

# THE INTERSTATE SYSTEM IN URBAN AREAS

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After five years, from a cold beginning and with all the handicaps of the reconversion period from a war economy to a resumption of a troubled peacetime routine of civic life, there is an encouraging number of urban arterial projects or partial projects now in service. Their performance, measured by vehicles safely carried in constantly increasing numbers, justifies confidence in the potentials of this relatively new approach to the multi-problem dilemma of urban area traffic. Where major results have been secured, they are the product of planning, but the planning was activated by, or made possible with, Federal allotments for urban construction and for anticipatory planning.

The sound selection of the urban area arterial plan of highways requires highly detailed studies and a series of progressive steps. There are no short cuts to enduring end results. When mass transportation was supplemented by the completely individualistic motor vehicle in fantastic numbers, planning from the top downward lost all authenticity. The highway net now has two major functions: first, to move traffic efficiently, safely and as directly as possible to its objectives, and second, to apply by means of adequate arterial expressways, the constant pressure necessary to accomplish the expansion as well as the re-development of outmoded city sections in conformity with a desirable, modern urban area pattern.

In the years just before the war traffic conditions on main highways became serious. This was particularly true of sections of routes into and through cities. A major reorientation of the highway program, having as a principal objective the modernization of main routes, appeared to be at hand when we were plunged into war. The need for major improvements had become so urgent that the 1944 highway legislation authorized a much enlarged postwar Federal-aid highway program and recognized urban major routes as a separate entity with dedicated funds.

This legislation authorized the selection of a National System of Interstate Highways not exceeding 40,000 miles in extent, and contemplated improvement with Federal assistance. The system initially recommended by the State highway departments was formally designated on August 2, 1947, and consists of our most heavily traveled highways connecting the larger cities. These cities are the principal focal points of highway travel. The greater portion of the travel on any main highway is bound to or from the nearest city or town. Accurate knowledge as to the extent to which destinations are in urban areas was a guidepost in the conception of the system.

From 1921 to 1940 State and Federal interest had been centered mainly on highways outside of city limits. In the new undertaking particular emphasis is placed on development of the system in cities. The initial total system designation was 37,681 miles of principal highways including 2,882 miles of urban thoroughfares. In the face of insistent demands for inclusion of additional intercity routes there is

a reserve of 2,319 miles for terminal distribution and circumferential routes. The fully developed system must include not only facilities for free and unobstructed movement outside of cities, but the same sort of service for components of the main traffic stream bound for the various sections within the city. The terminal pattern is maturing as rapidly as it is possible to produce the necessary factual data and to secure agreement among participating agencies. It should be noted that mileage limitations will restrict the urban routes on the Interstate System but each urban Federal-aid system will be completely integrated. Thus the whole mileage will serve as terminal facilities.

Since the war specific authorizations of Federal-aid funds have been available for improvement of urban highways - \$125 million for each of the first three postwar fiscal years, and \$112-1/2 million for the fiscal years 1950 and 1951. These authorizations are a direct outgrowth of the Interstate System plan. The several reports that led to authorization of the system emphasized the priority of the need for improvements in cities. They pointed out the increasing difficulties as a vehicle approaches a city and the congestion and delay as it attempts to move within and through the city. These conditions constituted the greatest obstacles to travel on the main routes of the country and are the ones most urgently in need of correction.

While the Interstate System is the main network of highways of the country, planned to serve the movements between all regions, it would be a mistake to regard it as serving mainly a long-distance movement. On main highways approaching cities of 50,000 or more population, at least 80 per cent of the vehicles are bound for the city. For cities of 10,000 to 50,000 the figure is above 60 per cent.

As the highway passes through suburban areas it picks up large volumes of local traffic. On even the most important main highways the traffic within metropolitan areas is principally a local movement, - into the city in the morning - out from it in the afternoon. On urban sections of the Interstate System traffic averages 9,500 vehicles per day. As a general characteristic of the total traffic, only 13 per cent consists of passenger vehicles with out-of-State tags. The major causes of traffic difficulties, - the creators of the bumper-to-bumper columns of creeping vehicles, - are the daily worker, the frequent shopper and the local truck movements. On these activities the life of the city depends. Serving them is more important than serving the through movement. On a volume basis the local movement is the prevailing segment.

No one acquainted with the characteristics of highway traffic advocates the serving of traffic from distant points with one set of facilities and the local movement with another. As they enter the city the two classes of movements have closely similar objectives. A very large portion of the vehicles are destined to or near the central

business area. Some are going to outer segments of the city. Relatively few are bound for points beyond the city.

An analysis of traffic approaching the congested downtown areas of cities of 50 to 100 thousand population, shows that 84 per cent originates within the city. Forty-two per cent have destinations within the central business district, and 58 per cent pass on through to other sections of the city or to points outside the city.

The traffic pattern is different in every city. Each is the result of existing highway facilities, placement of businesses and industries and residential development. Natural obstacles and barriers alone account for the absence of any close similarity between city traffic patterns.

The Interstate System in urban areas must be designed to give a complete service to both the traffic from a distance, and the greater volume that will enter its routes near and within the cities. A first step in planning is to define the lines of traffic movement - where people come from and where they are going. Many people will say "That is easy to do; we know where people live and where businesses and industries are located". But ask individual drivers if they follow a reasonably direct route from home to work and there is a different story. Many vehicles passing through or near the center of the city are there only because there is no better route to an outer portion of the city. Full service is possible only with direct routes through the city passing near the central district with radial and properly spaced

circumferential distribution routes as required.

The first step defines the lines of major traffic movement, - not the indirect lines often followed, but the lines desired for direct movement. Many of these studies are under way through cooperation between States and cities. Origin and destination surveys are being made to show where principal arteries should be placed. When full factual data have been analyzed, the second step is to select the arteries and then to proceed to improve them in a fully adequate manner.

When we begin selection of arteries and discussion of how they should be improved and financed, serious troubles begin. That is the time that the rocks of disaster often loom ahead. Many different agencies are involved in a complete plan for a metropolitan area. It is difficult to get them all to agree on any single plan. An expressway or other form of main artery almost always means the taking of some residential and business property. Any given location will be favored by one group of interests and opposed by others.

It is easy for the opponents of any plan to recruit an opposing force. To those who do not like the project it immediately becomes a wide ditch or Chinese wall, regardless of the fact that properly located grade separation structures may bring freer and safer cross communication than has existed before. The improvement may be opposed because it will divide a city ward and lead to readjustment of political strength. The impression may be spread that the facility is to be built only to serve people passing through the city when it

is obvious that local traffic will predominate.

It may be argued that there is no point in making it easier for vehicles to get into the city when there are too many there already. Packed parking spaces and congested cross streets are pointed out as reasons why we should not bring in more vehicles with no place to go. These are sound arguments if there is no intention of doing anything about the parking problem or the service streets. They are a part of the general problem that must be solved.

Federal, State and local agencies are all involved in planning and constructing main urban arteries. The necessity of reaching agreement on the basis of factual data should be uppermost in the minds of all parties from the inception of a project. Disagreement can best be avoided by having representatives of appropriate agencies and groups participate in the various planning steps.

There is no set formula for guiding a plan or project so that it always progresses through smooth waters, but we do have some good examples where obstacles have been avoided or overcome, and construction is under way or near at hand. Urban expressways are now under construction in several Texas, California and Ohio cities, and in Detroit, Chicago, Atlanta and Seattle.

New York State is instituting a plan that offers much promise of success in speeding up the steps that must precede construction. The Department of Public Works has created a Bureau of Arterial Route Planning which makes studies and prepares general plans for

development of arterial routes. These are submitted to city officials for consideration and approval. When approved the routes become the only ones on which State assistance is available.

For our largest cities, - those that are the focal points on the Interstate System - the only possible solution on main arteries is the construction of expressways. Elimination of cross traffic and full control of access are features that give this form of improvement its great traffic capacity.

A four-lane expressway of modern design with controlled access will accommodate as much traffic at approximately twice the average speed as

- (1) Five ordinary city streets, each 40 feet in width with parking prohibited.
- (2) Eight ordinary city streets, each 42 feet wide with parking on both sides.
- (3) Five ordinary city streets, each 68 feet wide with parking on both sides.
- (4) About three ordinary city streets, each 68 feet wide with parking prohibited.

By "ordinary city streets" is meant those that have the average amount of left-turning movements and pedestrian interference prevalent in downtown areas.

Our largest cities cannot expect satisfactory traffic conditions until they construct full expressways. Only divided highways of four or more lanes, free of cross traffic and with controlled access, can handle the largest traffic volumes without congestion and delay. As we descend the scale of city size, the necessity for full expressways decreases. In cities of medium and small size it may be feasible to permit some of the more important cross streets to intersect at grade. The outstanding feature in distinguishing one type of arterial highway from another is the degree of control of access. The fewer the number of places at which vehicles may enter, the greater will be the safety and traffic capacity.

To plan a better transportation system for Washington, and to insure intelligent programming of highway construction funds which would lead to a step-by-step solution of traffic problems in their relative order of priority, in March, 1948, a comprehensive origin and destination survey was begun. This study covered not only the city of Washington but also the satellite areas of Virginia and Maryland where urban development was contiguous to that of Washington. In all, an area of 198 square miles was embraced. The study was financed jointly by the District of Columbia, the States of Maryland and Virginia, and the Bureau of Public Roads. To date \$150,000 has been expended for field work and \$36,000 has been allocated for analysis. A guiding

committee representing the three political jurisdictions, - Public Roads, the National Capital Park and Planning Commission, the Department of Defense, - and the transit companies, is charged with the responsibility of conducting the survey and developing the analysis.

On each major road entering the area, a representative sample of all motor vehicles was interviewed during a typical day to determine the point of origin, the point of destination and the purpose of each trip. In all, 118,382 drivers of motor vehicles were interviewed at these stations. Within the designated area the members of one home in every twenty, selected by approved statistical methods, were interviewed to ascertain the origin, destination, purpose and mode of travel for each trip made the preceding day. These interviews reached 15,625 households and resulted in data on 83,750 actual trips. One-tenth of the drivers of trucks and taxis were interviewed, resulting in approximately 31,000 additional trips, or a total of 233,000 trips in round numbers.

These data were placed on punch cards, and basic travel tables were prepared showing the travel between small geographic units within the area. The field work was completed during the period March 1948 to October 1948. Approximately one year was required to code and punch the cards and prepare the travel tables. From these tables, plotted graphically, the principal lines of travel for motor vehicle users and mass transit patrons are apparent. These desire-line charts are now substantially complete, and there remains only the

task of testing alternate plans with the assembled data to determine the economic feasibility of one or more schemes. This will require from a year to eighteen months from today to complete the study, although we believe that in the interim definite recommendations can be offered on the more immediate problems without danger of being inconsistent with the final plan.

The final pattern of arterial highways, not only for the greater Washington area but for all other metropolitan urban areas, will reduce to the characteristic wheel design, with radial lines extending from an inner distributing route encircling the focal center outward as far as may be desirable, integrated with circumferential connecting routes at spaced intervals. The pattern will rarely be symmetrical or balanced about an axis. It may be grossly distorted as a geometric shape, but it will always be composed of radial and circumferential components. Such a pattern lends itself to extension beyond any presently accepted urban area limits, and makes possible not only the service necessary, but supplies the inducement for the establishment of satellite cities, - the objective of our present ideas of desirable decentralization. The prime requisite of such a pattern is a strictly controlled access design type of arterial highway improvement.

While this pattern of major highway development is of proven worth, it can do only a part of the whole job. Equally essential are the extensions and rehabilitation of the mass transit system, the

adjustment and improvement of the general street system, and the provision of not only adequate but generous areas for parking. In this last essential element lies the only hope of stabilizing the long range desirable urban area plan. The Interstate System concept has not only set in motion planning activities based on adequate factual data but has achieved highly encouraging results.