The basic approach in this study was to create development patterns that follow corridors and occur as linear extensions of urbanized areas. Transit routes will operate most effectively in a linear pattern with very few turns. These overlapping demands of market forces and transit engineering provide a natural situation for the development of organized transit corridors.

A few transit systems have developed guidelines for land use design. Most of these guidelines tend to focus on the individual site. This report furthers that concept by incorporating the present array of specific site design rules into a comprehensive set of guidelines that addresses transit on a systems level.

There are three major guideline categories: (1) Administration and Policy, (2) Systems Planning, and (3) guidelines related to the Design of the Transit Corridor Districts. While there is some overlap to these categories, guidelines are organized in this sequence. The systems planning and district planning guidelines each have three parts: land use, access to transit, and transit operations guidelines. Systems planning deals with the overall location of transit corridor districts, access to public transit and general rules for the operation of transit services. District level planning relate to the way in which land uses are arranged within a transit corridor district, how access is provided and how transit services are accommodated. Policy guidelines are not site specific and relate to how things are implemented, who has input in the process and how services and areas are managed. The guidelines that are provided are shown in Table 1.
### Administration and Policy Guidelines

Modify state and local policies to include transit as an element of land development (23).

Zoning should encourage transit-sensitive land use design through the designation of Transit Corridor Districts (TCDs) (24).

Provide for transit-sensitive review of site plans and development proposals (26).

Provide transit checklist for potential developers (28).

Parking requirements in TCDs should reflect availability of transit services (30).

Establish a Transportation Management Association to oversee transportation services and land use development along the transit corridor (31).

Provide a mechanism for transfer of development rights (TDRs) for the land surrounding the TCDs (32).

### System Planning Guidelines

#### Land Use Design

- Predesignate a future system of transit corridors (35).
- Separate transit-oriented and auto-oriented lands (39).
- Establish transit service zones along existing arterials (40).
- Explore public/private opportunities for transit and joint development (41).
- Provide adequate population size and density to support transit use (42).
- Design for a phase implementation of transit corridors (47).

#### Access Systems

- Control of through automobile traffic (49).
- Use corridor for primary pedestrian, bicycle, and transit movement (51).
- Avoid need for shuttle service (53).

#### Highway/transit relationship (55).

- Provide high quality transit service (56).
- Transit vehicles should be quiet and have low air pollution levels (57).
- Identity: Signage and compatibility of stops (58).

### ORGANIZATION OF GUIDELINES

Table 1: Transit Sensitive Land Use Design Guidelines
**Table 1: Transit Sensitive Land Use Design Guidelines (continued)**

### District Level Guidelines

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<td>Minimize the distance between building entrances and transit stops; provide logical connections between buildings and transit (79).</td>
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<td>Building location and design should be sensitive to transit-generated noise and views (81).</td>
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**GUIDELINES FOR TRANSIT SENSITIVE SUBURBAN LAND USE DESIGN**
ORGANIZATION OF GUIDELINES
F. Administrative and Policy Guidelines

The first set of guidelines relate to administrative procedures and overall policy which should be established to create a better setting for the integration of land use and public transit. These guidelines call for transit agency involvement in the review of development proposals and project designs.

A second area discussed is the establishment of special zoning districts, called Transit Corridor Districts (TCDs), which concentrate travel demand along future transit corridors. Transit-oriented land uses should be located in the TCD, while other land uses would be generally located outside of the district. Changes in parking codes and procedures to manage a TCD are also provided.
Modify state and local policies to include transit as an important element of land development.

Traditionally, the only government agency concerned with transit issues (excluding funding) has been the local transit agency itself. However, most development decisions in a metropolitan region are made by municipalities that have little or no involvement with transit service. While these guidelines are designed for the integration of transit consideration into local development decisions, this is problematical without the state's role in the encouragement of transit usage.

State statutes lay the groundwork for the operations of all municipalities. State statutes can provide the impetus for all municipalities to consider transit planning. The state should modify sections of the statutes that discuss the development of land or zoning to acknowledge the inherent relationship between land use and transportation. In more specific sections the statutes should require municipalities to consider transit and pedestrians in the development review process.³

Zoning should encourage transit-sensitive land use design through the designation of Transit Corridor Districts (TCDs).

The local zoning ordinance is the primary tool used to implement land use policy. Unfortunately transit issues are seldom addressed in contemporary zoning ordinances. The local zoning ordinance should be updated to include the consideration of transit throughout all relevant sections. The inclusion of transit in the code will provide a regulatory basis for the enforcement of the guidelines in this report. While some guidelines involve general concepts, others will need to be specifically added to the zoning ordinance. Detailed transit regulations should be incorporated in the zoning code for Transit Corridor Districts (TCDs).

Additions to the existing zoning ordinance will improve a municipality’s efforts to encourage transit, however, conventional zoning districts can still provide inadequate regulation of development in areas with a potential for high transit use. Transit Corridor Districts would provide a specially zoned area that is especially responsive to the use of transit. A TCD would permit much greater regulation of transit-related concerns in primary service areas while allowing the conventional zoning code to govern development in other areas. All land falling within a TCD would be subject to guidelines similar to those outlined in this report. Property outside of a TCD could be subject to some of the same concepts found within the guidelines, especially those concerning individual site design, but traditional zoning techniques would be utilized.

The review process for proposed projects in a TCD would be much like the review process for planned unit development used by many municipalities. The TCD would expand upon the concept to a 'Transit Overlay Zone' used in the Portland, Oregon area that focusses on the mixture and density of developments near light rail stations.
Transit districts of ten to eleven acres in size were created at light rail stations for high density residential and office development. Another example are the many historic districts zoning ordinances created to preserve the history of many older downtowns.

Transit Corridor Districts may be areas along existing arterial streets or could anticipate the location of new roadways/corridors for future transit-oriented development. The selection depends upon local constraints of existing development and other physical, operational and political factors.

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Provide for transit-sensitive review of site plans and development proposals.

A major obstacle to providing efficient transit service is the lack of analysis of transit factors in the site plan review process. Traditional site design planning practices are contradictory to efficient transit service and municipal staff are usually not familiar with the concept of transit sensitivity. If staff cannot effectively include transit in the site review process, then the local transit agency can be involved in this process.

Transit agency review should be included for many types of development proposals in a community. Guidelines would be made part of the Transit Corridor Districts and transit agency review would be a part of this approval process. Other suburban locations should also be reviewed based on a lower standard of transit operations.

This additional step in the development approval process requires cooperation between transit agencies and municipalities but the results will benefit both the municipality in terms of less review effort and the transit agency in better site designs. Another benefit is that comments on site design can remain consistent through the region. This consistency will benefit developers as well as the transit agency and municipalities.

The incorporation of transit route planning early in the land use decision making process will, in most cases, ensure that walking distances to transit are kept to acceptable levels. Community planning and road system design should also provide for the incremental extension of transit routes without the need to restructure or substantially revise existing service.

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\(^5\) Snohomish County, "Guide . . .," chapter 9.
The following guidelines may be useful in planning a street network which can be efficiently served by public transit:

- Design arterials and transit services in advance of development, to connect clusters.

- Encourage neighborhood and service area designs that minimize street lengths and the percentage of area devoted to streets.

- Apply suitable roadway geometries to accommodate bus turning maneuvers.

- Ensure that streets identified for possible transit usage be structurally capable of supporting the weight of transit vehicles.

- Pedestrian pathways should be provided on streets carrying transit. Sidewalks and an attractive pedestrian environment are particularly necessary on collector and arterial roads.

Bicycle access to transit centers, park-and-ride lots, freeway flyer stops, and other major bus stops should be encouraged by local jurisdiction. Wide curb lanes (13 feet minimum) or striped bike lanes should be considered for major streets leading to transit facilities.6

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Provide transit checklist for potential developers.

Local governments should work with transit agencies to create a checklist that can be used by real estate developers and their consultants during the site design stage. The checklist should be a condensed version of the guidelines. This is an opportunity for the municipality to minimize plan review time by showing the developer what is preferred before any plans are drawn. A sample of such a checklist as developed by the PACE Suburban Bus Service in Illinois is shown on Table 2.
Table 2. CHECKLIST FOR TRANSIT AGENCY REVIEW OF DEVELOPMENT PROJECTS

The Transit Checklist can be used to evaluate the accessibility of a development to public transportation. Development plans can be critiqued by answering the questions on the checklist. These questions are designed to receive a "Yes" response if the development will accommodate transit vehicles and provides access to public transportation. If a "Yes" response is not received, refer to the appropriate chapter in the Guidelines for design suggestions. If further assistance is required, PACE will review development plans and provide transit-related design suggestions and technical assistance.

*Do the roads within and around the development incorporate the following features to make the development accessible by public transportation?

  * Intersection radii for driveways and intersections designed for a 52.5-foot outside turning radius.
  * Roadway grades that are 3% or less.
  * Roadway pavement should be constructed to handle vehicles with loads of 20,000 lbs. per axle.
  * Bus loading pads should be designed with a minimum 8" portland cement concrete jointed reinforced pavement and a 4" subbase of stabilized granular material.
  * Lane widths of 12 feet.
  * Curb heights of 6 inches.

*Are residential developments designed with a central collector street that provides access for transit vehicles?

*Have bus stop locations near the development been identified by PACE?

*Are paved passenger waiting areas provided at all near-side corners of collector and arterial street intersections?

*Are passenger amenities (shelters, benches, adequate lighting, bicycle storage facilities, and landscaping) provided at bus stops?

*Are transit stops located within one-quarter mile (one-half mile in low density developments) or less of all buildings within the development?

*Have bus turnouts, berths, turnarounds and/or park-n-ride facilities been incorporated into appropriate roadway or development designs?

*Do pedestrian walkways provide a direct path from building entrances to transit stops?

*Are pedestrian walkways and bicycle routes located along the development's perimeter streets? Do they lead directly to building entrances?

*Are walkways, curbs, bus stops, building entrances, parking areas and transit facilities designed for the mobility limited?

*Do office and industrial developments over 25,000 square feet have lobbies designed with passenger waiting areas?

*Are retail, office and industrial buildings located within 150 feet from transit service?

*Is adequate lighting provided at bus stops, passenger waiting areas and along pedestrian walkways?

*Are 5% of the parking spaces near the primary building entrance from the parking lot designed for vanpool/carpool vehicles?

*Do parking spaces for the mobility limited conform in dimension and number to the Illinois Accessibility Code?

*Are parking spaces for the mobility limited located adjacent to the primary building entrance from the parking lot?

Parking requirements in TCDs should reflect availability of transit services.

The amount of parking required in a transit corridor district will be based on accessibility to transit as well as the traditional needs of different building types. The number of parking spaces will be limited along main transit corridors. Properties immediately accessible to transit stops will have the fewest number of parking spaces. This will encourage greater use of the transit system as well as allow for a higher development density near the stops.

Developments located closer to auto arterials will have traditional parking ratios to allow for a higher level of auto use. Larger parking lots should be provided for land uses that are primarily served by the automobile. These developments will be separated from the transit service. Although transit may not seem likely in these areas, the locations of buildings and parking areas may still be designed to accommodate service if it becomes necessary in the future.

In addition, innovative concepts such as joint parking should be encouraged. This type of arrangement minimizes parking areas by locating building types which use parking at different times adjacent to each other. Churches adjacent to office buildings and movie theaters are examples of such shared arrangements.

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7Snohomish County, "Guide . . .," p. 3-7.
Establish a Transportation Management Association to oversee transportation services and land use development along the transit corridor.

A Transportation Management Association (TMA) is a coalition of local businesses and other concerned parties that develops goals and appropriate strategies involving the improvement of transportation within a particular area. Transportation Management Associations are a recent phenomenon that have become important in mitigating traffic problems in impacted urban and suburban areas.  

These associations provide a regional or subregional coordination of transportation activities by participants who have a vested interest in convenient access to the impacted area. Local business leaders can often implement such changes more efficiently than government agencies.

Because the transportation system provides the armature for development within a TCD, the establishment of a Transportation Management Association should be strongly considered. A TMA not only provides a means of coordinating transportation facilities within the district but it also gives individual property owners some voice in transportation decision making.

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8 Snohomish County, "Guide . . .," p. 6-2.
Provide a mechanism for the transfer of development rights (TDRs) for the land surrounding the TCDs.

In order to ameliorate the disparity in land values created by the designation of a TCD, landowners in the surrounding areas should be able to transfer development rights to the district. By purchasing these rights, or increased floor area ratios, needed for development in the district from surrounding landowners a measure of equity is achieved as well as reduced political opposition to the TCD location. The transfer of development rights benefits the transit service by allowing private developers to concentrate dense development closer to transit stops. At the same time, outlying areas are left low densities and free from auto congestion.
G. Systems Planning Guidelines

Overall transit systems planning decisions need to be made to establish a transit-sensitive land use pattern. These decisions occur at a larger scale than an individual Transit Corridor District, generally at a metropolitan or regional scale. They are general guides which relate to overall locations of corridors and their basic structure. Guidelines for these decisions are given in the three categories which are essential to successful transit in the suburbs. These are Land Use, Access Systems and Transit Services. Systems planning guidelines for land use include the need to locate and designate transit corridor districts and/or transit service zones along arterials early enough so that a separation of auto- and transit-oriented land uses can occur. Access guidelines relate to the need to explicitly plan for pedestrian and bicycle access to transit and to control automobile traffic to avoid excessive congestion. Transit service guidelines deal with the types of transit modes that could be accommodated, vehicle design and operational patterns.
Predesignate a future system of transit corridors.

A transit-sensitive solution to land use in the suburbs must be part of an overall metropolitan or regional transportation plan. A transportation corridor must be linked to heavily concentrated locations, such as the central business district or existing major employment and/or activity centers.

An important element in making the concept feasible is to predesignate corridors for transit service and for the location of transit-oriented land uses. Early location and designation of the corridor is essential so that subsequent land use decisions can be made with a commitment to future transportation services. This will enable communities to separate auto-oriented land uses from transit-oriented land uses and to locate them in relation to the proper mode. Failure to do so will result in inappropriate levels of density, a separation of trip generators, and poor pedestrian access that would likely minimize the chances of successful transit services.

Transit-sensitive districts can be ideally accomplished by a physical separation of transit services from primary auto-oriented arterials. Transit services should be at least 1/4 mile away from the parallel arterial and should provide opportunities, through zoning, for development of land uses, population sizes and densities that relate to transit. The corridor could be located along an existing roadway or a proposed new roadway.

A transit corridor independent of a highway arterial would provide a full transit service area independent of the highway arterial -- walking distances to transit would then be limited to 1/4 mile and transit-oriented land uses should be within this distance to provide pedestrian access to transit services. A transit stop spacing of
TRANSPORT STOPs ARE LOCATED EVERY 1/2 - 1/4 MILE ALONG THE TRANSIT LINE FOR EASY ACCESS.
approximately 1/4 mile would provide good accessibility along the corridor itself where the most concentrated land uses would be located.

It is vital to establish the basic Transit Corridor District locations prior to most development activity. The most effective corridors will be initiated in undeveloped areas. The success of the corridor relies on the ability to integrate a pattern of land uses that are compatible with transit, as well as the internal design of each individual site. The use of transit-sensitive design guidelines from the beginning of the development process can accelerate corridor success.

Where ideal transit corridor locations contain some development, reasonable efforts should be made to incorporate existing land uses into the development of a transit corridor. This concept is especially important because finding large corridors of completely undeveloped land that could sustain dense growth may be difficult. More often there will be some older, scattered developments present. Future uses of developed parcels should also be considered as land use demands change over time.

Early establishment of TCDs reflects a commitment from the government to future developers that a full service transit line will operate in a specific area. This will help to eliminate fears and speculations about the future of the corridor. Demand for land along the corridor should stabilize once the zoning is established.

"The success of the corridor relies on the ability to integrate a pattern of land uses that are compatible with transit, as well as the internal design of each individual site."
Transit-related development/automobile related development.

Source: Snohomish County “Guide . . .,” p. 8-7 from Portland “Public Streets for Public Use.”
Separate transit-oriented and auto-oriented land uses.

A key element in the design of transit-sensitive suburban land uses is to spatially separate activities which are highly related to the automobile from those which are related to public transit. Certain activities are distinctly auto-dependent -- it is difficult to perform them using transit. These are activities that require transporting large objects, that require multiple stops, or that take place in evenings or weekends. Examples include purchases at a lumberyard, collecting a group of children and taking them to a soccer practice, or going out for dinner and a movie. Activities conducive to the use of public transit include those that occur with some regularity and with a direct origin-destination pattern.

To maximize the potential for the use of public transit and to alleviate suburban traffic problems, we propose a separation of land uses based on their associated traffic modes. Ideally, parallel corridors would be developed, one primarily for the automobile and its associated land uses, and one for transit and its related land uses. Land uses oriented to the automobile -- car dealers, large package retail shopping, low density housing, motels, car-oriented food franchises, large plot outdoor recreation, etc. -- should be located along highway corridors. Land uses oriented to transit -- high density residential developments, office buildings, schools, facilities for the elderly and some retail -- should be located along a transit corridor. Within the corridor a mixture of building types and the proximity of building types would also encourage pedestrian access. Concentrated locations of educational facilities, office buildings, shopping and housing would reduce the amount of transportation required -- whether by auto or public transit.⁹

⁹ See guide to auto/transit land use in Appendix A; also Snohomish County, “Guide . . .,” p. 3-8.
Establish transit service zones along existing arterials.

Ideally there should be a physical separation of at least 1/4 mile between primary auto-oriented arterial streets and transit service corridors. This may not be possible for physical, political, or operational reasons. It may also be difficult because existing development blocks the path of a transit corridor. Many of the principles of these guidelines could still apply, however, if land use along existing arterials were more effectively managed. This could be done by designating TCDs along specific zones of arterial streets to create a linear separation of auto- and transit-oriented land uses. For example, there may be a two-mile long district with transit-related land uses and building setbacks where transit vehicles would make frequent stops followed by an area of auto-oriented land uses which transit vehicles would bypass without stopping. While this may not be as efficient as having separated roadways, it still provides advantages over current systems of suburban development.
Explore public/private opportunities for transit stop joint development.

There is a symbiotic relationship between public transit and business activity. Transit provides quick, convenient access to commercial enterprises and customers and a market demand for business activities. Business activities and private developments generate trips on transit systems and help to support viable public transportation. Every transit stop should be viewed as an opportunity for joint development -- a place to link together public and private projects. The level of activity at a stop can vary from small, with the provision of newspaper boxes, public telephones, and a cash machine, to extensive retail and service areas serving both transit, employees and shoppers, with large multiple use projects directly tied into the transit systems.

The convenience of retail, service and office uses at a stop enhances the attraction of using public transit and the transit in turn strengthens these commercial activities. Convenience uses such as cleaners, flower shops, shoe repair, VCR rental and automated money machines, as in many other transit locations, will be successful as neighborhood enterprises. These will be relying on the neighborhood customers with a strong contribution due to the station location. Other uses will also have a strong competitive advantage -- this includes shopping for staples on the trip home, including grocery, drug and liquor stores.\(^\text{10}\)

Local government agencies and transit systems should work cooperatively with developers and private investors to seek out locations with good transit access for new development projects.

\(^\text{10}\)Rabinowitz, Beimborn, Lindquist and Opper, "Market Based Transit Facility Design."
Provide adequate population size and density to support transit use.

The density of trip ends at a transit stop is a critical element in determining if public transit has sufficient demand to justify its service. Both land use densities and the total population in the service area of a stop are important. Average residential densities of at least seven dwelling units per acre within the service area of a route are considered as the minimum level to justify the use of local bus routes with 30 minute headways, while densities of 15 dwelling units per acre are needed for 10 minute headways. These values, however, can vary significantly based upon assumptions that are made concerning capture rates of transit, service frequency, average fares, subsidy rates, hours of operation, speeds, and average hourly costs. These terms can be derived from settling daily revenues on a transit route to be equal to daily costs for break-even operation. The following equation results:

\[
\text{Transit trip density} = \left( \text{Cost recovery ratio} \times \text{Service ratio} \right) / 160
\]

Transit trip density is the number of daily transit trips per acre in the service area (within 1/4 mile) of a route. For a residential area this is the product of the residential density in dwelling units per acre times the trip rate in trips per dwelling unit and the capture rate (i.e. the percentage of trips that use transit). The cost recovery ratio is the average hourly cost of operation times a farebox recovery rate and divided by the average fare per passenger. As such it represents the number of trips per hour needed to generate enough revenue to operate a subsidized transit service. The cost of recovery ratio is the result of government policy as it relates to

\[11\] Seattle, *Encouraging Public Transportation Through Effective Land Use Actions*, p. 30, as developed from Pushkarev and Zupan, *Public Transit and Land Use*, p. 140.
subsidy levels and fares. For example, if a policy is set to have the users pay a
major portion of the costs with a high farebox recovery rate, this will require a
high transit trip density. If transit fares are raised, then the required trip density
would be lower.

The service ratio is the product of the frequency of transit service on the route
(vehicles per hour) and the daily hours of operation divided by the average speed
of the transit service, including stops. The units of the service ratio are daily
vehicle hours of service per route mile. It represents how often transit service is
provided. If vehicles operate frequently or for long periods of time during the day
it will result in a high service ratio and the need for a higher transit trip density.
The final term in the equation, the constant 160, is a conversion of square miles to
acres. It is 640 divided by 4 (divided by two because there is two way service and
divided by two again because the service area is 1/2 mile wide).

An example can help to understand these tradeoffs. Suppose transit service is to
be provided 16 hours per day at 30 minute headways (2 vehicles/hour) and it can
be operated at an average speed of 20 mph including stops. The average cost of
operation is $50 per hour with an average fare of $.75 and a farebox recovery rate
of 60%. What is the required trip density?

From these data the cost recovery ratio can be found as follows:

\[
\text{CRR} = \frac{50 \times 0.60}{0.75} = 40 \text{ passengers/hour}
\]

The service ratio:

\[
\text{SR} = \frac{16 \times 2}{20} = 1.6 \text{ vehicle hours/mile}
\]
The required average transit trip density in a route's service area:

\[ TTD = \frac{CRR \times SR}{160} = \frac{40 \times 1.6}{160} = 0.4 \text{ trips/acre} \]

The required transit trip density can be converted to residential or employment densities given assumptions on the portion of trips that use transit and trip rates per household. There is an important tradeoff between these factors. In the above example, a trip density of 20 trips per acre is required if there is a 2% capture rate by transit, but only 4 trips per acre if the capture rate is 10%. The density requirements drop off rapidly if transit successfully captures market share. On the other hand, a high capture rate is likely the result if there are low fares and high levels of service. These in turn increase the need for higher trip density. Thus there are many combinations of factors that need to be considered in determination of required density levels for transit.

The figures to the left indicate how four of these factors, transit capture rate, average fare, service frequency and farebox recovery rate, affect the necessary trip density. The required trip density varies inversely with capture rate and average fare. An increase in these factors leads to a lower density needed to support transit service. Trip density varies directly with service frequency and farebox recovery rates. If high levels of service are provided, there will be a need for higher densities. These graphs were developed using the data from the example and holding everything constant except the variable on the x axis of the graph. A five percent transit use was used in the base case as well. These indicate that the required residential and employment densities for transit are strongly dependant upon policy (i.e. subsidy rate fares), as well as operational factors.
Development is Phased Over Several Years’ Time
Design for a phased implementation of transit corridors.

The development of a redesigned suburban environment based on high accessibility to transit services is a long term project. There must be an assurance of quality transit service in order for private developers to commit to projects that rely on transit for a portion of their access. Similarly, there must be a concentration of demand and trip density in order to provide quality transit. Failure to do one leads to the failure of the other. Implementation should be done in phases in order to accommodate intermediate stages of land use and transit services. It is important that the system works well at all points in time so that a viable transit service can be provided to encourage further land use activity. Flexibility is also required since the sequence of projects is largely determined by private developers and market forces beyond the control of local government agencies. The design and associated zoning regulations and approved procedures should provide a framework for implementation which permits flexibility rather than a detailed blueprint. Predesignating transit corridors is an important step in this process. Also there should be a series of intermediate plans which examine viability at earlier stages.

The transit corridor is not meant to be an automobile-free zone; rather it should be a place where transit dominates and the automobile is accommodated rather than the reverse, which is typical in existing suburban areas.
Periodic breaks are made in the transit path to prevent through auto traffic.
Control of through automobile traffic.

The provision of a convenient transit service requires a speed and level of service competitive with automobile travel. If transit vehicles operate along a congested street, travel times by transit would be increased and the street would be dominated by auto traffic. TCDs are areas of concentrated development which will generate significant numbers of trips and it is important to control through automobile traffic to prevent excessive congestion along transit corridors. This could be done by providing periodic sections in the transit right-of-way where only transit vehicles would be permitted. This would prevent other vehicles from using the transit path for through movement. These breaks should occur approximately at every mile and would likely be located at high activity stops. The remainder of the corridor could operate with mixed traffic with the roadway serving as a local or collector street. Auto access to the properties in the corridor would be from parallel or intersecting arterials rather than from the transit corridor. Only limited parking would be permitted along the transit roadway. Careful planning will insure a proper mix of circulation without excessive traffic on the transit corridor.
Cross-section of Transit Corridor in an 80’ ROW
Use corridor for primary pedestrian, bicycle and transit movement.

The corridor should be designed to accommodate pedestrian and bicycle movement as well as transit vehicles. Separate pathways should be provided parallel to the transit routes. These pathways should be on both sides of the roadway and accommodate two-way movement. A typical section of the minimum configuration for the corridor is shown in the figure. The corridor should consist of a roadway with a minimum width of 34 feet and shoulder/tree lawn an adjacent pathway areas of a minimum of 23 feet on each side for an overall minimum width of 80 feet. The pathways area would consist of a seven foot wide bike path, a five foot walkway and eleven feet for tree lawn and landscaping. The bike path would be specified as a class I bike path and be wide enough to permit two way movement (AASHTO). There should be a minimum of five feet from the transit roadway to pedestrian path and five feet between pedestrian and bicycle paths. The 34 foot roadway provides the minimum width necessary for transit vehicle stop areas and a bypass lane for through vehicles. A wider right-of-way of 100 to 200 feet is preferred which would provide area for a median along the roadway, and additional roadway areas and green space between the pedestrian and bicycle paths as well as a better buffer between transit service and adjacent uses.

Avoid need for shuttle services.

One option that is considered in the design of major development projects is the provision of a shuttle service which connects the project to a primary transit route. This type of service should be avoided. Shuttle services require additional time for users to wait for the shuttle vehicle and to transfer between vehicles. This is highly inconvenient for users in that it involves out-of-vehicle time and transfer penalties. Travel demand studies have demonstrated that out-of-vehicle time to be perceived at two to five times as important as time spent in the vehicle in travel choice decisions. Hence a shuttle service could significantly reduce the potential demand for transit use. A second reason to avoid shuttle services is their costs. To be effective shuttle buses should operate throughout the day and evenings and at low headways. Annual operating costs can run several hundred thousand dollars per vehicle. The result is that service may be cut back to reduce costs. A reduced level of service makes it less attractive to users which in turn will reduce demand.
Auto-oriented land uses are kept near arterial to maintain pedestrian movement at the transit corridor.
Highway/transit relationship.

Corridors for transit service should be a minimum of 1/4 mile away from, but parallel to, major highway arterials. A parallel highway arterial serves two important functions. (1) Mobility: transit cannot provide service for all people to all destinations, especially traffic passing through the area; automobiles will be required for some travel. (2) Land access: while the transit line will be able to serve most development, there are certain land uses that are incompatible with transit and which need auto access. There are also developments, like major shopping centers, that are best served by both transit and auto access.

A minimum distance of one quarter mile should be maintained between the arterial highway and the transit line. A large proportion of the public will utilize transit if located within a quarter mile walking distance of their residence or workplace. Access to the highway arterial is also convenient at this distance for those uses that need access to both modes of transportation.
Provide high quality transit service.

Transit service should be of high quality to attract users from the automobile. The concept of a Transit Corridor District provides a concentration of land uses, connected by a high quality pathway system to the transit system. The transit service itself should have high operating standards to assure its continued use.

Transit can be successful in attracting ridership if a user-oriented service is provided. A high quality user-oriented transit service requires that direct service is provided between a user's origin and destination, without the need to transfer, at a schedule which matches the user's needs, at a reasonable cost compared to the automobile, and in a clean, comfortable, reliable, safe and secure vehicle. If transfers or waiting are necessary there should be a safe, secure and interesting place to wait and change vehicles. Information on how to use the system, its routing, when, and how much it costs should be readily available and easily understood. If these conditions are met, people will use transit. More transit use will reinforce the land use plan which can in turn generate a higher level of transit service and more usage.
“Efforts to design cleaner, quieter, and higher quality vehicles are critical for the development of the overall concept.”

Transit vehicles should be quiet and have low air pollution levels.

Transit vehicles, especially buses, have a very poor image in suburban areas. Local residents will often protest the location of bus routes in their neighborhoods because of the noise and air pollution produced by the vehicles. Noise levels of buses (in the range of 80-85 dB A while pulling out from a stop) are excessive and would need to be significantly reduced in order to prevent negative reactions to transit services. Similarly, vehicle emissions of pollutants and visible exhaust need to be reduced. Transit service in the corridor district must be of a high quality to both attract patrons and not be a nuisance in the community. Efforts to design cleaner, quieter, and higher quality vehicles are critical for the development of the overall concept.

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14 American City and County Magazine, January, 1991, p. 28.
Identity: Signage and compatibility of stops.\textsuperscript{15}

Transit stops along the corridor are entry points to the transit system. At a minimum these would be equipped with a shelter and associated information and signage. The transit stop is the first image many passengers have of the system as well as being an important piece of "street furniture" at the neighborhood scale. Therefore it is important to make it positive and recognizable.

- Provide colors, logos and forms which produce a sense of identity for the system itself.
- Use materials and images that are compatible with the surrounding community.
- Locate shelters so they can be seen and identified from a distance.

Signs identifying the stop and route should be designed to provide clear understanding for all users including those unfamiliar with the English language in appropriate neighborhoods.

- Maintain consistency throughout the system -- logos, color, lettering.
- Place information in direct lines of sight.
- Construct signage of low-maintenance materials.

The local stop is located along a transit corridor which may also serve as a collector street. The stop is surrounded by residences and occasionally a small shopping area.

The transit stop must fit into and enhance the neighborhood.

- The shelter must be compatible with the area that the station serves. Consider elements such as roof slopes, height, materials and details.

- Provide an image that is understandable and acceptable to the local community.

- Landscaping is an important design feature at the local community level.

- The facility should be identifiable as part of the transit system overall design.

- Climatic conditions should be considered, orient the stop if possible to take best advantage of sun exposure and wind conditions.