Urban Mobility for the Future

by F. C. Turner
Director of Public Roads

AT SOME VAGUE moment last November the population of the United States passed the 200 million mark and, according to conservative estimates, this figure will rise to 300 million by the year 2000. Whether or not this number will be reached precisely at that time, one thing is fairly certain: the majority of our people living in urban areas will continue to increase in the years between now and then.

Among the obvious implications of this prospect is that urban transportation needs will increase at a rate at least equal to and very likely much greater than the growth in population. And this in turn means constantly increasing demands for rubber-tired mobility — demands which must be met through the provision of new highways and the greater utilization of those now existing or developing.

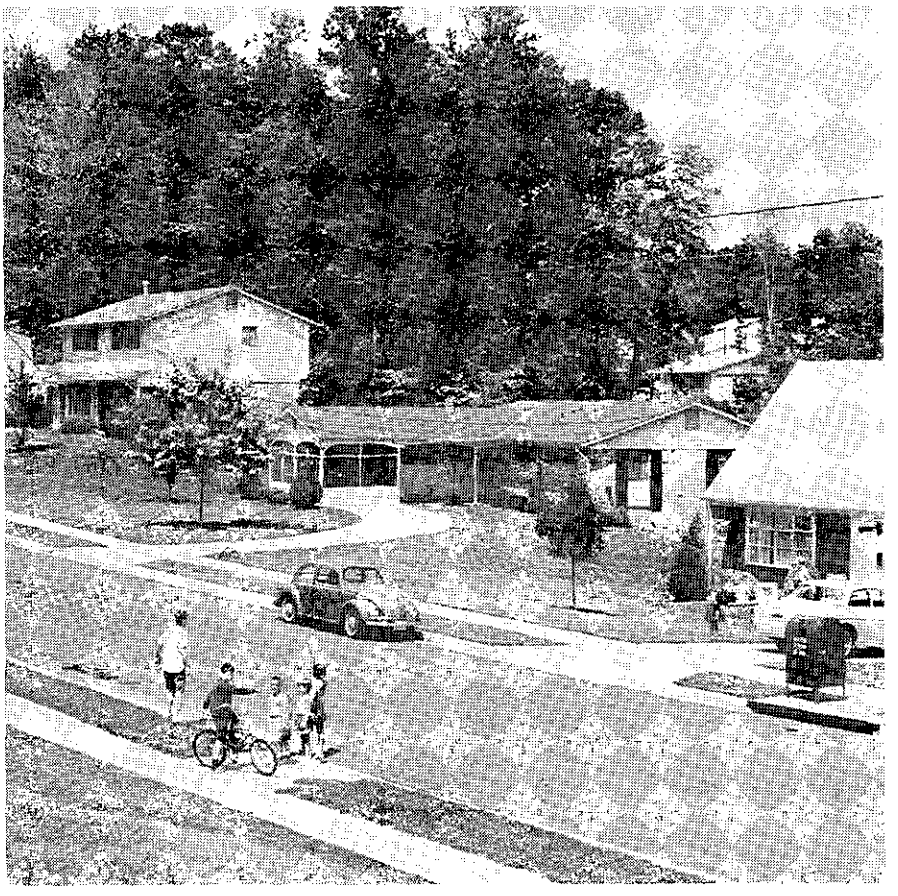
This is generally acknowledged except by a few who prefer to place their faith in wishful thinking about transportation rather than to face the facts of urban life and travel, particularly the varied types of trips made by the urban population every day. If some magic carpet could be developed to accommodate these movements, I'm quite sure that highway and traffic engineers would welcome it as much as anyone else. But for the foreseeable future we must depend largely on what we have—the rubber-tired vehicle and the highway it travels.

The Federal-aid highway program is now well into its second half-century and it is interesting and significant to note the change in emphasis it has undergone since its origin in 1916. It began and developed as a rurally-oriented program in accordance with the needs as they prevailed during the early years. Prior to 1944 only a token amount of Federal or State funds went for highway projects within urban areas of 5,000 or more population. From 1944, when 25 percent of the Federal funds was first legislatively earmarked for use inside urban areas, until 1956, less than a third of the Federal highway funds went for highway projects within urban areas.

The metropolitan areas thus accumulated a substantial backlog of needed highway improvements while their populations increased at an astounding rate. As a result the transportation needs of the urban areas have received increasingly greater Federal and State attention in the past decade and unquestionably will need more in the future. Federal highway legislation of the 1960's has been oriented more directly to the specific transportation needs of the urban areas, as well as to the many social and human values that are intimately bound up with the provision of new traffic facilities and improvements to those existing.

In looking ahead, therefore, we see the Federal-aid highway program pointing in almost the opposite direction from the one it faced for so many years. Rather than concentrating, as in the past, on intercity routes with urban connections, the program envisioned for the years ahead must necessarily focus on urban routes with "extensions" into rural areas.

This is probably the central thesis or implication of the 1968 National Highway Needs Report, recently



Typical single family homes in suburbia—the type of housing occupied by nearly seven out of ten American families living in urban areas.

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Francis C. Turner, Director, Bureau of Public Roads, was born in Dallas, Texas, December 28, 1908. Mr. Turner attended public schools in Fort Worth, Texas, the North Texas Agricultural College (Junior College), Arlington, Texas, graduating as salutatorian of his class and winner of Boy's Scholarship. He received his B.S. Degree at Texas A&M University, College Station, Texas and in 1940 the same college conferred the Degree of Professional Engineer for research work contributing to advancement of knowledge in the field of Civil Engineering.

Mr. Turner began his career with the Bureau of Public Roads in 1929 as a Junior Highway Engineer in Region 6 (Arkansas Division). He was transferred to Headquarters, Washington, D. C. in 1940 as Assistant Highway Engineer. By 1946 he had advanced to Division Engineer of the Philippine Division. In 1949 he was sent to Manila on a Special Detail by the Department of State as Economic Attache and Coordinator of the Philippine Rehabilitation Program. In 1950, he returned to Washington as Assistant to the Chief, Inter-American Regional Office and was named Assistant to the Commissioner a few days later. Mr. Turner became Deputy Commissioner and Chief Engineer in 1957. Prior to his present position he served as Assistant Federal Highway Administrator and Chief Engineer of the Bureau of Public Roads. He has served on a number of Special Designations and he has received the following awards: the Philippine Legion of Honor (Officer) for meritorious services in the Philippines; Department of Commerce Meritorious Silver Medal Award; Department of Commerce Exceptional Service Gold Medal Award for outstanding contributions to the Bureau of Public Roads, the Department, and the nation in the advancement of the Nation's highway program.

He is a member of the American Society of Civil Engineers, the Society of American Military Engineers, American Association of State Highway Officials, Highway Research Board, and the Arctic Institute.

submitted to Congress by the Secretary of Transportation in response to a Congressional directive. That directive, embodied in Senate Joint Resolution 81 of 1965, called for a biennial reporting on the highway needs of the Nation, beginning in 1968.

The first report outlines in general terms the present conditions of the Nation's highway network, the demands likely to be placed on it in the next two decades, and the nature of the deficiencies now existing and anticipated; and suggests a variety of changes that should be considered for better directing the Federal-aid highway program to meet transportation needs in the last quarter of the 20th century.

My purpose in this article is to summarize the 1968 National Highway Needs Report, with particular reference to those portions of it dealing with urban mobility. However, I strongly recommend a reading of the full Report — not only because of the greater detail it contains, but also to avoid confusion since I will be referring in this article to some ideas and developments not contained in the Report.

In any case, the 1968 Report deals with the period 1973-85 and it takes full cognizance of the continuing growth of urban areas. In 1967 motor vehicle travel in the United States amounted to about 967 billion miles. More than half, 50.5 percent, took place in urban areas. Urban travel, expressed in vehicle miles, is now increasing at a rate equivalent to doubling about every 20 to 25 years in most urban areas; that is, at roughly twice the population growth. About half the yearly increase in urban travel is accounted for by the increase in urban population. The other half comes from changing travel habits occasioned by the dispersal of homes and activities, and by greater affluence.

People have chosen to live in suburbia and exurbia, and whether this is good or bad is not a matter for highway and traffic engineers to decide. However, we do have an obligation to fashion a transportation system that will accommodate the choice which the people have made. In doing so, we have to keep in the forefront of our consciousness the fact that the great mass of urban area travel is entirely outside the home-to-job commuting pattern. It is made up (as much as 95 percent in the largest cities) of the countless trips to school, to visit friends and relatives, to go to work but also to move about in making a living, to go to the neighborhood theater, restaurant, drive-in, bowling alley or shopping center — trips that are largely dependent on the private automobile or the taxi.

But ignoring for the moment that this is the case, highways would still be indispensable instruments of urban living. Mass transportation in the United States is mainly bus transportation. Both in terms of service provided and transit usage, bus transit exceeds rail transit by three to one on the average. Of the 7.5 million transit customers in 1966, nearly 77 percent traveled by bus and only a little over 23 percent used rail systems. The percentages for car miles of service provided was about the same — 76 for bus systems and 24 for rail transit and commuter railroad combined.

When the data for the New York metropolitan area is removed, the predominance of bus transit becomes even more striking. A total of 94 percent of all transit passengers in the country, excluding New York, traveled by bus, while only 6 percent used rail systems. And 91.6 percent of all car miles of transit service was provided by buses.

We justly look upon highways, then, as the key links in the Nation's total transportation system. They are the most flexible links and the ones most used. The service provided by our streets and highways extends to and from every home, business, factory and institution. There is an automobile for every 2.2 persons in the United States, according to our latest figures. Total annual travel amounts to something like 4,600 miles for every man, woman and child. Highways are basic to our whole pattern of living and making a living.

This has been recognized by Congress in successive Federal-aid highway acts, as has the increasing

which it frequently affords for replacement housing of better quality for persons displaced by the highway project itself. It also, of course, makes the most efficient use of both funds and space in urban areas which are usually short of one or the other, or both.

The Report suggests that Federal highway legislation and State acquisition authority might be amended to authorize the use of Federal-aid highway funds by the States for acquisition of property beyond the actual highway right-of-way lines where this would make possible a joint development project not otherwise feasible. If legislation were so drawn, it could permit the initial expenditure from highway funds needed for the additional land acquisition to be recouped later from the ultimate owner or land user. The Report also mentions as worthy of consideration new legislation setting up a revolving fund for use by the States for early acquisition of right-of-way, many years in advance of construction, in the outlying portions of urban areas.

The point is made, though, that the improvement of urban transportation is not entirely a matter of additional funds and more broadly based programs; it is also one of local government organization. Here again I quote from the Report:

"The prospect of increased Federal aid to highway transportation in urban areas offers opportunities to increase the resources available to improve urban transportation, and since such improvement depends in part on more unified metropolitan efforts in planning and executing improvement programs, future Federal highway policy could be shaped to encourage the creation and strengthening of a form of metropolitan organization capable of dealing with areawide transportation problems.

"Although the States have a clear major responsibility for planning and carrying out urban highway projects involving through routes on the statewide highway system, some of the new programs considered in this report are for transportation elements primarily of local significance. Metropolitan agencies are best able to formulate governmental policy for the metropolitan area, and further extension of State authority over such local projects probably would be strongly resisted by the local population. The future Federal-aid highway policy in urban areas can contribute to strengthening metropolitan agencies to cope with their areawide problems, helping to fill a gap that should be filled if real future achievement in the solution of urban transportation problems is to be expected.

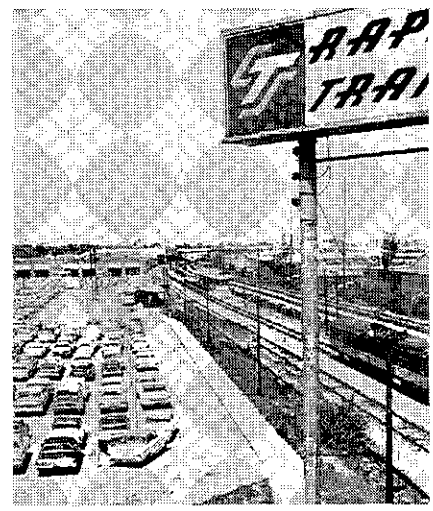
"Continuing urban highway improvement programs are of such crucial importance and so pervasive that inevitably they affect all parts of each area. Thus, future Federal highway policy, whatever it may be, will have major impact on future developments in metropolitan reorganization, particularly with respect to transportation. Federal policy can either stimulate or retard the trend toward stronger metropolitan organization, but even by inaction it can hardly be neutral. By encouraging the creation of metropolitan decision making bodies, Federal highway policy can reinforce, or at least not deter, other efforts, already operating in other functional areas (for example water supply, sewerage, land-use planning, air and water pollution control, and open-space development), leading toward the strengthening of general-purpose metropolitan organizations.

"This could be accomplished, for example, by amending the urban transportation planning section (title 23, sec. 134) of the Federal-aid highway legislation to provide that:

"1. The policy committee of each area's transportation study develop a continuing 5-year program of recommended capital improvement projects on the Federal-aid metropolitan system in the area, based on anticipated levels of Federal, State, and local funds to be available for future expenditures in the area; also, that the policy committee review such 5-year programs annually and make appropriate modifications as well as advance the program another year. When approved by the State highway department, such programs of projects would establish the list of projects eligible for Federal-aid participation, assuming that other requirements and procedures of the Federal-aid program are also satisfied.

"2. In each urban area, the selection for construction of specific projects within the 5-year program on the Federal-aid metropolitan system would be initiated by an areawide agency properly designated to initiate such highway projects, which agency would be controlled by locally elected officials or their representatives. Should there be no existing areawide agency meeting these requirements, the Governor of the State could designate, subject to Department of Transportation approval, the areawide agency that can initiate Federal-aid projects on the Federal-aid metropolitan system. Lacking either, the urban area would not qualify for Federal financing for projects on the Federal-aid metropolitan highway system.

"What is outlined here would strengthen the urban transportation planning process required by the Federal-Aid Highway Act of 1962 in areas having more than 50,000 population. Under that provision highway plans are developed with areawide local cooperation and in coordination with land-development plans and plans for other modes of transportation. The new provision would also extend local participation to the selection of Federal-



Terminals that allow easy transfer between modes increase urban mobility by providing urban residents greater opportunity to combine the best of each mode in meeting their travel needs. (Cleveland Transit System Photo.)

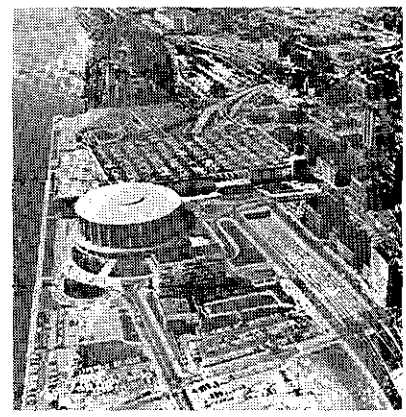
these route sections into statewide highway plans. It would nevertheless be a responsibility of the State to coordinate projects on these routes with local land development plans, and the planning of these routes would come under the requirements of the urban transportation planning process, as they do now. The initiation of improvement projects on these routes for Federal-aid financing would also be a State responsibility, as it is now. This first category is actually identical or similar to the present Federal-aid primary system in urban areas, and it could carry the same name.

"The second category of the urban arterial system could comprise the routes of prime local areawide importance, which collectively might be called the Federal-aid metropolitan highway system. The initiation of Federal-aid projects on routes of this system would be the responsibility of an areawide coordinating agency, presumably organized by, representing, and acting for the local population. Such projects would be introduced into the Federal-aid program by the States in the usual manner, but would have to be proposed to the States initially by the areawide agency. Local officials, acting through the areawide coordinating agency, would exercise a large degree of control over the selection of projects on the metropolitan system, reflecting its primarily local rather than State significance.

"The Federal-aid secondary system routes of local significance could be discontinued at the urban area boundaries, as they were, in effect, until recent years, insofar as Federal-aid expenditure was concerned. Their extensions into the urban areas to suitable connections could be included in the Federal-aid metropolitan system.

"The selection of routes to be included in the metropolitan system could be accomplished under the areawide urban transportation planning process, conducted cooperatively by the States and local communities. That system would provide service to existing important travel generators in the area, but would also allow the shaping of the future highway system to reinforce the area's development goals. While the system primarily would be responsive to present travel demands, it would also represent the arterial highway system calculated to best advance locally-established land-use plans and goals."

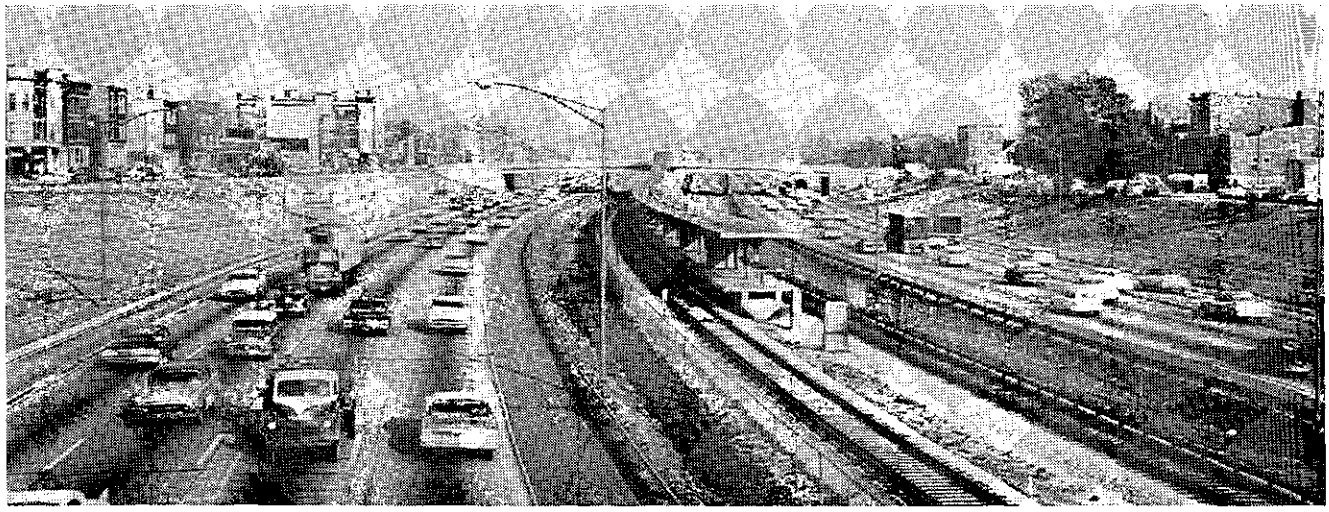
Parking is generally recognized as an important element of the urban transportation complex but the Report adopts a cautious approach to legislation which would make Federal-aid highway funds available to help solve parking problems. It suggests that, if so authorized, the funds should probably be used for parking research and demonstration projects and for the construction of fringe-parking facilities. Careful correlation would be necessary with operation of private enterprise parking facilities within the same general area.



Aerial view of downtown Detroit, showing how effective planning and land use permit the construction of streets and freeways in the core city and still preserve space for parking and public buildings.

"Federal funds for parking might be used experimentally, testing a variety of approaches to make parking a more harmonious element in the total transportation system," the Report notes. "Based on such experiments, demonstration studies, and research, further recommendations could be made in the future on the desirable outlines of a continuing program."

The Report deals in some detail, and properly so, with what we call the joint development concept in metropolitan areas. This involves the simultaneous and coordinated construction of urban highways with non-highway activities such as housing, parking, recreation and other community needs in air space above or below the highway or on land adjacent to it. One of the most important social aspects of the joint development plan is the opportunity



The Eisenhower Expressway in Chicago, showing transit line in the median.

urbanization of the country. In 1962, as the Report notes, a law was passed which required that urban highway plans be developed in cities of 50,000 or more population as part of a cooperative, comprehensive and continuing urban transportation planning process, including coordination with plans for other modes of transportation, for local land development, and with full participation in planning by local government.

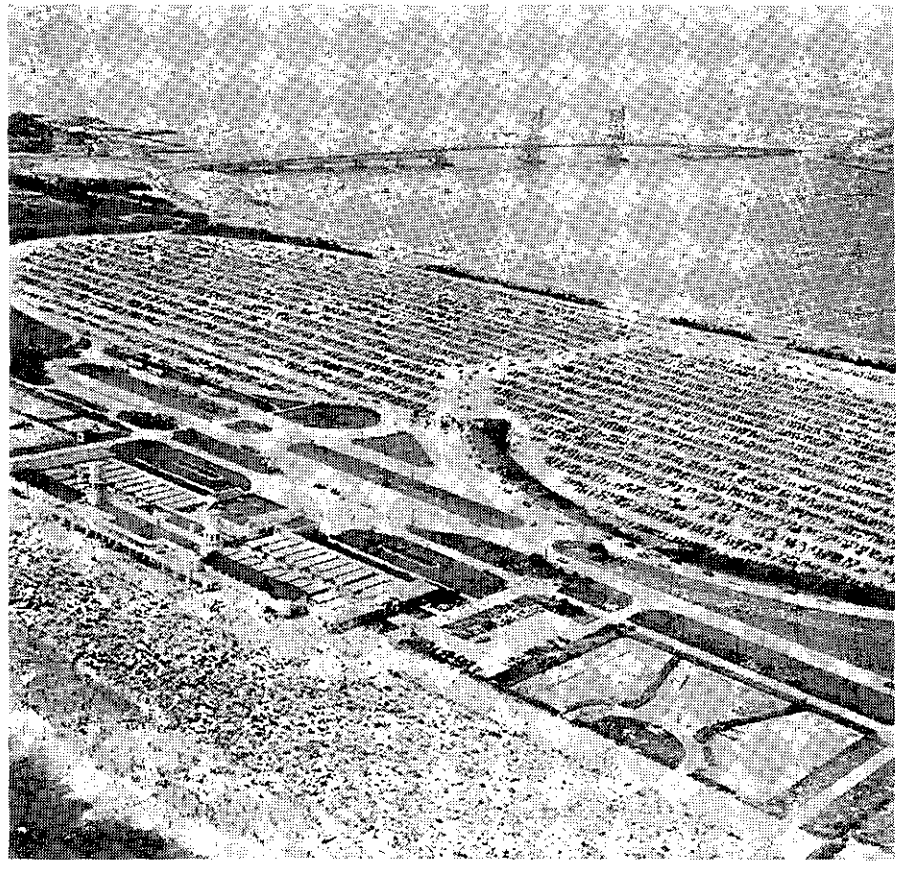
I want to emphasize that this process is concerned with transportation, not just highways, and by its very nature must involve land-use planning and the overall economic, social and cultural objectives of the community and its people. This process is now in various stages of advancement in all of our larger cities. And while it was written into law in 1962, the concepts and techniques which make the process feasible and worthwhile were developed largely by the Bureau of Public Roads and the State highway departments somewhat earlier.

If I were to summarize the 1968 National Highway Needs Report in a paragraph, I would quote this one:

". . . a future Federal highway program, while it must continue to aid in the improvement of intercity and interstate routes, needs to turn greater attention to urban and urbanizing areas. This is where the major highway transportation problems of the next two decades will be."

Traffic in most urban areas is expected to double by 1985 and certainly new highway facilities will be required, especially in the outlying sections. On the other hand, there are social and economic limitations on the mileage of new facilities that can be provided, and even on the widening of those we already have.

Much can be done without great dislocation through intelligent traffic engineering improvements such as those encouraged under the TOPICS program of the Bureau of Public Roads. This is a relatively new program, initiated early in 1967, and the letters signify "Traffic Operations Program to Increase Capacity and Safety." For the first time, regular Federal-aid funds are authorized under TOPICS to improve the capacity and safety of existing urban arterials without major construction, but rather by improving traffic operations, coupled with minor construction.



Parking demand at recreational areas. (Triborough Bridge and Tunnel Authority Photo.)

These improvements include such things as intersection channelization, traffic control and lighting installations, judicious street widening at bottlenecks and intersection approaches, and a variety of other proven engineering techniques. These and other efforts, which may be undertaken in cooperation with local police — parking restrictions, for instance — can produce an increase in the capacity of a street system of from 10 to 15 percent, with a consequent decrease in accidents.

We now have about 20 cities of varying sizes taking part in the TOPICS program. The participation so far is concerned with the necessary preliminaries — studies, reports, preliminary engineering. But we expect that actual implementation of TOPICS projects with Federal-aid funds will begin on a small scale in several cities before the end of this year. I believe the future potential of this program is tremendous.

In terms of urban mobility, the key section of the Report is that proposing an expanded Federal-aid system in urban areas. I will quote the most pertinent portion:

"It is worthy of consideration to extend the Federal interest in the improvement of the Nation's highways to cover all of the arterial systems in urban areas. For administrative purposes it would be logical to subdivide an area's urban arterial system into two categories: Urban extensions of through routes, and local arterials. It is recognized of course, that some routes simultaneously serve both purposes in varying degree.

"The urban extensions of intercity routes and their major distributors, which are generally State highways, could comprise a network for which the State would have primary responsibility to insure the proper integration of

aid construction projects on the Federal-aid metropolitan system.

"Such a procedure should not undermine the present Federal-State relationship in administering Federal highway aid, which is consistent with our Federal structure of government and which time has proven to be an effective partnership. Federal highway aid would continue to be directed to the States, as in the past, since they are the intermediary key to solving the complex difficulties that make up the general metropolitan problem. It is believed that the best long-term gains can be achieved if the relationship between State highway departments and metropolitan areas is strengthened rather than weakened.

"That relationship would be strengthened by making available within the Federal highway program an administrative procedure that can be used by the States to encourage the creation of metropolitan agencies capable of dealing with areawide problems. Such metropolitan agencies, working cooperatively with the States and strengthened by standards and technical assistance available from the States, would represent the areawide interest and would also provide the needed bridge between State interest and local interest in the development of areawide transportation systems."

The Report raises questions about the desirability of extending the mileage of the National System of Interstate and Defense Highways beyond the presently authorized 41,200-mile limit. This may come as a surprise to many people but it should not be misinterpreted. The State estimates upon which much of the Report is based include some 53,000 miles of needed freeway improvements on systems other than the Interstate. These are the miles needing improvement, but they may be considered as roughly indicating the total miles of freeways that will need to be in service in 1985. It appears, then, that to serve the traffic anticipated in 1985, additional freeway mileage at least equivalent to the presently authorized Interstate System will be needed. This includes, of course, a substantial but as yet undetermined mileage in urban areas.

Also on the basis of State estimates, the Report includes some preliminary figures on the cost of road and street needs for the years 1973-85. The estimates come to an average annual capital cost of $17.4 billion, more than double the $8.5 billion per year estimated annual capital accomplishments during the remainder of the current period, 1965-72. It is pointed out, however, that the cost increase per vehicle-mile of travel is not spectacular—going from 0.9 cents in 1965-72 to 1.4 cents in 1973-85.

It is premature to speculate on the means of financing such a program as that envisioned in the Report. I should mention in passing, though, that we have studied possible changes in the methods of apportioning Federal-aid highway funds, bringing into play such factors as motor vehicle registrations, vehicle miles of travel, and mileages related to functional classification. However, this question needs a great deal more study and there is time for it to be made in subsequent needs studies; so we are not making any suggestions now as to future apportionment formulas.

The Report suggests that the greatest possibility of reduction of highway needs exists in the corridors specifically served by rail lines, but even there the effect is more likely to be one of reducing the number of lanes required rather than the complete elimination of a proposed new highway. In concluding this summary of the urban mobility section of the Report, I believe the following quotation is appropriate:

"Rail transit would attract a considerable proportion of riders from buses, which would have a significant effect on the number of highway person trips, but less on the number of highway vehicles, in proportion to the total. Not all trips are transferable to rail transit, because many trip requirements can best be met by highway travel; for example:

"Trucks and other commercial vehicles (about 15 percent of all downtown trips).

"Persons who use their cars in their work, such as salesmen, physicians, service and repairmen, etc.

Utilization of air space above the east approach to the George Washington Bridge in the New York City metropolitan area. (Port of New York Authority Photo.)

"Persons who need to drop off others along the way; for example, children to school, or a spouse to another job location.

"Those who come to the downtown district from outlying areas not well served by transit.

"Those who prefer to use their personal cars regardless of the availability of transit.

"In any traffic corridor where there is sufficient patronage to warrant a rail transit line, usually there are also sufficient highway users to require high-capacity highways such as freeways. In such high-density corridors, it is often impracticable for reasons of cost and space to provide sufficient freeway lanes to satisfy total traffic requirements (without transit). Conversely, it is equally unrealistic to suppose that a rail transit line, even if it had sufficient capacity, could satisfy all the diverse transportation needs of the corridor. For such high-volume corridors, the provision of both rail and highway facilities is needed. Because both kinds of facilities tend to serve different components of travel, they can exist in harmony. Together, they can provide the flexibility necessary to raise the level of mobility available to our urban population.

"The conclusion from this general analysis is that future urban highway needs in urban areas will be great, even though urban areas undertake extensive programs to improve mass transit, whether bus or rail, or both."