

# Planning Controlled-Access Highways in Rural Areas

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Interstate highways can bring many benefits to rural areas. They may reduce producers' transportation costs to distant market centers for farm supplies and farm products. They may make city jobs more accessible to farmers and other rural residents. Further, the high-design highways may bring distant recreational areas hours closer to both city and rural inhabitants. Many other beneficial effects on the rural economy can be cited. Two important ones are defense and stimulation of economic growth.

However, there is another aspect of the interstate highway. This is the disruption that may result from the alignment and design of the new highway through individual farms and through rural communities. Rural community, as used here, means the group of farmers and rural residents who live in the vicinity of the highway.

The distinction made between individual farms and the rural community is intentional. This is done because the highway's effects on the two differ. The actions that can be taken by highway personnel to help avoid or relieve the problems of the two differ also.

## DISRUPTIVE EFFECTS ON INDIVIDUAL FARMS IN THE HIGHWAY PATH

Recently the USDA made a study of the changes in farm operating units crossed by Interstate Route 35 south of Des Moines, Iowa. (1)\* The study points out effects of an Interstate highway on individual farms. (2)

Interstate 35 is a north-south highway on new right-of-way. Overpasses or interchanges range from one mile to six and one-half miles apart for the 33 miles of highway examined. Right-of-way acquisition

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\* Numbers in parentheses refer to list of references.

took all or part of six sets of farm buildings. It also took just under seven per cent of the farmland in the 80 operating units it crossed. Almost a third of the farms lost ten per cent or more of their land to the right-of-way, while more than a third lost four per cent or less.

The right-of-way taking resulted in considerable farm segmentation despite the fact that the highway was generally located on the half-section line. Of the 80 farms, 40, or exactly half, had land that was separated from the farm headquarters by the highway. About seven-eighths of the 43 separated parcels were from farm units that were previously contiguous. The rest were parcels that had not previously adjoined the farm headquarters. The average size of all parcels left separated by the highway was 66 acres.

Of the 43 parcels of land separated, 27, or 63 per cent, were accessible to the operator by road and a few were accessible by both cattle pass and road. The remaining 16 parcels, or 37 per cent of the total, were landlocked by the highway. If we consider only those separated parcels that previously adjoined their farm headquarters, somewhat less than half were landlocked by the highway. Farm operators had to travel an additional two to three miles oneway to reach the 27 separated parcels that were accessible by local roads.

The existence of the highway had some additional effects on farm operators who lost land. Seventeen of the operators stated that it caused them to have farm drainage problems. These operators also indicated that neighbors who had not lost land for highway rights-of-way shared these problems.

The drainage difficulties were of three types. In some instances, the highway diverted water to adjoining fields where erosion and flooding resulted. In other instances, the highway acted as a dam and retarded the runoff of surface water from abutting land. The slowing or the ponding of runoff made fields difficult to till or harvest. Some farmers abandoned small acreages that were too wet to farm. A third type of problem voiced by farmers was that the placement or elevation of a highway culvert had interfered with the functioning of the tile line in abutting fields.

## EFFECTS ON RURAL COMMUNITIES

You may ask how an interstate highway affects the group of farmers and rural residents who live in its general vicinity. The community effects cited are taken from research in Wisconsin and Iowa and from other published sources.

One of the possible community effects—a change in land drainage—has been mentioned. The highway also can bisect school districts and farm districts for soil conservation, irrigation, and drainage. Similarly, it can sever school, milk, and mail routes. The rerouting of these services and local farm to market traffic, plus the round-about travel by farmers to and from separated parcels could lead to traffic congestion and maintenance problems on some local roads.

As an additional effect, a high-speed controlled-access highway may encourage urban or commercial development at interchange areas or in small towns along the highway. (3) It is reasonable to expect that most communities will be unprepared for such development.

A final point that needs to be made is that effects on rural communities can be both varied and obscure. For example, who would think that an interstate highway might materially reduce the fire protection enjoyed by certain areas of a rural community?

## MODIFYING DISRUPTIVE EFFECTS IN HIGHWAY PLANNING

These several effects are reported, not because they are the only ones that can or do occur, but because they can be modified by the planning engineer. Some of them, of course, can also be modified through the policies and procedures used in appraisal of land, purchase of rights-of-way and separated parcels, and timing of possession taking. (4) However, the discussion here is limited to ways in which the planning engineer can modify disruptive effects of controlled-access highways.

Even though farmers may be compensated for many of these disruptive effects, there are two important reasons for their consideration by highway planners. First, a reduction in highway department costs may result. Second, some of the effects for which no compensation is made may be minimized.

The planning engineer will influence any disruptive effects by his choice of highway alignment and by his location and design of interchanges, overpasses, service roads, culverts, drainageways, and related structures accompanying the controlled-access highway. The decision he makes regarding location and design will depend upon the facts he collects and considers. Therefore, the remainder of this paper discusses, first, some additional items that could be considered by planning engineers in locating highways in rural areas, and second, the sources they can use in obtaining these facts.

## ADDITIONAL FACTS TO BE GIVEN CONSIDERATION

Highway research in both Iowa and Wisconsin disclosed that the planning engineers carefully consider each of the factors necessary to make an accurate road-user benefit analysis. They determine in great detail the cost of right-of-way, construction, maintenance, and operation. They consider with equal detail the economic benefits to road users through reduced vehicle operating costs and savings in time.

However, the road-user benefit analysis gives only limited consideration to possible disruptive effects of the highway. For example, little consideration may be given to the cost of providing community services because of the highway alignment or to the costs of adjustment by farm operators or by the community. While some planning engineers consider disruptive effects that go well beyond those estimated in right-of-way costs, other planning engineers do not.

If the planning engineer is to reduce disruptive effects on farms in the highway path, he will need to know and consider:

1. The amount and kind of agricultural land taken by each alignment. (5)
2. The number of farm buildings presently in use and located in the path of the right-of-way for each alignment.
3. The number of farm ownership tracts bisected by each alignment.
4. The number and acreage of farm ownership parcels to be landlocked.
5. The number of farm operating units bisected by each alignment.
6. The number and acreage of parcels landlocked for farm operators.
7. The extent to which severance to farm ownership units and farm operating units can be overcome by highway alignment and by design and placement of related highway structures.
8. Whether the plan for culverts and other drainage structure complements soil conservation, drainage, and flood-control efforts on adjacent land.

If the planning engineer is to reduce the disruptive effect on the rural community, he will need to know and consider:

1. The amount of farm-to-market travel disrupted by each alignment with its overpasses and interchanges.
2. The school, milk, and mail routes that may be disrupted.
3. The extent of rerouting in passenger miles or in cost of the rerouting.
4. The soil conservation, irrigation, drainage, and fire-protection districts that are severed and the effects of the severance.
5. The extent to which any serious effects of such severance can be overcome by design and placement of related highway structures.

The highway engineer should try also to determine whether the highway alignment and the positioning of related structures is consistent with county or community plans. Further, if development is likely to occur at an interchange or in a nearby small town, he should determine whether the community or county government is equipped to plan land use changes in that area. If they are not so equipped, the highway personnel may need to assist local communities in guiding such changes in land use. An important benefit to the highway planner from such action would be some control over the traffic generated by urban or commercial development.

### INFORMATION SOURCES THAT CAN BE TAPPED

Several information sources can be tapped by the planning engineer. While these sources are known and used by some planning engineers, they are foreign to others.

The county Soil Conservation Service technician, the county Agricultural Extension agent, and the county Agricultural Stabilization and Conservation Office manager can provide information on location and productivity of different kinds of agricultural soils, farm ownership boundaries, farm operating unit boundaries, and soil conservation plans on individual farms. Also, the county agent and SCS technician can provide information on irrigation, erosion, or drainage problems that have occurred in the area. They can also furnish information as to the boundaries and composition of districts established to cope with these problems.

Postal officials, local school officials, and county and town police and fire-protection officials will have information on postal routes, school routes, and police and fire protection plans.

The county agricultural agent, the county ASC manager, and the ASC committeemen can assist also in delineating farm-to-market traffic patterns. This latter information can be used to supplement origin and destination studies and traffic counts conducted by the highway agency.

Not to be overlooked as an important source of information on irrigation, conservation, and drainage are abutting land owners and operators.

The county and town engineers and planners, local governing boards, and the county attorney will be able to provide information on the existence of community plans and local authority to execute these plans.

An additional source of information is the public hearing. The hearing can be largely for public relations, or it can be highly informa-

tive and fact finding. If it is the latter, as recommended by the Bureau of Public Roads, it will dispel the uncertainty associated with the location of the proposed highway. In addition, it can help the planning engineer to determine what groups have information of use to him. (6)

On some occasions, two hearings may be helpful to the planning engineer. On others, one public hearing supplemented by private meetings with groups of farmers or community representatives will be even more helpful.

### EXAMPLES OF USE OF FACTS AND SOURCES

Both additional facts for the planning engineer to consider and their sources have been listed. A few examples will show how consideration of these facts and use of these sources have been rewarding to farmers and highway agencies alike.

When the Iowa Highway Commission planned Interstate Route 35 in 1956, its personnel contacted school and postal officials in an effort to keep disruption of cross-traffic patterns to a minimum. Consequently, we heard very few comments from Iowa farmers about such problems.

Even at that early date, Iowa planners recognized the importance of proper culvert placement to abutting farmers. One farmer told a right-of-way agent of his desire to have a culvert opening placed at a higher elevation than was originally planned by highway engineers. This change would impound water and silt and eventually would fill an eroding ditch on the abutting property. The farmer's request was relayed to the planning and design engineers who willingly consented to this change.

A short time later, the Iowa Highway Commission made a pioneering effort to coordinate more completely and more directly the location, elevation, and design of highway-drainage structures and of conservation and drainage efforts on abutting lands. Commission engineers obtained the assistance of a local SCS technician. Together they visited abutting land owners and operators. During these visits, the location and preservation of tile systems, the design and height of culverts, and the control of erosion were given special attention. Although new, this technique has resulted in substantial erosion control and drainage benefits to farmers and savings in construction costs to the commission.

At about the same time, a district engineer in northeastern Wisconsin was holding a meeting with farmers. These were farmers who had or expected to have farm drainage problems because of a new highway. Each case was given special attention by highway engineers. Later,

minor adjustments in existing structures were made which remedied the drainage problems and satisfied the landowners.

In another Wisconsin project, this one involving an interstate highway, the district engineer gave local residents specific advanced information about the proposed location of an overpass near a small town. The farm people and businessmen of the small town jointly suggested changes in the location of the overpass near the town. They based their views on facts collected which related the location of the overpass to such items as marketing, school transportation, and fire protection. Fortunately, the suggestions were made before the highway plans were final, and the suggested changes were carefully reviewed and adopted by the State Highway Commission. Such a change would not have been possible without interested and cooperative highway planners.

The planning engineer should not despair because of what may appear to be a new burden. First, he will find the county agricultural agents, the SCS technicians, and the ASC office personnel most helpful and eager to cooperate. Also, local groups and officials and researchers from the state universities will probably be eager to help him. Thus he need not shoulder the entire burden alone.

Further, to be effective in reducing some of the disruptive effects of the highway, the planning engineer will not need to launch into a new, more comprehensive, and more complex economic analysis than he is presently conducting. The application of economic analysis in highway planning has not advanced to the point where a handy rule is available for a dollar and cents valuation of all disruptive and beneficial effects of each highway alignment.

W. C. Pendleton of USDA and others have pioneered in developing an overall conceptual scheme for analyzing community benefits and costs. (7) However, it will be some time before a handbook comparable to the AASHO publications for road-user benefit analysis is available in this area.

In conclusion, here are three observations arising from contacts with planning engineers and local groups. First, local groups and local officials are anxious to have information about the proposed highway and they are equally anxious to provide information to the planner if he requests it. Second, the planning engineer may need additional time and personnel and encouragement from his supervisors in order to consider facts beyond those needed for the road-user benefit analysis. Third, if planning engineers consider these additional facts,

they will soon be making alterations in proposed alignments and in design and placement of structures that will reduce disruptive effects of our controlled-access highways.

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