# SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS OF A SYSTEM OF HIGH-ACCESSIBILITY CORRIDORS

Robert B. Teska, Barton-Aschman Associates, Inc., Washington, D. C.

The concept of a system of high-accessibility corridors is being applied in the city of Chicago as a basis for the structure and development of the city and its metropolitan area. It articulates the 3 principles—accessibility, opportunity, and concentration—that guided all elements of the 1966 comprehensive plan of Chicago. In high-accessibility corridors the land uses and transportation facilities are to be coordinated in accordance with the level of accessibility they require or provide. Each corridor must contain high-speed, high-capacity transportation facilities both for private motor vehicles and for public transit. This paper discusses the impact of the proposed system of high-accessibility corridors on the 6 strategic objectives of the 1966 plan: family life and environment; expanded opportunities for the disadvantaged; economic development and job opportunities; moving people and goods; proper allocation of land; and unified city development. It concludes that the concept is in physical terms ideally suited to Chicago, but that the real benefits will eventually be measured primarily in social and economic terms. Furthermore, the initial application of the concept to case studies in metropolitan and regional planning indicates that it has widespread utility and that the advantages will be no less dramatic at the larger scale.

•THE TERM "corridor" is commonly used in urban and regional planning. There are development corridors, renewal corridors, transportation corridors, highway corridors, scenic corridors, environmental corridors, and corridor spaces. To this list has now been added a new concept: the high-accessibility corridor.

Formulated in Chicago, the concept of high-accessibility corridors could become the most important planning and development concept for the future of that city and its metropolitan area. It can be distinguished from many of its predecessors in that its purpose is multiple rather than singular and that its purpose is basically social and economic. Though uniquely suited to the Chicago area, the high-accessiblity corridor concept has applicability in a wide variety of cities and regions.

## THE COMPREHENSIVE PLAN OF CHICAGO

Corridors are not new to cities. For example, the growth of Chicago in the first half of the twentieth century closely followed the streetcars, rapid transit, and railroads. As a result, clearly defined strips of high-density development were created along these routes prior to popular use of motor vehicles. In recent decades, the expressway has also become a stimulus for such corridors.

In 1961, a report prepared for the city of Chicago highlighted this historic trend and stated that "it might be wise to examine the potential of actually attempting to design and develop streets and high traffic generation land uses in a strip or corridor form. This would require the conception of an ideal or desired relationship between corridor streets and corridor land uses, and the application of this ideal to existing or potential new corridor areas" (1).

Sponsored by Committee on Social, Economic and Environmental Factors of Transportation and presented at the 50th Annual Meeting.

Subsequently, the 1966 comprehensive plan of Chicago established 3 basic principles on which all of its elements were based: accessibility, opportunity, and concentration. It states that a major municipal policy for urban form is to develop a "system of corridors of high-accessibility" (2). The corridors would increase the range of choices of home and work locations for all Chicago area residents, make available more sites from which business and institutions could serve the entire city or area, and make the central area more accessible.

In 1967, this conceptual system of high-accessibility corridors was the subject of a special study to evaluate its benefits and to formulate guidelines for subsequent joint development projects such as the Crosstown Expressway (3).

## DESCRIPTION OF HIGH-ACCESSIBILITY CORRIDORS

A high-accessibility corridor is a striplike concentration of land uses that requires accessibility to all or a large section of the metropolitan area and that is organized along one or more high-speed, high-capacity transportation routes. If policies established by the city of Chicago are to be achieved, the corridor must also satisfy the following criteria:

1. It must contain high-speed, high-capacity transportation facilities both for private motor vehicles and for public transit, and it may also contain railways, waterways, or other forms of ground transportation;
2. Land uses within the corridor must require levels of accessibility compatible with the levels of accessibility provided by the transportation facilities, and they must be of such intensity as to support but not hinder the efficient operation of these facilities;
3. The corridor must be planned and programmed to maximize desirable functional and environmental relationships between transportation facilities and land uses; and
4. The corridor must function as an integral part of the total system of high-accessibility corridors.

Not all corridors, or segments of corridors, are alike in their existing conditions, nor should they be. Each must satisfy its own function. The functional classification of corridors was expedited by establishing a simple procedure so that each corridor could be classified according to its location, area served, trip-generating characteristics, predominant land use, and distance from the central business district (Fig. 1). Principles of corridor planning were recommended, and typical corridor forms represented in Chicago were evaluated. The application of these principles produced the following 3 typical corridor forms:

1. Expressway and rapid transit superimposed, which is best suited to radial corridors (Fig. 2);
2. Expressway and rapid transit separated, which is best suited to grid corridors, especially to predominantly residential or institutional corridors (Fig. 3); and
3. Divided expressway with variations of rapid transit, which is best suited to grid corridors of predominantly nonresidential land uses (Fig. 4).

The findings were applied in prototype studies of 3 substantially different segments of the North Lakeshore corridor, the Kennedy corridor, and the Cicero corridor. Finally, the potential benefits of the concept were evaluated.

## RELATIONSHIP TO STRATEGIC OBJECTIVES

An effective way to summarize the benefits of the proposed system of high-accessibility corridors is by reference to the following 6 strategic objectives of the Chicago comprehensive plan:

1. Family life and environment;
2. Expanded opportunities for the disadvantaged;
3. Economic development and job opportunities;
4. Moving people and goods;
5. Proper allocation of land; and
6. Unified city development.

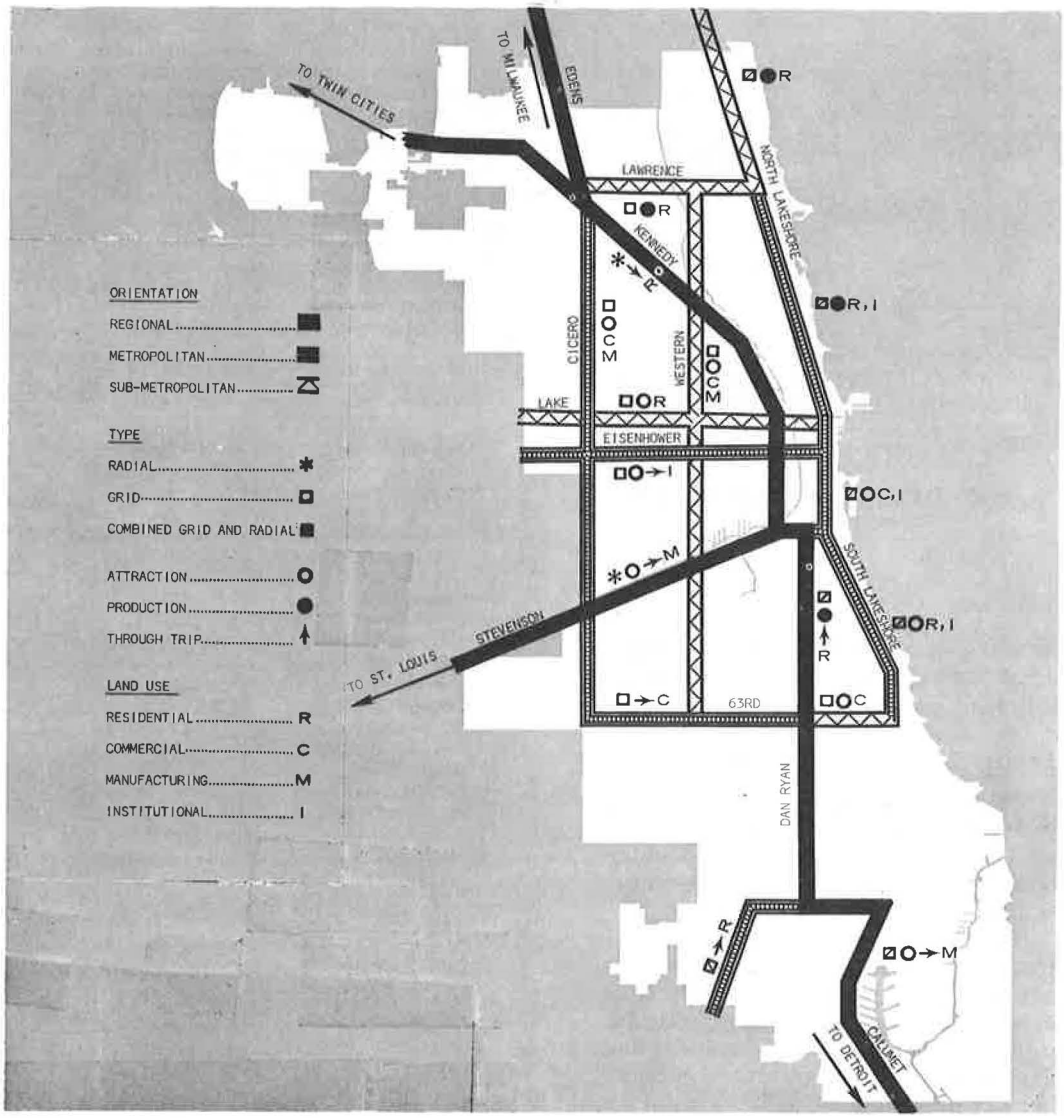
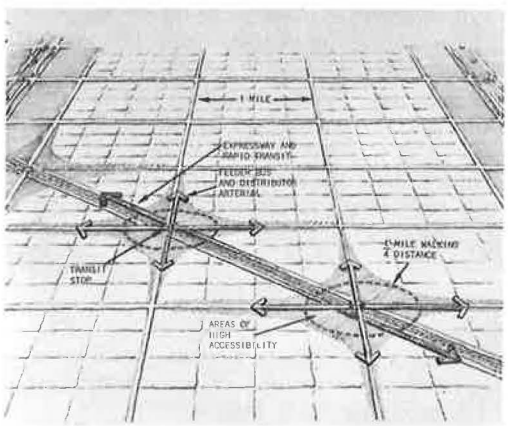
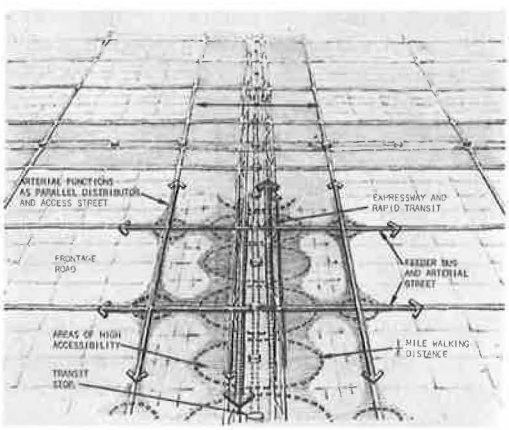



Figure 1. Example of classification of high-accessibility corridors.




VARIATION "A": TYPICAL RADIAL CORRIDOR,




VARIATION "B": TYPICAL GRID CORRIDOR,

Figure 2. Typical corridor: expressway and transit superimposed.

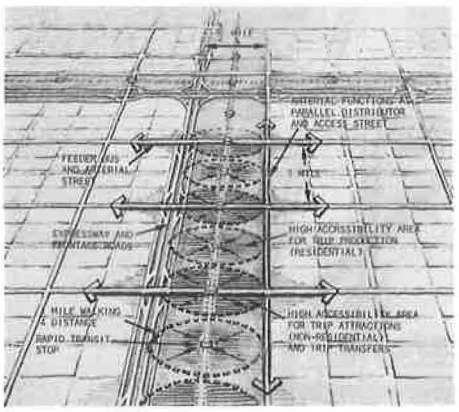
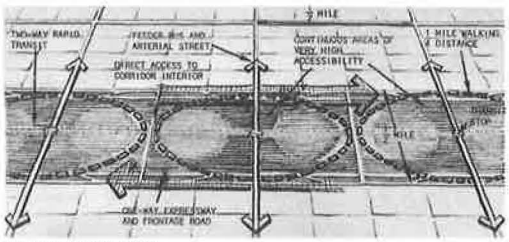
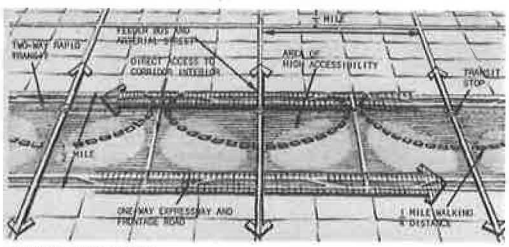


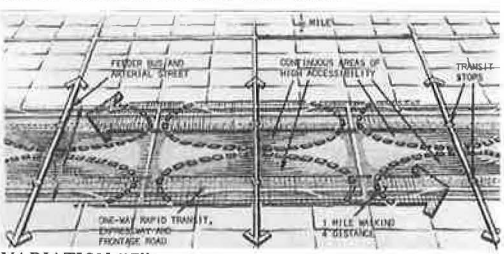

Figure 3. Typical corridor: expressway and transit separated.




VARIATION "A":
RAPID TRANSIT IN CENTER OF CORRIDOR




VARIATION "B":
RAPID TRANSIT ON ONE SIDE ONLY




VARIATION "C":
ONE-WAY RAPID TRANSIT ON EACH SIDE

Figure 4. Typical corridor: divided expressway.

A more detailed discussion of each strategic objective is contained in the following paragraphs.

## Family Life and Environment

"Neighborhoods that are attractive to families with growing children, as well as young unmarried and older couples, will be created and maintained" (4).

Corridors are appropriate locations for medium- to high-density housing, especially if housing is built at a scale large enough to create its own environment. The greater the proportion of housing units is in high-density development within corridors, the less land will be required for medium-density apartments outside of corridors. This makes more land area available for the low-medium density (1- and 2-family) type of housing desired by young and middle-aged, middle-income families with children.

Traffic generation is also directly related to residential densities and, hence, to family life and environment. Within corridors, residents of high-density development will be well served by public transit, reducing dependence on private vehicles. Traffic that is generated by such development need not normally penetrate nearby single-family residential neighborhoods. Therefore, major reductions can be made in the estimated 318 miles of local streets that are now being misused by traffic not intended for such streets.

The city's policy of increasing freedom of residential choice will also be furthered. Improved accessibility between points within the corridor system will permit persons to live in a wide variety of areas within the city and commute to places of employment a considerable distance away by public rapid transit.

## Expanded Opportunities for the Disadvantaged

"The City will increase, intensify, and coordinate programs to arrest poverty and improve living conditions for low-income people through urban opportunity programs, education and job training, public housing, social services, and other efforts" (4).

In terms of this study, the disadvantaged are people who could not achieve their full potential because they do not have relative freedom of mobility. Recent studies indicate that as many as 80 percent of the people using public transportation in major U.S. metropolitan areas fall into the category of "captive riders." More specifically, it is well documented that the low-income and nonwhite person relies heavily on public transportation. In Chicago, more than 78 percent of all work trips to the central business district made by persons whose family income was less than $4,000 were by public transportation; 53 percent of such trips throughout the city were by public transportation.

Currently, all rapid transit routes in Chicago focus on the central business district, making rapid crosstown travel nearly impossible except along the Lakeshore corridor. A complete system of corridors, each including public rapid transit, could increase access to other areas of employment opportunity, even in the suburbs. It would ultimately be possible, for example, for those who live in public housing on the south side of Chicago to travel conveniently to employment in industries along the Cicero, Western, or Kennedy corridors (Fig. 5). In 1969, rapid transit became available from the Dan Ryan corridor to O'Hare International Airport and its thousands of jobs.

Accessibility to medical services is another essential need for many disadvantaged persons. The corridor concept can help the young, elderly, or handicapped who may not be able to drive to medical facilities. It can also help the low-income person, or the adult in a one-parent family who may not be able to afford the time away from job or home to receive proper medical treatment.

Educational, cultural, and recreational opportunities would be enhanced. Likewise, policies favoring school transfers, "magnet schools," and city colleges can best be achieved in relation to corridors.

## Economic Development and Job Opportunities

"Chicago's dynamic industrial and business economy continues to thrive because of the City's location at the focal point of world trade routes and because of its expanding role as a regional capitol. The City's programs will select and emphasize the key opportunities to build upon this economic potential" (4).

Economic development and job opportunities can be assisted through improved access to more sites by all modes, through coordination of transportation facilities with important business and industrial land uses, through provision of appropriate new development sites within corridors, and through increased mobility or closer proximity of the

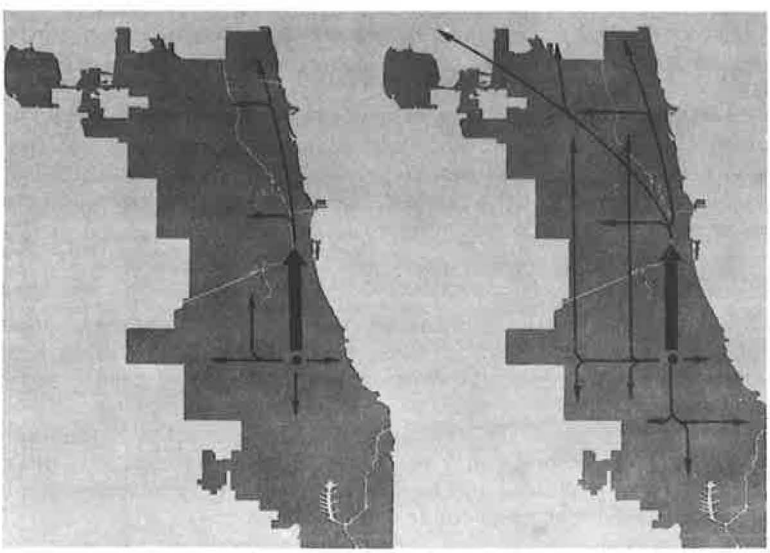


Figure 5. Employment opportunities now and in the future.

labor supply. Each of these factors improves the competitive advantage of sites within the city and increases the strength of the metropolitan area.

Despite the vitality of the Loop, many businesses and industries either cannot afford such a location, cannot find proper facilities there, or do not require the highest level of accessibility provided by the Loop. For these activities, the choice is between a suburban site or a site in another area of the city. Currently, the choice is not a difficult one to make because there are few adequate city sites and environments that would attract such development. Chicago's policy presented in the comprehensive plan is to modify this trend.

Approximately 8 square miles of new manufacturing and heavy commercial development will be needed by 1980, most of which can and will be provided in high-accessibility corridors. Approximately 10 percent of this new land could be made available in one short section of the Cicero (crosstown) corridor that was studied as a prototype.

Although some 40,000 acres of city land are currently zoned for industry, 20 percent remains vacant because of problems of environment, transportation access, and land ownership. The corridor system could help provide better land use-transportation relationships in many of these areas. Because most major retail centers are located in corridors, the concept of improved public and private access and higher residential intensities should be a positive influence on the retail market (Fig. 6).

With reference to office districts, it has been stated, "Within the City outside the central area, urban renewal powers can be used to create office building sites in attractive locations. These sites should be part of light industrial or office parks, especially designed and landscaped for regional office tenants. Such parks could be successfully developed only if built adjacent to expressways" (5).

Finally, over 3,000 new hotel rooms have been built or proposed within high-accessibility corridors in the past 5 years, most of which are located outside the central area.

## Moving People and Goods

"Increasing freedom of movement and choice of travel mode through the transportation system is essential in order to expand human opportunities and strengthen the economy" (4).

A system of high-accessibility corridors is intended to improve the movement of people and goods in several ways. First, it offers a balanced system of public and private transportation (Fig. 7). Second, all major terminals in Chicago (air, water, and railroad) lie within the corridor system. Third, reducing motor vehicle demand and distance traveled is another way of improving the movement of people and goods. Fourth, distance traveled on secondary and local streets is reduced. Fifth, high-accessibility corridors can be planned to ensure the economic feasibility of major transportation facilities. Therefore, public transit systems will benefit most from the corridor concept.

Six of the 7 radial corridors in Chicago now have public rapid transit, and just recently rapid transit has been determined to be feasible in the Cicero (crosstown) corridor. All other Chicago corridors can be planned to exceed feasibility thresholds in the near future. Furthermore, the arrangement of varied land uses and corridors may extend the period of transit usage throughout the day and week.

## Proper Allocation of Land

"The City's basic pattern of land use is logical. In most cases activities are appropriately related to the lake fronts, rivers, and major transportation routes. But there are opportunities for great improvement in the quality of areas, especially in the central city" (4).

As indicated in the definition, the key to the proper allocation of land within corridors is to locate land uses in proximity to the transportation facilities providing the level of accessibility they require, and to design or control development intensities in direct relationship to the capacity of those facilities.

All or most land uses requiring high accessibility (more than 80 percent) would be located within corridors according to the comprehensive plan. Of the following land

uses, 100 percent will be located within or adjacent to corridors: major residential improvement areas, public senior colleges, central and regional libraries, central police headquarters, community health centers, major medical complexes, regional special service centers, and special industrial opportunity areas.

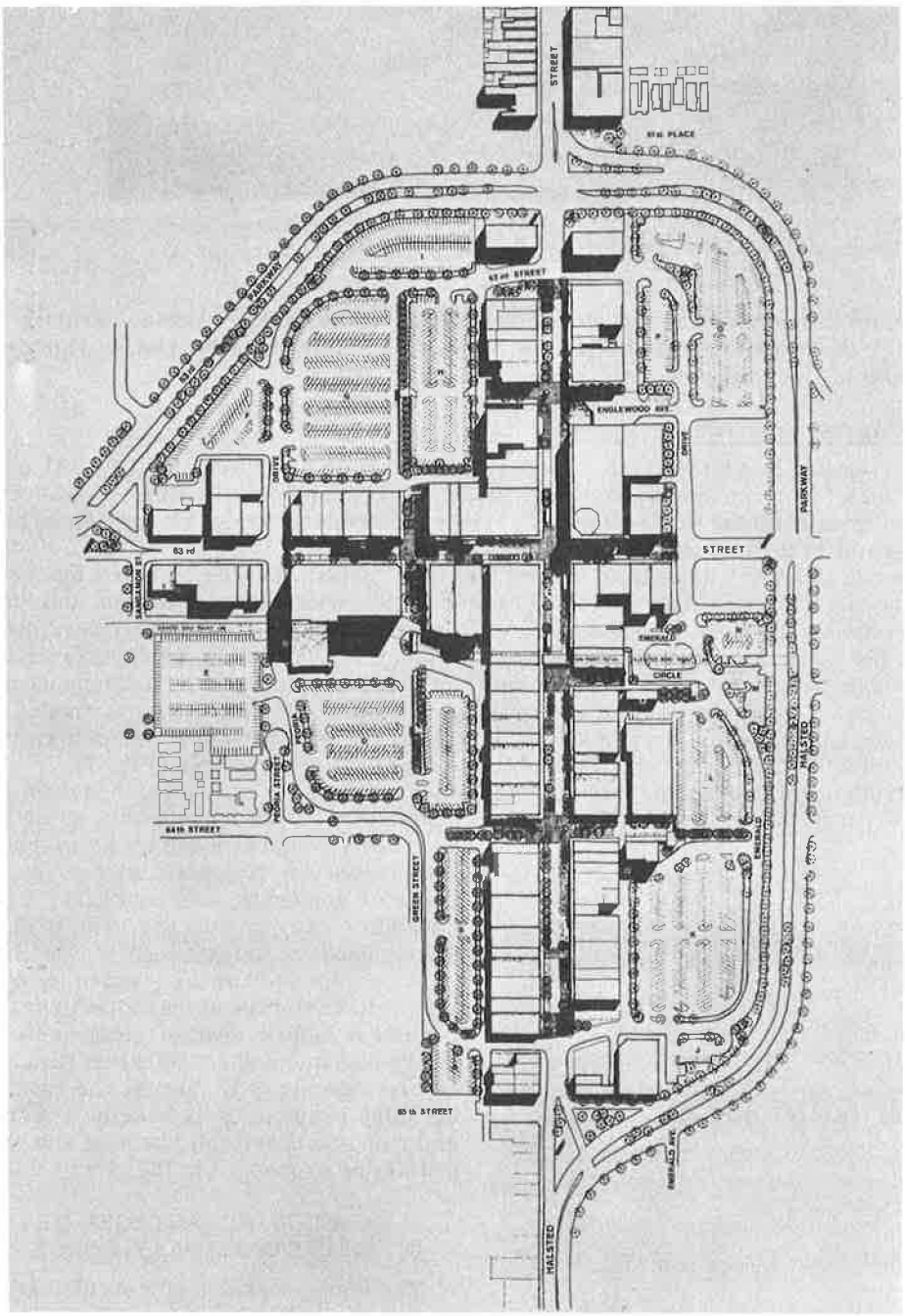



Figure 6. Business district renewal in 63rd Street corridor.

Figure 7. Choice of travel mode.

In certain areas, existing street rights-of-way may be vacated within corridors to provide for the consolidation of districts, and air rights over transportation rights-of-way may be utilized for new development.

## Unified City Development

"In translating these strategic objectives into tangible progress, the City will continue to work for cooperation and coordination in public and private efforts. The development area planning procedure will serve as a means of achieving maximum effectiveness of programs within large areas of the City" (4).

There are at least 3 aspects of unified city development that are affected by the corridor concept: relationships within and between urban systems; visual form and identity; and plan and program coordination. The system of high-accessibility corridors provides the opportunity for strengthening the interrelationship between economic functions throughout the city while at the same time decreasing pressures and dependence on the central area as the point of metropolitan transportation interchange, employment opportunity, and economic development. It encourages the "breaking out" of a rigid radial system that might eventually inhibit growth of the central area (Fig. 8).

As development occurs and intensifies within corridors, it can strengthen even further the strong visual form of Chicago as a "legible city." The system as a whole can be readily comprehended by its users, and the uniqueness of individual corridors, corridor segments, and landmarks within corridors can provide the user with a strong sense of orientation.

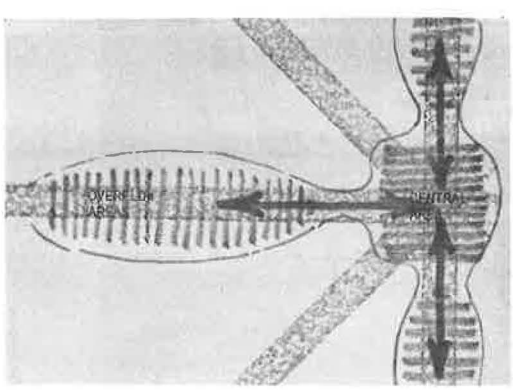
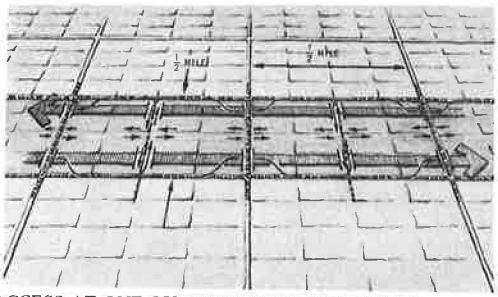



Figure 8. Central area "overflow" guided by corridors.

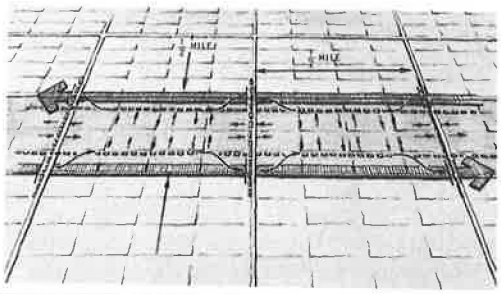
A concept such as this, which is more simple to comprehend than to achieve, will require a higher level of public-private intergovernmental coordination than ever before experienced. Hence, the conduct of "joint projects" will become a more common and beneficial planning and programming procedure in the city.

## SPECIFIC ADVANTAGES OF DIVIDED-EXPRESSWAY CONCEPT

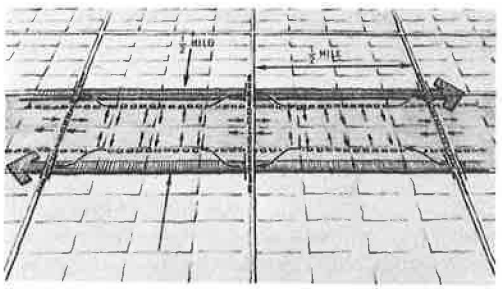
The high-accessibility corridor study produced what is considered by many to be a unique and highly innovative concept,



ACCESS AT ONE-QUARTER MILE INTERVALS



CONTINUOUS ACCESS: LEFT SIDE RAMPS



CONTINUOUS ACCESS:
RIGHT SIDE RAMPS REVERSE FLOW

Figure 9. Typical corridor: divided expressway variations.

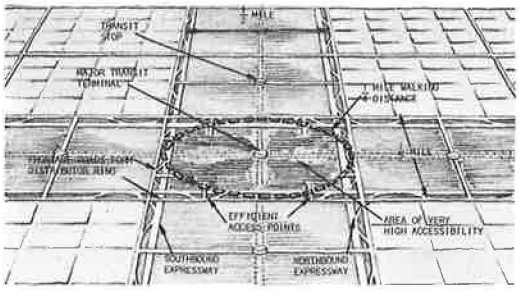



Figure 10. Typical corridor intersection: divided expressways.

that is, a corridor of land uses and transportation facilities formed by splitting the expressway into 2 one-way expressways at an interval of ¼ to ½ mile. There are at least 3 basic variations of roadway configurations (Fig. 9) and 3 variations of rapid transit configurations, totaling 9 possible combinations.

This concept was explored in detail and compared with other more traditional alternatives by the design concept team responsible for detailed planning and design of the Cicero corridor and the 75th Street (east-west) corridor. The results of this detailed evaluation were to confirm the social-economic and environmental advantages of this alternative and to recommend it above all others (6). Subsequently, the 3¼-mile Stevenson-Midway segment won approval from community groups, the city of Chicago, the Illinois Division of Highways, and the U.S. Department of Transportation. The Federal Highway Administrator called it "a historic milestone in urban highway planning and design" (7).

The concept of reversing the direction of parallel one-way expressways and of placing the service street within the corridor provides an extremely high level of service to land uses within the corridor. This is accomplished by providing continuous access from the service roadway to interior sites and by minimizing turning movements and intersection conflicts in the vicinity of arterials perpendicular to the corridor. The potential development intensity of the corridor will make feasible a rapid transit system with trains at frequent headways (without sacrificing level of service on vehicular routes). Finally, a major advantage is gained, according to analyses by Barton-Aschman Associates, at the intersection of 2 such corridors where the capacity of transportation facilities can accommodate as many as 30 percent more trip ends than a conventional corridor intersection (Fig. 10).

Of primary concern to the residents and public officials of the city of Chicago is the fact that the divided expressway concept will produce less of a physical barrier between neighborhoods and development areas and will substantially reduce the displacement of residential, commercial, and industrial buildings when compared with other alternatives. This is accomplished by the fact that the right-of-way for each one-way express-

way and service road requires land acquisition along one side only of an existing major arterial; existing land uses on the opposite side can remain largely intact. In addition, the right-of-way for a single one-way freeway can be provided by an obsolete railroad right-of-way that would otherwise be inadequate for a standard expressway.

Within the high-accessibility corridor so formed, businesses and especially industries can readily accommodate site expansion requirements without impinging on adjacent residential neighborhoods. This, of course, will mean that many industries previously considering relocation will remain, and some will expand to provide increasing job opportunities for central city residents. The tax base of the city will also benefit.

Furthermore, a preliminary benefit-cost analysis by the Crosstown Associates concluded that the divided expressway concept was approximately 10 percent more costly for the initial capital investment but that vehicle-hours and vehicle-miles traveled were reduced to such an extent that the advantages in operating costs and time costs produced the least total annual cost for all alternatives (8).

## METROPOLITAN AND REGIONAL APPLICATIONS

The high-accessibility corridor concept is also applicable to metropolitan areas and to regions. For example, in the Chicago metropolitan area it has already been applied in at least two major planning efforts. First, it was applied as the basis for a plan for the economic and physical development of the area surrounding the National Accelerator Laboratory at Weston, Illinois, in Chicago's western suburbs (9). The team of economic and planning consultants recommended the extension of Chicago's high-accessibility corridor system into the hinterland in general conformance with the Northeastern Illinois Planning Commission concept of "development corridors." The Laboratory, itself a very low-density user of land, occupies a critical location at the inside quadrant of the intersection of the Eisenhower corridor (extended) and the Fox River Valley corridor. The city of Batavia, in an opposite quadrant, is now preparing a comprehensive plan based on the same concept.

In northwestern Indiana, a growth area for which a comprehensive plan is still several years away, the high-accessibility corridor concept was applied as the framework for planning of a new community of 9,000 persons in the vicinity of the town of Chesterton. The concept establishes basic principles for guiding transportation improvements and orderly growth of the entire area as well as the integration of the new community into the growth center of Chesterton. It takes into account the need to balance a resident labor force with industrial and secondary job opportunities and the need to protect the environment of the National Lakeshore and the Little Calumet corridor.

The benefits of the high-accessibility corridor concept would also accrue to entire development regions, particularly those of limited resources and economic potentials where coordinated investment plans are essential. One such region is that which is formed by Charleston and Huntington, West Virginia. At present, each is the center of an economic development area, the size and potentials of which are not quite great enough to support one-of-a-kind facilities such as a regional jet airport, a major graduate university, or an efficient public transit system. Together, however, they form a regional corridor along the Kanawha River of more than one-half million residents. The central business districts of the two cities are only 45 miles apart and are connected by an Interstate freeway. Huntington has the largest and most respected university, whereas Charleston has the highest concentration of scientific and research activities as well as the state capitol. Both have airports restricted in size so that they cannot accept jet aircraft having 4 engines. It would appear in this case that a regional investment plan is required to provide one-of-a-kind facilities to serve both SMSA's and that the high-accessibility corridor concept would make it possible to achieve a single social and economic development region with benefits to its citizens that neither SMSA could provide by itself.

## CONCLUSION

A system of high-accessibility corridors is ideally suited to Chicago. The size and density of the city ensure a sound basis for urban rapid transit. The existing street

pattern is an effective grid system. Because the city is located on the shore of Lake Michigan, its growth and that of the metropolitan area is asymmetrical, and the theoretical center of gravity (or point of highest accessibility) continues to move westward each year. A moving center of gravity enhances the attractiveness of intercepting positions and strengthens the concept of corridors.

The real benefits of this system will eventually be measured primarily in social and economic terms but also in terms of positive influences on the physical environment. The initial application of the concept to case studies in metropolitan and regional planning indicates that the social, economic, and environmental advantages will be no less dramatic at the larger scale.

## REFERENCES

1. Rethinking the Role of Chicago Streets: An Approach to the Development of the Chicago Street System. Barton-Aschman Associates, Inc., Chicago, March 1961.
2. The Comprehensive Plan of Chicago. Chicago Dept. of Development and Planning, Dec. 1966, p. 33.
3. High-Accessibility Corridors in the Comprehensive Plan of Chicago. Barton-Aschman Associates, Inc., Chicago, May 1968.
4. The Comprehensive Plan of Chicago: Summary Report. Chicago Dept. of Development and Planning, Jan. 1967, p. 2.
5. Economic Analysis of Housing and Commercial Property Markets in the City of Chicago, 1960-1975. Real Estate Research Corp., March 1963, p. 21.
6. Chicago Crosstown Expressway, Route Location: Midway Airport/Chicago Skyway. Crosstown Associates, Chicago, Vol. 2, Nov. 1968.
7. Passenger Transport. Dec. 1968, p. 8.
8. Report of Preliminary Benefit-Cost Analysis: Stevenson-71st Street. Crosstown Design Team, Chicago, April 29, 1968.
9. Dukane Valley Area Development Study. Real Estate Research Corp. and Barton-Aschman Associates, Inc., April 1970.