

# Land Use Development and the Highway Interchange

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## INTRODUCTION

It is particularly appropriate, of course, to focus on the National System of Interstate and Defense Highways, and especially the points of interchange of that system with other highways. These systems may be to our communities, both urban and rural, what river junctions and railroad division points were to the transportation media of the past. The interchanges logically become the nodes of new developments.

Perhaps we ought to narrow the problem down to Indiana specifically, as quickly as possible. Indiana has designated approximately 1,090 miles of Interstate highway, including toll roads. Of this, approximately 90 miles are urban, the rest rural. On this mileage, there will be, of course, numerous points of interchange of the Interstate system with other highways. Their frequency will depend upon a number of physical and functional factors; and there is hardly time, here and now, to dwell upon these in detail. With respect to the entire Interstate System, I have heard estimates of the total number of interchanges as high as 14,000. It is impossible to say at this time exactly how many interchanges there will be in all; but suffice it to say, that there will be frequent points of interchange.

## THE LAND USE PROBLEM AT THE INTERCHANGE

Each interchange is designed in accordance with established engineering and design criteria, and each interchange ramp has a given design capacity. The criteria and design capacity used are based upon traffic that could reasonably be expected to accumulate as of 1975 and other factors. Highway officials have been directed to anticipate the future at least to this extent by the Congress of the United States in Title 23.

In meeting this responsibility, highway officials in this State, as in others, are doing the best that modern highway technology makes possible. Highway officials cannot foresee the impossible, they are not magicians; they are technicians; and can they see around too many *sharp* corners.

It is in this connection that the land use problem at the interchanges arises. In terms of a given interchange, the highway official will assume that certain land use developments will reasonably occur. He goes ahead and designs the interchange on that basis. In a number of instances, at least, particularly where other location factors are at a maximum, almost before the pavement is dry on the interchange ramps, several huge industrial plants, a regional shopping center, a huge housing center, a complex of motels and restaurants, or other large traffic generators will set themselves down right next to the entrance or exit terminal of the interchange, literally at the ends of the ramp. After a while, the unanticipated, additional traffic load which these generators create frequently will cause the ramp to break down functionally because the design capacity of the ramp has been exceeded.

#### LAND USE DEVELOPMENT FROM A PRIVATE POINT OF VIEW

This situation creates the problem we have at hand today in connection with many of our highway interchanges. It can render ineffective investments of highway funds ranging from \$129,000 to over \$2,000,000 each. It can also mean that additional millions of dollars of private capital can also turn out to become bad investments.

In this connection I would like to explore the bypass analogy. In the past, highway officials have built highway bypasses to provide for through traffic service on a route that had become cluttered with all sorts of roadside enterprises. When traffic was thus diverted to the new route, the businesses on the old route that may have suffered as a result of such diversion of traffic were not and could not legally be compensated for any damages. Kokomo and Lebanon in this State are typical examples of such bypasses.

After the new route was opened to traffic, new private installations of all sorts traditionally would again engulf the new highway route, unless it happened to be of the expressway variety. Then, a bypass would be built to bypass the bypass.

Private enterprise itself has an important stake in establishing itself along highways of modern design, and in such a manner that their

venture capital is not impaired long before the physical plant wears out, only because of the functional obsolescence of the highway. It is to the advantage of private venture capital, as well as of the public at large, that interchange areas be so designed and land uses in the vicinity appropriately placed in relation to the access facilities, so both can thrive for years to come. If the public facilities break down physically or functionally, the private adjacent uses stand to lose as heavily as the public, if not more so.

This does not mean, of course, that private land uses be prohibited in the private areas beyond the interchanges. We are not building the Interstate System for it to become a museum piece, encased in glass. The System is not an end in itself, but a means to an end. It is being designed and built to serve traffic, private land use, and private enterprise that has made the Nation great. In order to serve this end most effectively; however, we must focus right now on the most intelligent means to create order out of what otherwise will be chaos.

Now about timing. One may say: "It will really be another five years or more before the problem really gets too acute. Why not wait until then for corrective measures?"

The answer is simple: If we wait until the problem is upon us, it will be too late. In another five years, land use development will already have taken place, and it will be largely academic as to what can be done about them at that time. The time to act is now.

## TYPES OF LAND USES AROUND INTERCHANGES

As an aid to possible solutions to the problem of effecting a more orderly arrangement of land uses around highway interchanges, we might inquire into the various types of uses which are customarily attracted to interchange areas. There are at least four broad classes of such uses:

(1) One type might be identified as "highway-oriented," seeking to cater to the motorist and his vehicle. These include the gasoline filling station, the restaurant, motel, and related enterprises.

(2) A second type of use is the large traffic generators which seek to have ready access at the interchange points, to a ready market for their merchandise, to a labor force that is widely dispersed but easily accessible via express highway, and to large numbers of vehicles generally. These include factories, shopping centers, outdoor theaters, and the like.



Fig. 1. This is the section of the Eastshore Freeway looking northerly, with Jackson Street interchange in the foreground. It is obvious that urbanization is rapidly engulfing the interchange.

(3) A third variety might be called ordinary community-type enterprises which seek to establish themselves at points of interchange largely because that is where the community ends or begins. These uses might conceivably include individual stores, service establishments, and the similar activities.

(4) The fourth type might include all other kinds of uses such as individual residences and the like which seek only the most elemental type of access but are found at the points of interchange largely because of special circumstances.

There are other types of uses or other classifications, but the particular grouping is not important. What is important is, characteristically, certain kinds of land uses are attracted to the interchange

points; and that these, almost invariably, are substantial traffic generators.

### POSSIBLE REMEDIES

What can be done to cope with this developing and vexing problem? Unfortunately, there are no pat answers. But we do have some leads. For years, some devices have been developed and used for other or allied purposes. Some offer greater promise in connection with the interchange problem than others. Let us consider these briefly, one at a time; and perhaps in the end, we might agree, one or more of these, perhaps with a little different twist, might answer the need.



Fig. 2. A typical section of San Diego, California, 1947, near one of the interchanges at the Cabrillo freeway. Note the residences and the rather pastoral character of the area.

### DESIGN SOLUTIONS

It would be ideal, of course, if through the interchange design mechanism itself we would achieve the type of control we are seeking. If there is such a design solution, nobody has come forward with it as of now. However, some design considerations are pertinent. For example, the Interstate interchange itself is being designed by highway officials in this State, as elsewhere, according to the highest acceptable standards of geometric design formulated by the AASHO and adopted by the Bureau of Public Roads.

Additionally, more and more highways that lead off of the Interstate interchanges are being designed with median strips. This in itself is helpful, for obvious reasons.



Fig. 3. This is the same area as shown in Fig. 2, 10 years later (1957). Note how Sears Roebuck & Company has taken advantage of the proximity of this site to the Cabrillo freeway, a very logical development.

#### *EXTENSION OF CONTROL OF ACCESS*

Another possible solution may be found in an extension of the principle of control of highway access. This feature characterizes the Interstate System itself and its ramps. Some advocate that if control of access is further extended to a reasonable degree beyond the entrance or exit terminal of the ramp, this would be wholly adequate to deal with the problem. Some States already are using this device to a limited extent for this purpose.

One might ask: What is a reasonable extent? Half mile beyond the entrance or exit terminal of the ramp? Three-quarters of a mile? One mile? Or more?

Others may ask: Will this really be effective, or are you just pushing the point of potential congestion that much farther down the crossroad and not really assisting the situation materially? An engineer for whom I have a lot of respect recently indicated to me he thought this was a solution well worth considering, because the extra length of control of access may provide, under some circumstances at least, the needed length for heavy volumes of traffic to enter the approach road in an orderly manner, and this in itself would be helpful.

#### *ACQUISITION OF THE PRIVATE AREAS*

Still another solution might be for public authority to buy up at least some of the private areas adjacent to the highway interchange.

This would solve the problem but would hardly be the most feasible answer, for several reasons: In the first place, it might be difficult in most States to establish legally that the acquisition of such areas involves a public use or a highway purpose. Second, public authority does not have the financial resources to complete the Interstate System itself within a reasonable time, let alone having money to spend for such a collateral purpose.



Fig. 4. This is another typical interchange area, still under construction, near one of California's newer freeways, in 1954. Note the several enterprises in the area.

#### *ACQUISITION OF INTERCHANGE OR DEVELOPMENT EASEMENTS*

Some bright fellow recently suggested we might consider acquiring, not the entire private areas adjacent to the interchange, as suggested, but merely limited easements along strip a half a mile long and a few feet wide, adjacent to the interchange and its approach roads. This would permit private land uses beyond this strip to develop largely unhampered. Yet, easement control of the strip would enable public authority to exercise desirable control in the public interest.

#### *EXPANDED ENTRANCE AND EXIT CONTROL*

A number of States exercise some control over the number and placement of any cut into a State highway to create a private drive-



Fig. 5. This is the same area as indicated in Fig. 4, five years later (1959). Many new industries have now located in this interchange area, as close to the expressway facilities as possible. Each of these generate considerable volumes of traffic.

way to an adjacent use. In most states, however, very little design or traffic engineering review is made of applications for such private entrances and exits to highways of conventional design.

It is conceivable, however, that this control, already authorized in at least 24 states,<sup>1</sup> including Indiana, could be sharpened up and its scope expanded to involve an appropriate review by design and traffic engineers in the highway department. Also, elements might be incorporated into the device so it would be of substantial help in solving the interchange problem we are considering here and now.

### ZONING

Zoning is being applied in most of the urban areas of the Nation and some of the rural regions too. City and county zoning has been

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<sup>1</sup>Twenty states have statutory authority to exercise driveway control: California, Georgia, Illinois, Indiana, Louisiana, Maine, Maryland, Mississippi, Nebraska, New Hampshire, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Washington, West Virginia, and Wisconsin. Five states have authority to exercise driveway control under broad, general authority of state highway department: Delaware, New Mexico, North Carolina, Texas, and Virginia.

effective, by and large, in preserving the integrity of the principal zones of the areas subjected to the control. But, beyond a certain point, zoning just is not effective. It frequently succumbs to partisan pressure, and the practice of spot zoning and the variance, both, can become practices inconsistent with the public interest.

If it were possible somehow to strengthen or eliminate the weaknesses in the zoning mechanism, it might be considered seriously as a possible solution to the interchange land use problem. It might be possible to contrive a new type of zone called an interchange zone and to devise special regulations applicable to it alone calculated to reconcile more nearly private land use development and public facilities at the point of interchange.

### *SUBDIVISION CONTROL*

Subdivision control is another device which may be worth considering in connection with the problem at hand. In fact, two States, Wisconsin<sup>2</sup> and Michigan<sup>3</sup> have utilized a form of subdivision control along State trunk highways which involves a formula that might be very helpful here. In Wisconsin, for example, by law the State highway department has been granted jurisdiction over all subdivisions along State trunk highways, involving five or more parcels. Certain standards are written into the law. If there is a city, county planning commission, or other local body that has the authority to review subdivision plats, such body retains the power to deal with subdivisions along State trunk highways. But it must adhere to the standards set forth in the law. If there is no local body with jurisdiction, then the State highway department is the reviewing body.

Since the law was enacted, the Wisconsin State Highway Department has reviewed literally thousands of plats with outstanding and effective results. The formula set forth is excellent: It sets up and requires adherence to State-derived standards. Yet, it preserves grassroots administration of a control that traditionally has been local in character.

It might be possible for the interchange areas to make use of a similar formula under which certain standards, highway-oriented, for

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<sup>2</sup> *Wisconsin Stats.* 1957, Ch. 236.1 *et seq.*: The act specifies that all land subdivisions provided for under Chapter 236 of the Wisconsin Statutes shall be so designed as to provide for the safety of entrance to and departure from abutting highways or streets and for the preservation of the public interest and the public investment in the highway plant.

<sup>3</sup> *Michigan Compiled Laws Ann.* 1948, Sec. 560.35 *et seq.*

the arrangement and accessibility of adjacent land uses would be derived by the State highway department, and administered by the localities, wherever and to the extent they wish.

### *FRONTAGE OR OTHER INTERIOR ROADS*

We could also consider the desirability of using a system of frontage or service roads parallel to the crossroad that interchanges with the Interstate System at a particular point. Frontage roads are being



Fig. 6. A section of U.S. 101 freeway in California, 1957. Note how little private structure there is near the interchange area.



Fig. 7. This is the same interchange area as in Fig. 6, three years afterward (1960). It is quite obvious that the interchange has magnetic qualities as far as private development is concerned.

used in a number of instances in connection with the more urbanized sections of the Interstate System itself with notable success. Perhaps some of the same concept could be transplanted for use along the crossroads with equally effective results.

### *SET-BACK CONTROL*

Several States make use of the set-back device in connection with the improvement of highways. But admittedly, it is not very effective. The set-backs involved are only modest, and there is always the ques-



Fig. 8. Several interchange areas on the West Coast. Note the partial interchange in the foreground and how the adjacent residential development is insulated from the interchange ramps and without any direct connections to it. Legal controls and proper design can go a long way toward regulating private land uses in interchange areas in the public interest.

tion of the extent to which public authority may proceed under this police-power mechanism. The set-back tool merely provides some additional area between the highway and the actual traffic generator, and one may wonder whether this really is helpful in connection with the problem.



Fig. 9. Another interchange area in Long Beach, California. Here again proper design of the adjacent private land use and the interchange areas themselves have avoided what otherwise would have become a chaotic situation.

### *COMPREHENSIVE PLANNING*

Mention should be made of the over-all mechanism of comprehensive planning. If a thorough job is done in this area, the presumption is that the interchange areas, both public and private, will be

adequately protected and provided for. We must realize, however, that the comprehensive planning tool as we know it today in most of the urbanized areas of the Nation, does not necessarily have the full force and effect of constraining public and private development according to its specifications; and it still depends upon the willingness to the parties at interest to go along. Moreover, in itself, it depends in its execution upon other planning tools such as zoning, subdivision controls, frontage roads, and set-back controls.

## CONCLUSION

On closer scrutiny, perhaps none of the several solutions tentatively proposed will prove to be entirely feasible. That is not necessarily important. But it is of paramount importance to recognize that the problem of highway interchange in terms of its land use development is upon us right now, and we need to do something intelligent about it as soon as possible. The sooner we devise some effective answers, the better we will be able to reconcile the uses of the highway interchange with the uses of the adjacent areas to the more lasting benefit of both public and private interests.