
5. One way from right	_____		
6. One way from left	_____	_____	
<u>III. Passenger Movement</u>			
1. Heavy transfer to and from bus approaching from left	_____		
2. Heavy transfer to and from bus approaching from right		_____	
3. Major origin or destination of passengers (factory, etc.)	_____	_____	_____
4. Need and availability of additional curb space for peak-hour loading	_____		_____

	Near Side	Far Side	Mid Block
IV. <u>Passenger Facilities</u>			
1. Sidewalk and landing surfaced and unobstructed	_____	_____	_____
2. Street lighting	_____	_____	_____
3. Protection from weather	_____	_____	_____
4. Traffic control favorable to pedestrian	_____	_____	_____
5. Favorable transfer connection	_____	_____	_____
6. Incompatible adjacent property use (taverns, pool halls, etc.)	_____	_____	_____

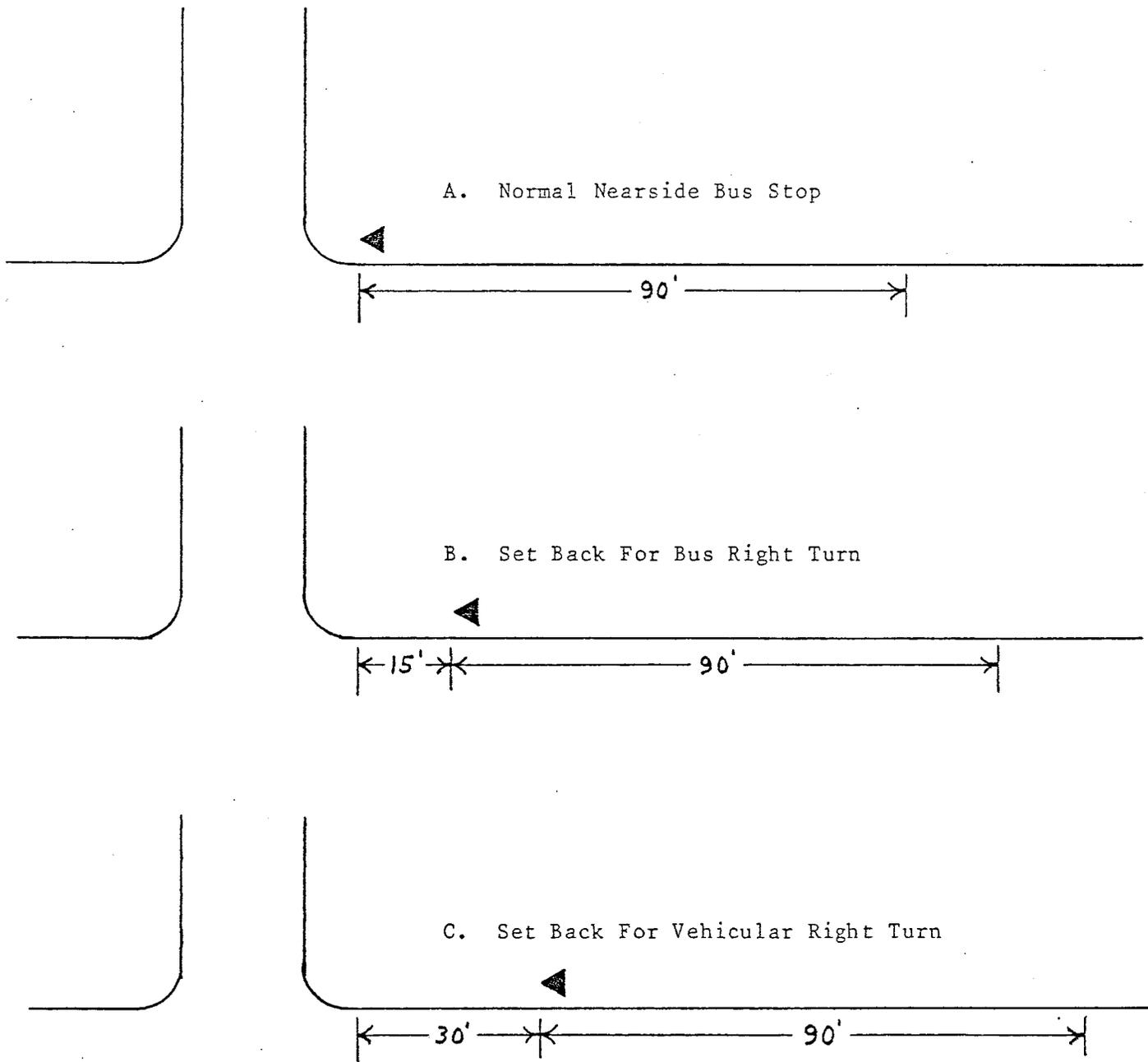


Figure 1. LOCATION OF SINGLE NEAR SIDE BUS STOPS

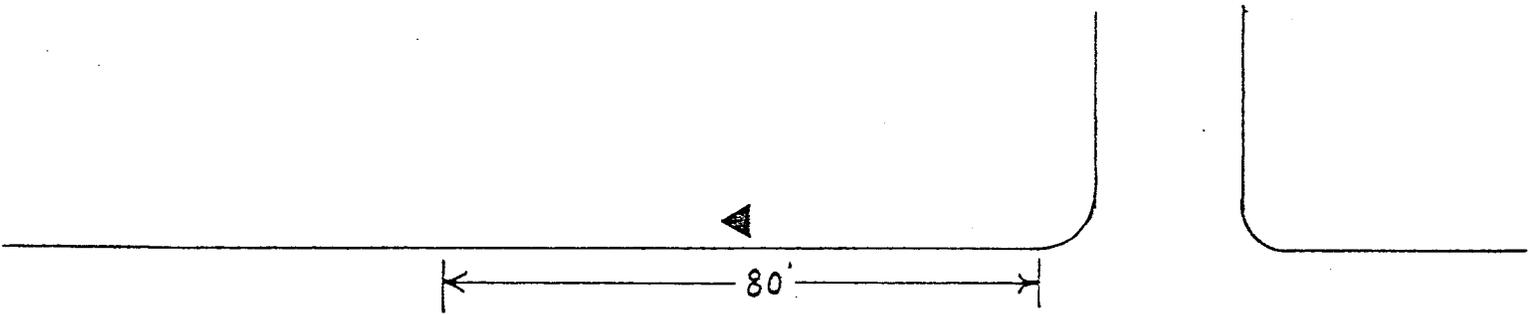


Figure 2. NORMAL FAR SIDE SINGLE BUS STOP

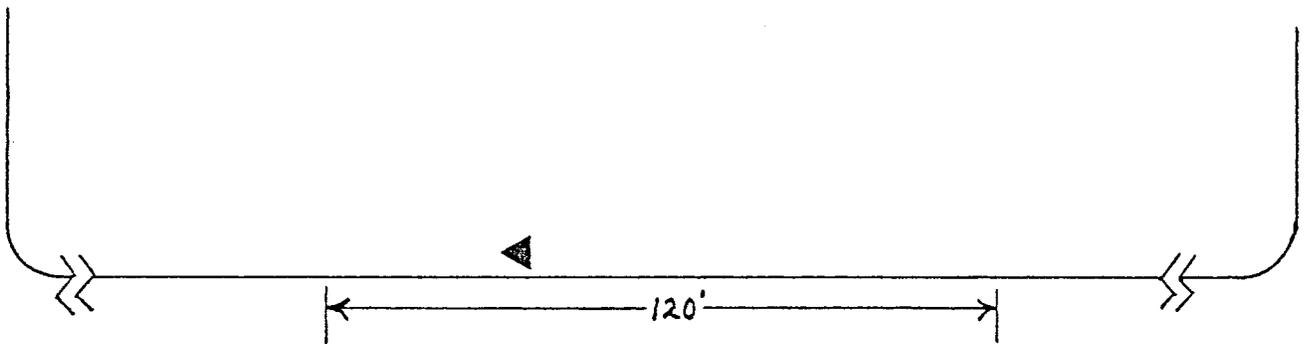


Figure 3. NORMAL MIDBLOCK SINGLE BUS STOP

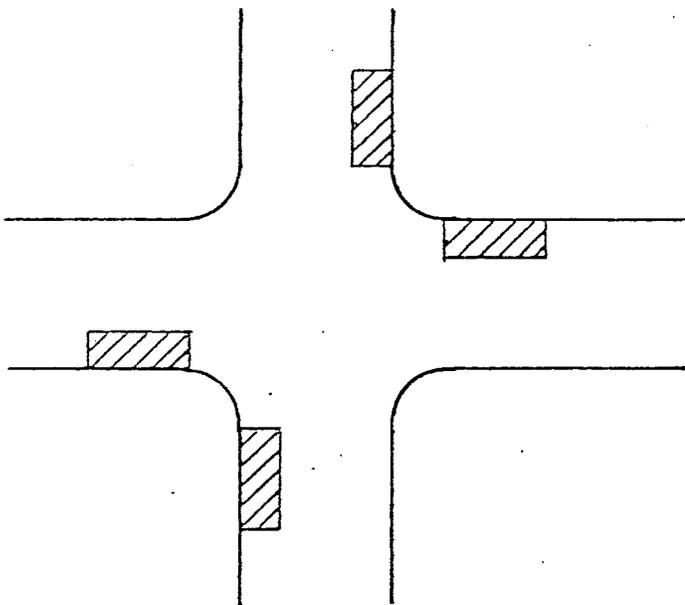


Figure 4. STOPS LOCATED TO FACILITATE PASSENGER TRANSFER

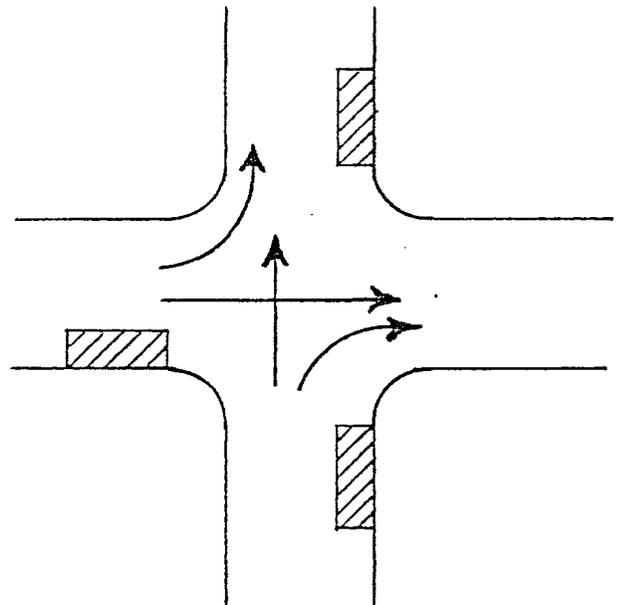


Figure 5. LOCATION OF BUS STOPS ON ONE-WAY STREETS

BUS ZONES

LOCATING/SELECTING A BUS ZONE

Safety of our passengers and equipment shall be the Number One concern in locating/selecting all new bus stops. Study the intersection and determine where the bus can stop safely and with the least objections from the residents or businesses adjacent thereto. Establish the zone where the least amount of parking will be affected. Experience will teach you what types of businesses will resist your efforts.

Always ascertain the number of Lines operating at the intersection and bus turning moves. If there is more than one Line operating in the intersection and one of the Lines turns there, it will create a common stop situation. After you familiarize yourself with the conditions at the intersection selected, then review it with the local authority in charge of bus stop locations. In dealing with the local engineer, police department, city manager, etc., remember that you will probably have to make many requests of them in the future, and you need their cooperation. Present your choices to them with engineering logic. Good, clear sketches should accompany any requests for proposed bus stop locations. In most cases, thorough field work prior to meeting with the City or County representative will help present your proposal better.

There are pros and cons regarding the establishing of bus stops nearside versus farside. Each location should be governed by the conditions at each intersection.

Some of the following factors must be considered in stop locations and street capacity. Change in bus route direction; the origin and destination of patrons boarding or leaving bus; operation of traffic signals controlling the intersection before bus stops may be established; layover zone and fare break zones where the coaches are required to layover while making their fare checks must be considered on a more selective basis than that of a regular coach zone. The terminal zone cannot be established across driveways or in such a manner as to block traffic. Desirable locations where a restroom facility can be provided for our operators and also afford them the greatest amount of protection by keeping them in a well-lighted street to lessen the hazards of being a victim of armed robbery or assault must be considered.

NUMBER 1, NEARSIDE BUS STOPS: ADVANTAGES: Buses accelerating from a nearside stop are under better control in the intersection than vehicles decelerating at a farside stop. Operators attention is not diverted by cross traffic and turning vehicles when pulling into a nearside stop. Compared to a farside stop, nearside stops eliminate the practice of loading and of unloading at non-established loading points, and eliminate the tendency for persons to run out into the street, trying to board a bus at a non-established loading point while it waits for a signal change. Operators have a direct view of three directions from which passengers may come at a nearside stop. Farside stops provide direct view only in front with unsatisfactory views of sides. A bus stopped at an intersection waiting for a signal change at approach to farside stop may encounter difficulty pulling into curb lane due to vehicles attempting to pass on the right side. Farside stops

encourage greater approach speed near the intersection and more frequent signal violation in effort to beat the signal in order to reach farside stop. Nearside stops encourage the stopping and slowing at intersections and it becomes much easier for the bus to leave the curb from a nearside stop.

Many riders automatically wait for their bus at a nearside stop out of habit. Refusal of a bus driver to load or unload at a non-established point while waiting for a signal change, at the approach to a farside stop irritates some riders. At a nearside bus stop, buses continue to load while waiting for traffic signals to change, thus making productive use of time. In suburban areas, nearside stops eliminate curb parking near intersections by location of nearside bus stops, thereby increasing street capacity.

NUMBER 2, FAR SIDE STOPS: ADVANTAGES: Safety. At nearside stops, passengers leaving a bus have the tendency to try to cross in front of the bus. This situation is not present at a farside stop, which also eliminates hazardous condition of vehicles making right turns in front of a stopped bus, which could start up suddenly. More access space is available for pulling to the curb which reduces the potential of side-swiping parked vehicles. Rear exit doors are spotted closer to the curb at farside stops. Farside stops eliminate blocking the view of traffic signals by a bus, which is common at a nearside stop. ~~They reduce accidents due~~
ACCIDENTS caused by the rear end of the bus protruding into another traffic lane at nearside stops ARE REDUCED.

Convenience. It is easier for a bus to enter a farside stop in urban areas. Also, encourages use of back door for exiting, since it is closer to crosswalk than the front door.

Traffic. Eliminates congestion of right turning vehicles waiting behind loading buses at nearside stop. Right turning vehicles stalled at crosswalk due to heavy pedestrian movement do not hold up buses which can use inner lane to approach farside bus stop. Expedites right turns permitted on red signal which would ordinarily be blocked at nearside stop.

Special conditions. Pedestrian generator locations: Bus stops should be located where the greatest amount of pedestrian traffic is generated. Bus patrons should not be required to cross major streets when this can be avoided. This factor will quite often determine the proper location for the bus stop, whether to be located nearside or farside.

Interchange and transfer points. It is desirable to provide bus zones in such locations that interchange between lines may be effected conveniently without crossing major streets.

Similarity. At the junction of two lines proceeding in the same direction they should have a common stop at their junction to avoid the confusion of two loading points for the same direction of travel. The bus routes will generally indicate the most suitable loading points to satisfy these conditions. At intersections where the street width changes abruptly it is usually advisable to locate the stops at the wide section, whether near or farside, as a means to minimize interference with other traffic.

Physical Characteristics. Desirable locations. There are physical features which sometimes determine the proper location for a bus stop. These include pedestrian tunnels, irregular and offset streets, intersections, boulevard stops, existing sidewalks, crosswalks, etc. It is frequently desirable to concentrate all pedestrian movements into one crosswalk to reduce pedestrian conflict areas. This may call for a combination, nearside stop on one side, with a farside stop on the other.

Undesirable locations. Similarly, there are numerous locations where physical barriers and objectionable adjustment develops rule out those locations as bus stops. These include high curbs, drainage structures, hazardous driveways, alley ways, poles, trees, shrubs, steep grades and proximity to bars and night clubs.

The above clearly indicates that each stop location must be evaluated individually.