CHAPTER 7
URBAN SRA ROUTES

7.1 TRANSIT

Techniques associated with mass transit which may be applicable in certain urban situations are described below. All measures are supportive of bus and/or rail service and are consistent with the objectives of the SRA system.

7.1.1 Light Rail Systems

On selected arterials, where development densities would support them, construction of light rail lines may be considered. At the present time the City of Chicago is planning a light rail system serving the Chicago central area; segments of this system may be located in the Ohio/Ontario corridor. In selected urban corridors which have been identified in the 2010 Transportation System Plan, implementation of light rail lines may be appropriate later in the twenty-year planning period. Reserving rights-of-way would allow preservation of the option of light rail system implementation.

7.1.2 Circulator and Shuttle Services

These services provide connections between office buildings, retail centers, social services, residential developments and other major trip generators, and may be operated by either the public or the private sector. Within the urban environment, the typical application would be to have buses serve an area with several large activity centers, such as office complexes, medical facilities, apartment buildings, universities or portions of the Central Business District. Shuttles may also connect transit facilities to employment and other activity centers. For example, Diversified Regional Centers as proposed for consideration in the NIPC Strategic Plan for Land Resource Management would be appropriate locations for circulator and shuttle services.

7.1.3 Ridesharing

Carpools and vanpools are the most common forms of ridesharing. Carpools are frequently privately organized, but employers sometimes sponsor vanpools. In Northeastern Illinois, CATS and the Regional Transportation Authority assist with the organization and start-up costs of vanpools. On request, CATS also provides assistance in identifying carpool participants. Marketing and financial support for van and carpooling programs are strategies which complement the SRA program in general, and in selected major activity areas, can have a significant effect on traffic congestion.

7.1.4 High Occupancy Vehicle (HOV) Lanes

Section 4.4 discusses the criteria and conditions that should exist before High Occupancy Vehicle (HOV) treatments are to be considered. Where criteria and conditions can be met on urban SRA routes, provision of HOV lanes should be considered in the specific route configuration. Examples of the application of HOV lanes are shown in *Figure 7.1* and *Figure 7.2*. If the median bus lane treatment shown in Figure 7.2 is proposed, automobile left turns from the urban SRA route should be permitted only at other SRA routes.

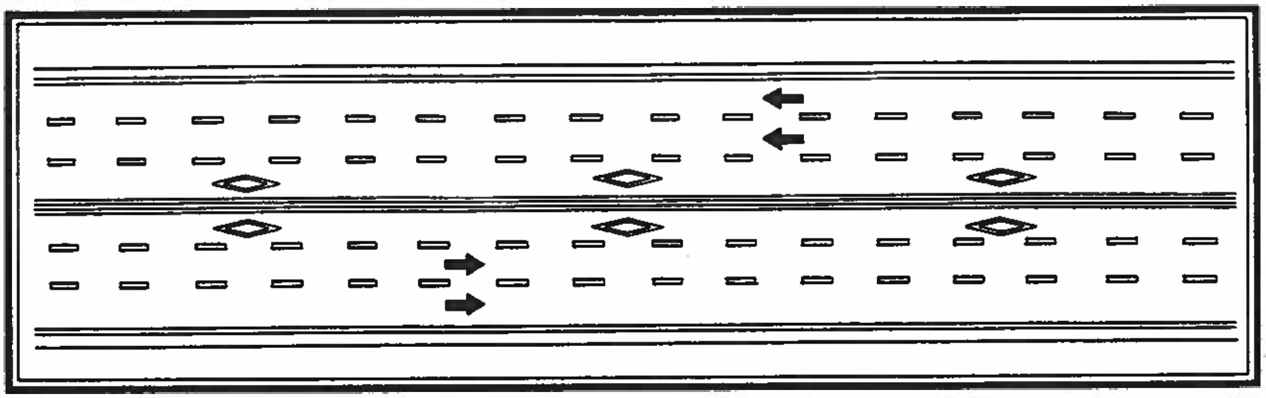

Figure 7.1 HOV Lane Application

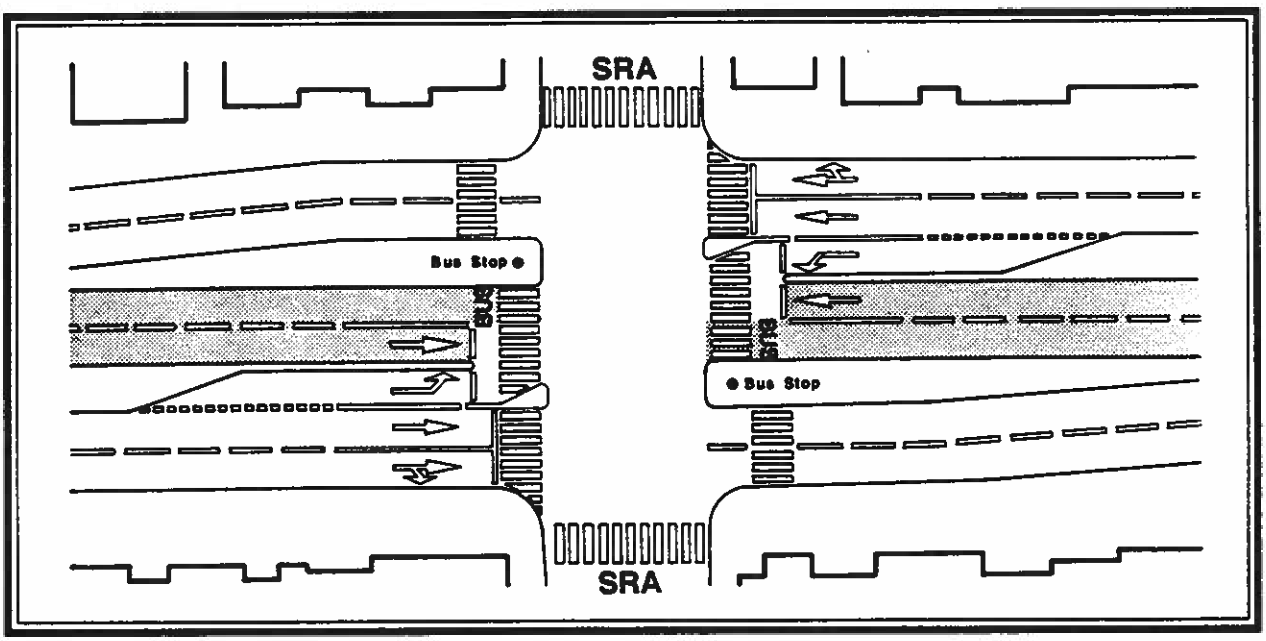

Figure 7.2 Center Bus Lane Treatment

7.1.5 Transit Contra-Flow Lanes

Lanes on urban SRA facilities could be dedicated to transit vehicles which travel in the reverse direction from the normal traffic flow. See *Figure 7.3* for an example of a typical transit contra-flow lane. Contra-flow lanes have been used in downtown Chicago, and have been very effective in reducing both bus travel times and bus operating expenses. Difficulties can occur in educating the public as to how they work so that accidents can be prevented, in segregating the lanes, and in signing. Because of accident potential, transit contra-flow lanes are not generally recommended. A physical barrier to separate the bus lane from the sidewalk may be necessary. This design option should, nevertheless, be considered to improve transit travel times on urban SRA routes where additional lanes cannot be easily added because of space limitations and reserve capacity is available in the non-peak direction.

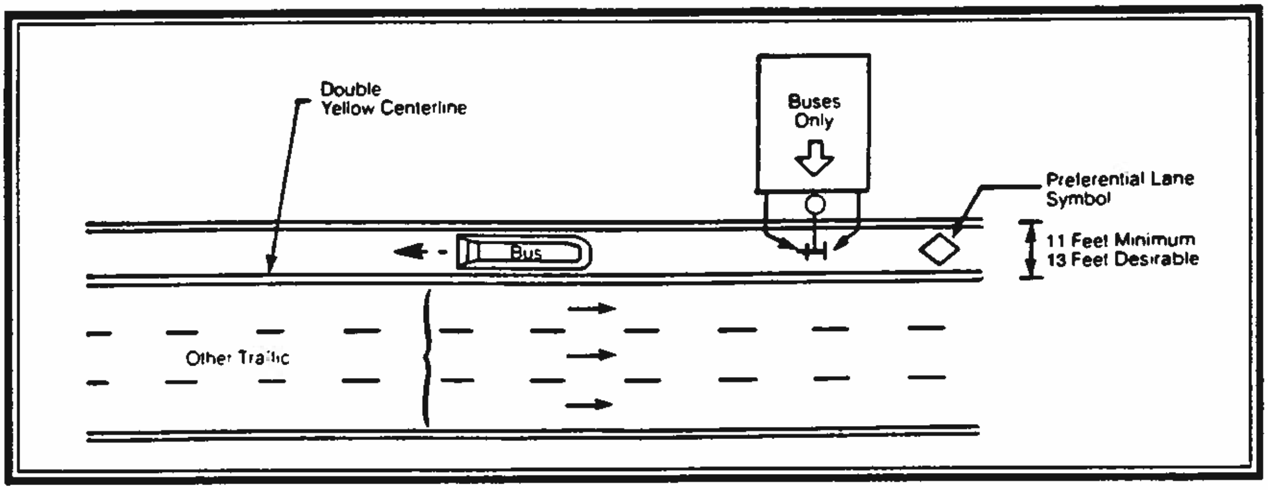

Figure 7.3 Typical Transit Contra-Flow Lane

7.1.6 Passenger Facilities

Passenger facilities, which make it easier and safer to use transit while minimizing SRA congestion, should be provided. Ideally, these facilities are constructed in proximity to, but off of the major arterial. They include sheltered facilities where riders can transfer among bus and rail services, as well as between personal autos and transit. These facilities offer comfort, convenience and safety. Sidewalks should be built along the roads to complement transit facilities, including bus stops, and to connect them with commercial, retail and residential complexes.

7.1.7 Signal and Intersection Improvements

Signal and intersection improvements which benefit transit should be considered in appropriate situations. Signal preemption capability for transit vehicles is an important amenity. This capability would permit transit vehicles to speed their flow through traffic, reducing travel time and increasing potential for transit use. Signal preemption should only be activated to keep buses on schedule.

7.1.8 Improved Transit Station Accessibility

Improved transit station accessibility concepts are discussed in detail in Section 8.1.8.

7.1.9 Transit Signage

A sign system should be developed for public transportation that is consistent with the overall signage plan for the SRA system. The creation of such a sign system would guide motorists along the SRA routes to transit facilities, warn of possible train and pedestrian traffic ahead, and heighten public awareness of alternate modes of transportation.

7.2 ROADWAY OPERATIONS

7.2.1 Intersections

In urban locations where an SRA route intersects with another SRA or major intersection, unmarked pavement areas often exist. These areas often leave much to the discretion of the driver. Channelization and traffic islands can be used at these locations to guide motorists, reducing confusion and conflicts. When properly designed, channelization can also increase intersection capacity.

Traffic islands can also provide pedestrian refuge at wide urban intersections. When used as pedestrian refuge areas, islands must be of sufficient size and protected by a raised median curb.

An example of using channelization on an urban SRA is shown in *Figure 7.4*.

Reconstruction of offset intersections can also improve traffic operation where cross-street traffic is forced onto the SRA rather than using a single intersection. Elimination of offsets at signalized locations can reduce the traffic flow on the SRA route.

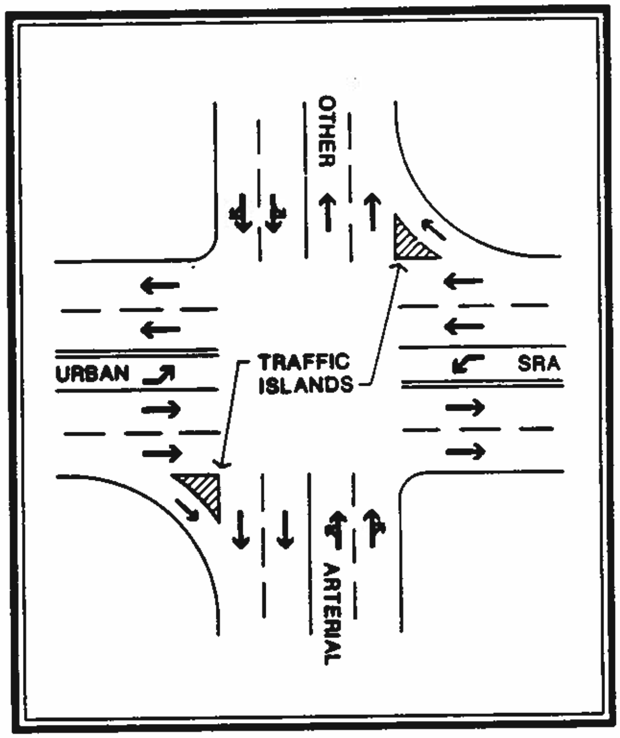

Figure 7.4 Channelization Islands

7.2.2 Driver Information Systems

In addition to providing signs and pavement markings to guide motorists, providing motorist information on congestion, construction, or other incidents which may affect their trips is increasingly important.

Driver information systems may include variable or fixed message signing, radio and television traffic reports, newspaper articles, and brochures. Newspaper articles and brochures work well for long-term construction projects where maps of the area and alternative routes can be provided to the public. Radio and television can be helpful in warning drivers of congestion, accidents or short-term maintenance and possibly providing alternate routes. Variable message signs can be used for both long-term and short-term information, provided the message board can be changed conveniently and from a remote location. In the Chicago area drivers can call *999 to report information on current traffic conditions on the Chicagoland expressways.

These more traditional approaches to driver information systems have been used extensively throughout the United States. However, the following ideas could be employed to improve the systems and apply them to the SRA system as well as the expressway system:

- Expand the current coverage of the radio traffic reports and changeable message signs to include SRA routes.

- Establish a clearinghouse for obtaining and distributing information on traffic conditions to the proper locations.

- Continue to explore new incident detection methods as well as methods for distributing the information to motorists. As new technologies are developed and are proven effective they could be employed on the SRA system.

The future of driver information systems is "smart" cars and "smart" roads. The idea behind smart cars is that an on-board computer would receive information concerning traffic conditions, alert the motorist and recommend a course of action. There have been several different types of "smart" car ideas ranging from an on-board computer map system to aid the driver, to systems which can receive the destination from the driver and combine this with updated traffic conditions to choose the shortest route. Several prototype smart cars have been tested throughout the world.

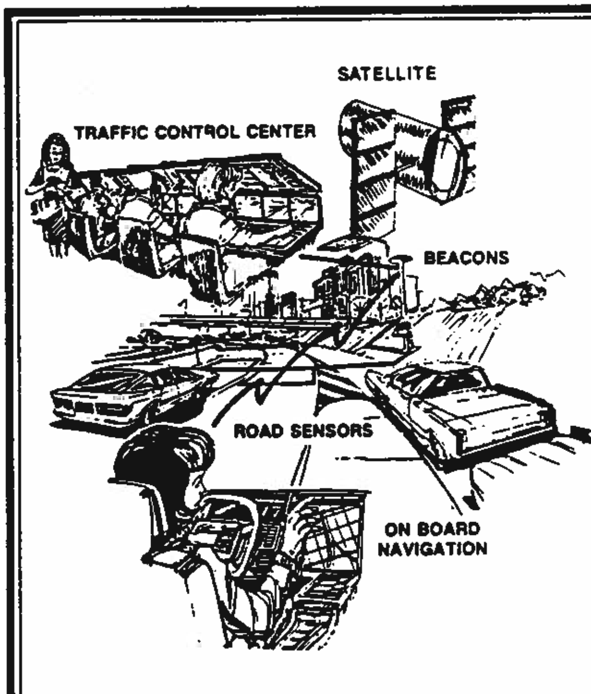

Figure 7.5 Driver Information Systems

In Illinois, the feasibility of a demonstration project is being studied by the Illinois Department of Transportation. This project is the largest of its kind to date. It could include 2000 to 5000 cars equipped with computerized displays which would inform drivers of congestion and alternate routes. The decision to proceed with this project could be readied as soon as 1991. *Figure 7.5* shows the components of an advanced driver information system.

7.2.3 Advance Signal Interconnect Methods

Presently, signals are interconnected by time base coordination, 7-wire hardwire and twisted pair wiring. In some cases, signals are interconnected by lines leased from telephone or cable TV companies. A communication wire is often a vulnerable link in a signal system. Wires are sometimes inadvertently cut by maintenance work and construction, disrupting signal progression. Recently, advances have been made in the way traffic signals are interconnected to achieve coordination. New methods include radio, coaxial cable, and fiber optics.

Radio interconnection has the advantage of eliminating any interconnect wiring and the expense of conduit installation on an existing street. This would prove most beneficial in urban areas where interconnecting signals may be limited by the inability to install conduit or overhead wire.

Coaxial cable interconnection methods have the ability to transmit video for surveillance and control of signal systems. Fiber optics is an excellent communications carrier with multi-channel capability. However, coaxial cable and fiber optics both require special technical knowledge for installation and maintenance. These new methods of signal interconnection can provide additional capabilities such as transmitting video which could be used in conjunction with driver information systems.

The selection of an interconnect method should include an evaluation of reliability, maintenance and desired uses.

7.2.4 Left Turn Lagging Signal Phase

The use of a lagging left turn signal phase (e.g. the left turn phase comes after the through phase) can improve synchronization. Progression bandwidths, which controls time available during which all cars can progress through a series of signals, can be increased with lagging left turn phasing.

This type of phasing should only be allowed at T-intersections or intersections allowing left turns only on the protected phase. The lagging left turn should not be used in conjunction with a left turn yield on green for opposing traffic flows.

7.2.5 One-Way Arterial Pairs

One-way arterial pairs can dramatically increase the capacity of a roadway by reducing turning movements and conflicts. The one-way pairs should be within close proximity of each other, and therefore, this concept would be most feasible in urban areas where right-of-way for capacity increasing improvements is limited, and where closely-spaced parallel streets are available. An example of this concept is shown in *Figure 7.6.*

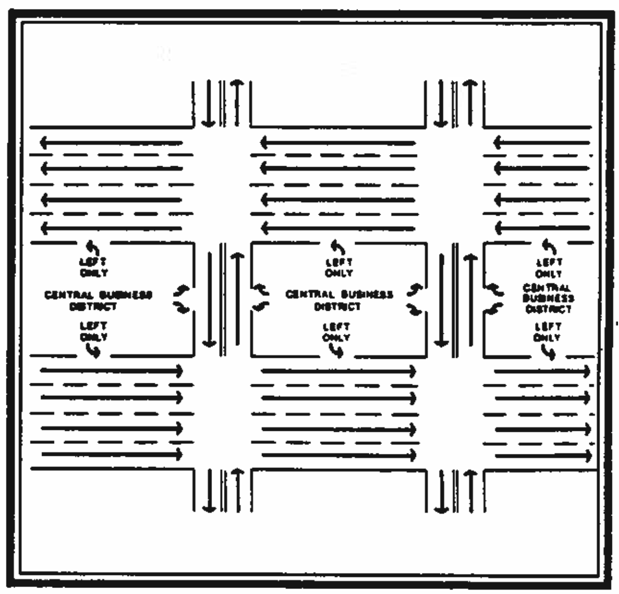

Figure 7.6 One-Way Arterial Pairs

7.2.6 Reversible Lanes

In areas where there is a substantial amount of commuter traffic, and a directional bias to the traffic corresponding to the time of day, reversible lanes could be considered.

Using lane control signals in combination with signing, the direction of flow could change in areas where capacity is limited and directional flows exist. A specific example of the use of this technique is Ridge and Hollywood Avenues from Peterson Avenue to Lake Shore Drive, which uses three eastbound lanes during the morning rush hour (one westbound) and three westbound lanes in the afternoon (one eastbound). Lane control signals are used in combination with road cones to alert drivers to the current lane usage. *Figure 7.7* shows this section of roadway during the morning peak period.

This technique would be most useful on urban SRA routes where right-of-way is limited and other capacity increasing techniques are not feasible.

Figure 7.7 Ridge Avenue Reversible Lanes

7.2.7 Left Turn Restrictions

At intersections where capacity is limited and volumes are high, left turn restrictions and elimination of signalized turn phases may be necessary. This will increase capacity on the SRA and reduce intersection conflicts. Alternative routes or access will be required for the affected movements.

In some instances limiting left turn movements to off-peak periods on an urban SRA route can be beneficial to roadway operations. This alternative is particularly adaptable in locations where turn lanes are not available because one turning vehicle can effectively reduce the the SRA capacity by one-half if only two through lanes are present.

7.3 ROADWAY DESIGN FEATURES

7.3.1 Grade Separations

Capacity and safety on the urban SRA route is at the highest level when the SRA is grade separated from intersecting cross streets and railroads. Limited right-of-way and economic considerations of construction cost restrict the use of grade separations to special locations. Protection of sufficient right-of-way is critical wherever a grade separation is recommended. The design of the grade separation and corresponding right-of-way requirements are based on the design criteria in *Table 4.2* in Chapter 4.

7.3.2 Interchanges

Conventional intersection widening and signalization techniques may not provide sufficient capacity at every SRA intersection. An urban SRA intersection projected to operate at a peak hour level of service E or F in year 2010 with conventional improvements will be the basic criteria for interchange evaluation.

Insufficient right-of-way in the urban environment represents the greatest impediment to the feasibility of interchange construction. For this reason, other criteria such as the elimination of spot congestion and hazards do not represent adequate and cost effective criteria for interchange construction in the urban environment.

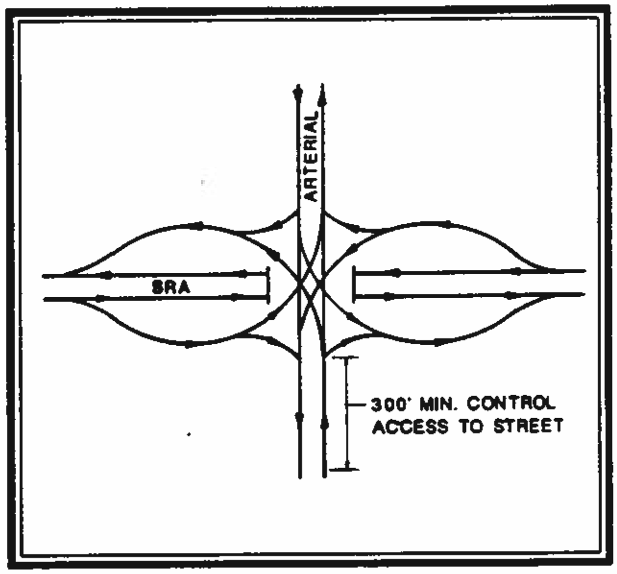

Figure 7.8 ***Single Point (Urban) Diamond Interchanges***

Because of right-of-way limitations, the single point (urban) diamond interchange or the compressed diamond interchange as shown on *Figure 7.8* and *Figure 7.9*, are the recommended interchange types for urban SRA routes. The construction of either interchange type is limited to the area within the existing right-of-way at most urban intersections. The single point diamond requires less right-of-way than the compressed diamond and provides more capacity in most cases. The urban diamond may provide more efficient storage of left turn vehicles on the cross road compared to the compressed diamond. However, the compressed diamond may be more applicable in urban areas because of the existing access requirements at intersection corners. Access can be permitted onto the interchange ramps near the cross street. The applicability of each type should be evaluated at each location. The SRA must receive the grade separated through movement priority for interchanges with cross streets of lower classification and volume.

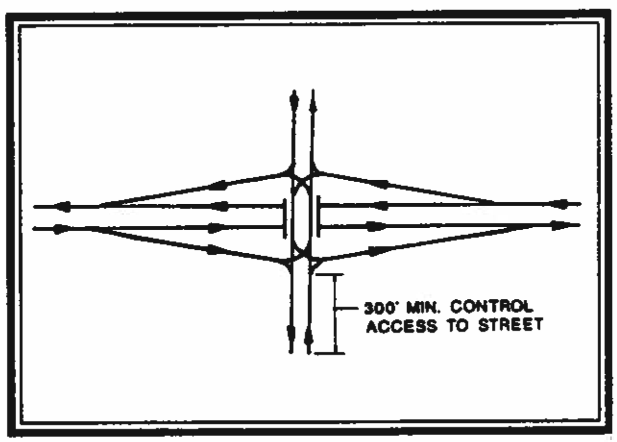

Figure 7.9 ***Compressed Diamond Interchanges***

Where an interchange is proposed at the intersection of two urban SRA routes, the route that is designated for grade separated through movement priority should be determined by which route is projected to carry the heavier traffic volume. Certain geometric, right-of-way and access requirements, however, may mandate that the other SRA route receive the grade separated through movement priority.

A U-turn movement could be added to a diamond interchange between an urban SRA and a lower class/volume cross-street. The underpass U-turn would allow SRA users to access an opposing frontage road without having to pass through signalized intersections on the cross streets (See *Figure 7.10*).

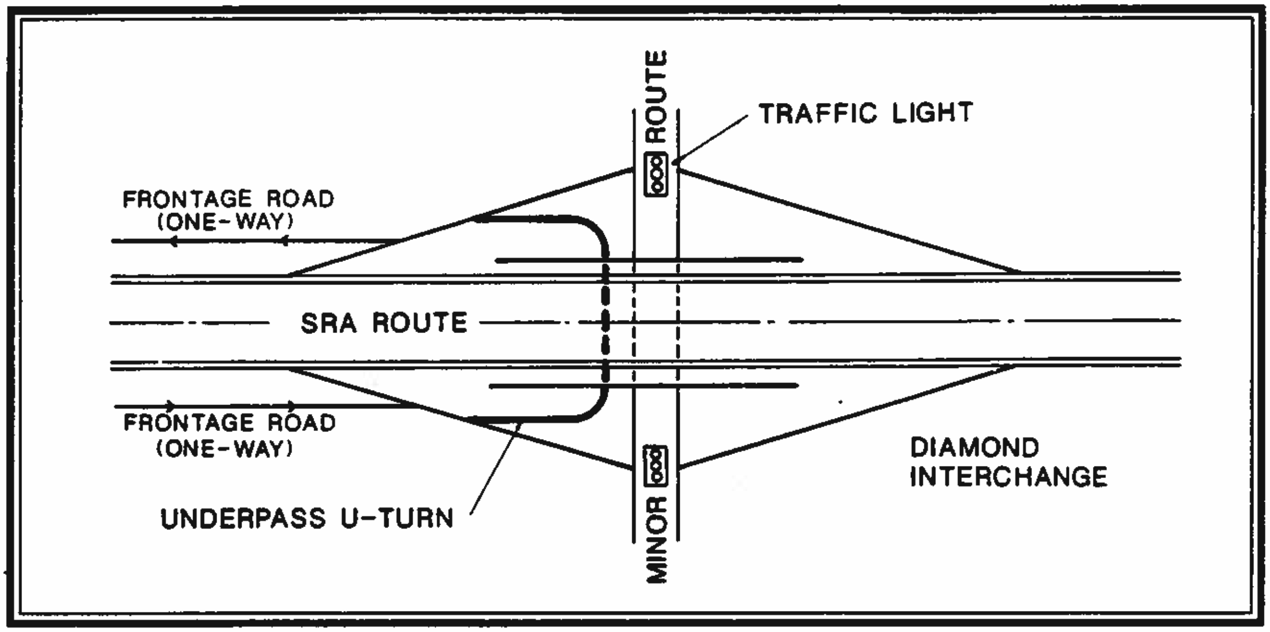

Figure 7.10 Underpass U-Turn

7.3.3 Existing Interchanges with Expressway/Tollway System

Each existing interchange between an urban SRA route and the metropolitan Chicago expressway/ tollway system should be evaluated in the SRA planning process. Some existing interchanges are of the half diamond or partial cloverleaf design which permit access to the expressways from the urban SRA routes in one direction only (usually oriented towards the Chicago Loop). Traffic conditions and directional flows that existed when these interchanges were initially constructed have changed significantly in some cases. Consequently, the absence of some directional movements at the interchanges may be detrimental to arterial and/or expressway traffic by forcing longer trips through circuitous routing.

It is recommended that existing interchanges that do not provide all directional movements be evaluated for potential to add those movements. Ramp types that may be considered include direct "diamond interchange" ramps in restricted right-of-way areas or "cloverleaf" type ramps if adequate right-of-way is available. Before a final recommendation is made regarding the additional ramps, however, the impact of ramp additions must be evaluated for its effect on the expressway. Expressway interchange/ ramp spacing, capacity and safety should be factors considered. If studies indicate that the level of service on the expressway would be lessened with the addition of the ramps, then they should not be proposed.

Other improvements that may be considered at existing interchanges with the expressway/tollway system include widening the SRA structure over the expressway, lengthening storage bays for left turning vehicles from the SRA to the ramp, construction of separate right turn lanes and interconnection of traffic signals to promote progression along the urban SRA route.

7.3.4 Restrictive Right-of-Way

It is recognized that certain urban SRA routes consist of a 66 foot right-of-way with no building setbacks for existing development. It may not be feasible to obtain additional right-of-way required for expansion into the desirable urban SRA roadway cross section at these locations (See *Figure 4.1*).

In these restrictive right-of-way locations, it is recommended that emphasis be placed upon the implementation of two through lanes in each direction, allowance of left turns from the SRA only at major intersections and the consolidation or control of intermittent access points. Other applicable techniques include permanent on-street loading restrictions and designation of an alternate freight route onto a parallel facility.

7.3.5 Major Projects/Corridors of the Future

The 2010 Transportation System Development Plan recommends eight future major expressway projects and six future major transit projects and identifies six major expressway corridors of the future and seven major transit corridors of the future. SRA roadway design should make special allowances, such as flexible designs and additional right-of-way, at intersecting points and parallel facilities for these future major projects/corridors of the future.

7.3.6 Commencement/Terminus of Urban SRA Routes

The commencement/terminus points of urban SRA routes may require changes in roadway cross-sections, such as a reduction in the total number of lanes, elimination of channelized median treatment or change in posted speed. Tapers or transitions should be provided in these instances to avoid abrupt and unsafe cross-section changes and provide smooth transitions.

7.4 ACCESS AND RIGHT-OF-WAY

7.4.1 Access Management

Length of travel time and driver safety are affected by the number and configuration of access points to the SRA. Each driveway and cross street adds to congestion and increases the likelihood of accidents. Where these problems are particularly serious, the following techniques may improve traffic flow without seriously inconveniencing access and cross traffic.

7.4.1.1 Eliminate Local Street Access

The intersection hazards and congestion at some low volume local streets could be eliminated by terminating or rerouting the street prior to its intersection with the urban SRA. The typical urban street pattern of 8 to 12 streets per mile makes this alternative feasible. Increased capacity would result on the urban SRA route. The impact of this alternative must be evaluated prior to its implementation to assess local traffic patterns, land use impacts and its effect on emergency vehicle response times. Streets which serve as collectors should not be considered for elimination of access to the SRA. While streets can be closed to motorists, access should be maintained for pedestrians and bicycles.

Where the cross streets are wide enough, they could be converted into mini-parking lots where parking would be compatible with nearby land uses. Alleys could be used for deliveries and access to on-site rear parking where available. Additional directional signage would aid motorists in finding parking convenient to their destination.

7.4.2 Right-Of-Way Protection

7.4.2.1 Less Than Fee Simple Acquisition

Acquiring only the rights to the land that are needed to accommodate particular users can reduce cost and environmental impact. Full possession of land is made of many rights including rights to use the surface, subsurface, and air space and access to the land. In some cases, acquisition of only one of these rights would be adequate to relocate one or more right-of-way users.

Use of subsurface rights is common in the Chicago central area. Mass transit, streets, and pedestrian ways honeycomb the subterranean landscape. Pedestrian use of public open spaces and pedestrian ways connecting parallel streets are common. New applications could include surface rights-of-way for pedestrian ways, transit stops, and alley improvements. Air and subsurface rights would remain with the landowner (see *Figure 7.11*).

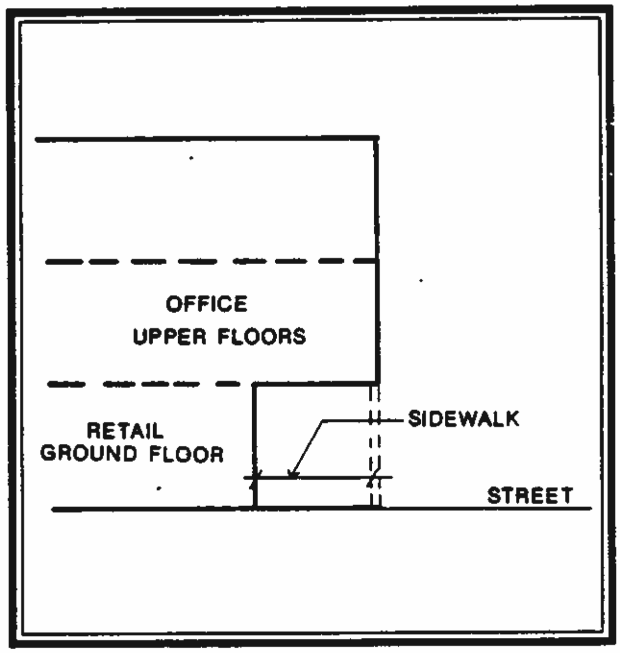

Figure 7.11 Surface Rights Easement

7.4.2.2 Alley Maintenance and Improvement Agreements

Along many segments of urban SRA routes, buildings are separated from the lanes of traffic by only a sidewalk and parking. In these situations, improvement and maintenance of existing alleys can provide some alternatives for certain uses, such as off-street loading.

Alleys are the hallmarks of early, grid-like subdivision practice (see *Figure 7.12*). They can be as much as thirty feet wide and most are at least half that. Access to the rear of buildings, particularly for service traffic, is certainly possible. Many property owners already use the alley for access. Improvements to encourage greater use of these often ignored pathways would lend to better maintenance and more regular supervision.

7.4.2.3 Acquisition of Out-Holdings

Some segments of the SRA network were developed so that older homes and commercial development intrude into the otherwise standard right-of-way causing short bottlenecks. Developed intersections may also have less right-of-way than is necessary to make needed improvements. Purchase of these properties is one method of bringing these segments into conformity (see *Figure 7.13*).

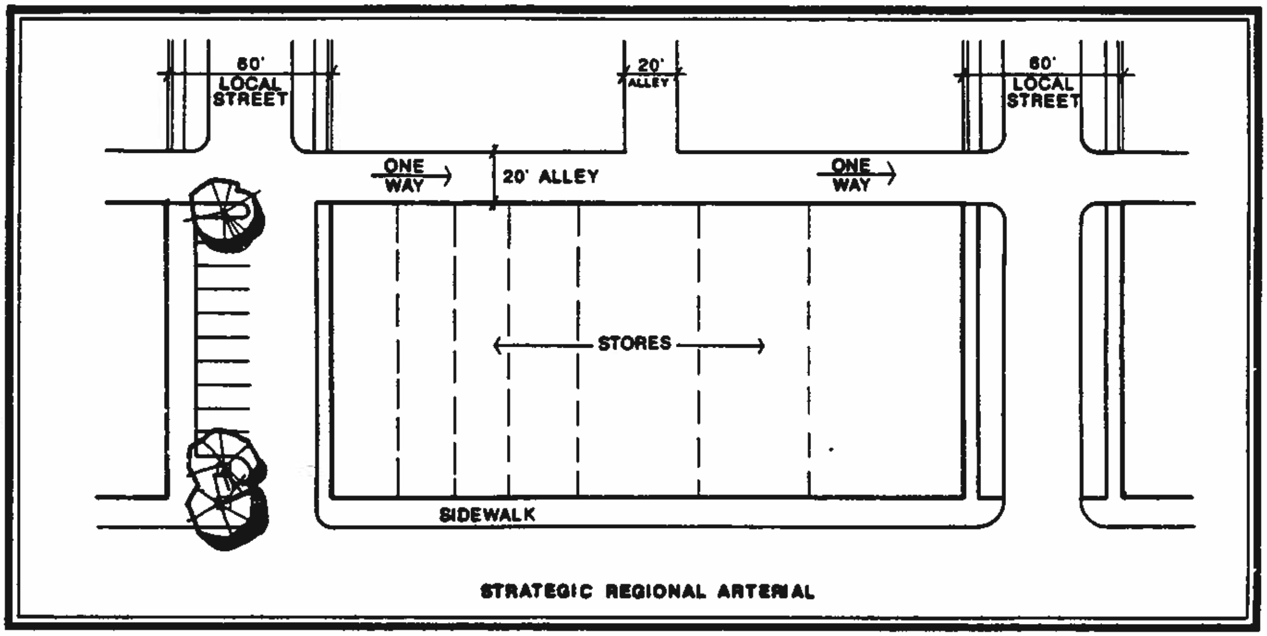

Figure 7.12 Alley Development

7.4.2.4 Right-of-Way Substitution

Some communities value existing land uses over transportation needs. In some instances, it may be preferable to relocate one or more segments of the SRA over expanding the existing roadway. If a portion of the route is relocated, the implementing agency could assume responsibility for maintenance of the new segment, while the local government would assume maintenance of the existing roadway.

7.4.2.5 Supplementary Corridors

In all areas of the region there are unused or underused rail beds, rivers, and canals that offer many miles of unobstructed right-of-way. Their expanded use or adaptive reuse could provide much needed supplements to existing routes. Compatibility with the adopted NIPC Regional Greenway Plan will be addressed. Plans for redevelopment of railroad rights-of-way could reserve enough corridor to provide a throughway for possible future transit or freight.

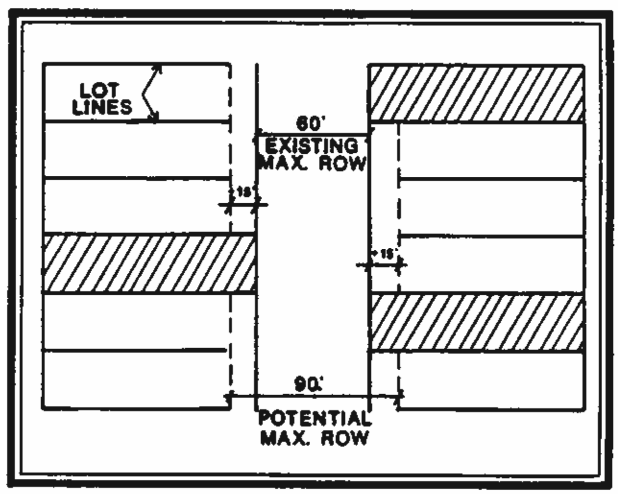

Figure 7.13 Out-Holdings

7.4.2.6 Partial Purchase and Site Rehabilitation

The object of this strategy is to acquire enough of a site as is needed for the right-of-way and to make repairs or build facilities to restore the property to its original function. Examples might include parking spaces and corner businesses. Parking spaces can be rebuilt, if there is space elsewhere on the parcel. Corner commercial enterprises can be moved or rebuilt.

7.5 FREIGHT

7.5.1 Vertical Clearance Improvements

The need and methods to improve structural vertical clearances on urban SRA routes have been discussed in Section 2, Recommended Designs and Features, Chapter 4. The recommended vertical clearance standard for urban SRA routes is 14 feet - 6 inches. If the methods for improving structural vertical clearances are judged not feasible at a particular structure, then designating an alternate freight route around the structure may be a realistic option.

7.5.2 Turning Radius Improvements

Insufficient turning radii for freight vehicles at intersections on urban SRA routes negatively affects traffic capacity because it takes much longer for the freight vehicle to make the turn. It is desirable that the turning radii at SRA to SRA urban intersections be capable of accommodating the WB-50 design vehicle without encroachment into oncoming traffic.

Turning radii improvements should not be indiscriminately applied. In urban areas there are frequently heavy pedestrian volumes and shallow setbacks for buildings. Turning radii improvements should only be proposed after it is ascertained that the existing sidewalk widths or adequate pedestrian capacity can be maintained.

7.5.3 Loading Zones

When there is no opportunity for any off-street options, the impact of on-street loading can be minimized. Specifically this would include the elimination of on-street parking on the SRA and the installation of loading zones in the curb lane. These zones should have restrictive hours so that they are used only in off-peak periods. The zones should be located so that right-turning traffic can use the curb-lane at intersections. *Figure 7.14* presents a typical arrangement of on-street loading zones.

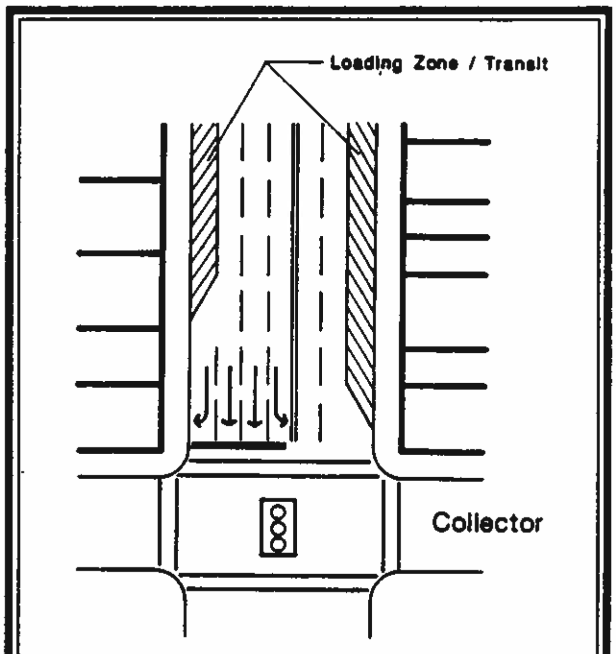

Figure 7.14 Typical Treatments for On-Street Truck Loading Zones

It may be possible to serve the loading needs of some properties by improving alley space for access by delivery vehicles. Service and freight vehicles could exit the SRA on either a collector or local street and enter the alley behind the building to which the delivery will be made. Loading and unloading should have a time restriction in alleys that are too narrow for two vehicles to pass one another. One-way alley operation may also be considered to reduce delivery vehicle conflicts.

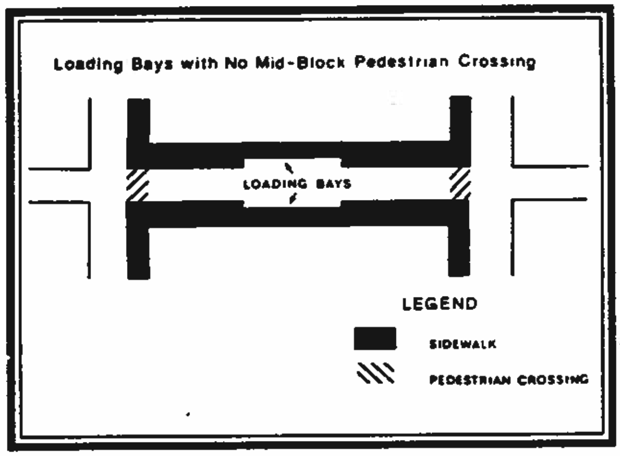

Figure 7.15 On-Street Truck Loading Bays

Another option is to move the loading zone to a local side street. In this situation, parking would be prohibited and loading bays would be created using a part of the sidewalk area. Such a treatment should only be considered where pedestrian traffic is relatively low and alleys are not present. *Figure 7.15* presents typical treatment for local street loading.

Where unused land is available, a central loading area in the middle of a block and behind the buildings could be developed. While large delivery vehicles probably could not use such a facility, since the area would be too small for maneuvering space, small dual-axle vehicles could use it. *Figure 7.16* displays this concept.

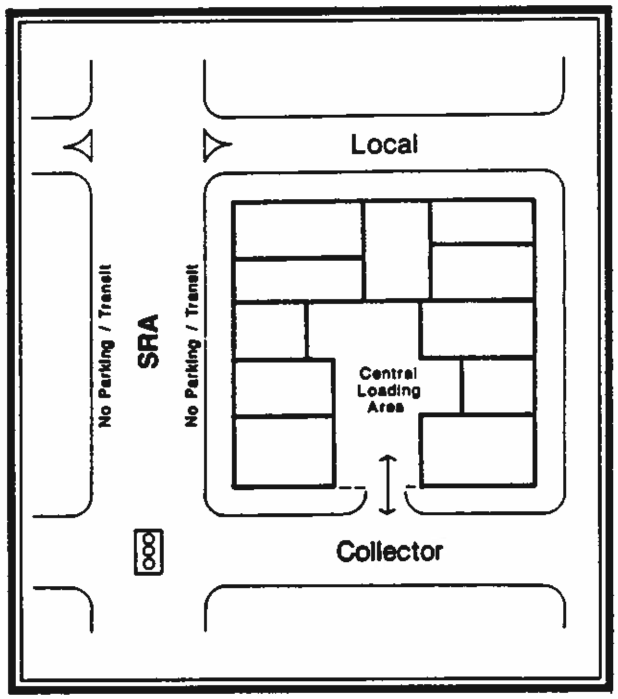

Figure 7.16 Central Loading Area

7.5.4 Alternate Freight Routes

Alternate freight routes on urban SRA routes should be considered when there are inherent capacity restraining features such as inadequate number of through traffic and turn lanes, insufficient vertical clearance for a structure or series of structures, substandard turning radii at intersections, or where surrounding land use patterns make freight delivery a non-essential element.

Alternate freight routes should be designated on roadways parallel to the urban SRA which do not cause a great deviation from the route of travel and should be clearly signed to indicate the alternate route.