

ROADSIDE PROBLEMS on the INTERSTATE SYSTEM: FOREST and CONSERVATION ASPECTS

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As previously stated, this panel was requested to key the discussion of roadside design to the aspects which emphasize the difference between the new Interstate Highway System and the old or other systems. When analyzed, it appears that the principal difference between the old and the new is that enabling legislation has been passed which now makes mandatory the application of many of the standards and concepts for which forward-looking roadside planners and designers have been working for years. Now that the means of accomplishment is at hand, however, there are very real differences to consider in determining what must be done.

In this short paper, the subject has been taken to include forest and conservation aspects in relation to areas both within and adjacent to the highway right-of-way. In consideration of these aspects in relation to adjacent areas, the statements made here now apply to National Forest lands. However, the basic principle of protection, conservation, and utilization could apply to any interdependent area.

Review of forest and conservation aspects of roadside design on the Interstate Highway System involves two major phases, with each being somewhat dependent on the other. These two phases can best be delineated as aspects within the legal right-of-way limits and those outside such limits.

Brief mention as to the interdependency of these zones is in order before discussing in detail the aspects of each. As stressed in previous presentations, physical phenomena such as fire, flood, shifting soil and rock, snow, etc., do not recognize right-of-way markers or boundary posters, and no sooner is a new highway constructed than these forces of nature are at work to destroy it.

Proper upstream land management and use can minimize the cost of highway drainage structures and erosion control measures and can assist with reducing maintenance expense. Proper design and consideration by highway people of the effect of drainage release on downstream lands can be helpful in preserving and improving watershed conditions. What a waste of time and money it is to design a roadside properly by carefully preserving and restoring ground cover within the right-of-way limits, only to have it destroyed by wild fires encroaching from adjoining lands! Consider the cost of permanent damage to the national resource base from forest fires which start from roadsides which have not been adequately fireproofed. Mountain and forested areas, which provide the aesthetic values considered in location of the highway as a scenic route, are dependent on these highways to serve the recreational and other values of the area. It is of real importance that the highway designer give proper consideration to the problems of land management and, of equal importance, that the land manager be fully aware of the effects of his manipulations on the job of the highway designer.

WITHIN THE RIGHT-OF-WAY

Forest and conservation aspects of roadside design within the limits of the legal right-of-way have been considerably magnified under the criteria established

by the Federal-Aid Highway Act of 1956. The major differences between these aspects as expressed in the new Act and as practiced in the past are found in the two items of increased right-of-way width and control of access.

The increased right-of-way width will require that greatly increased acreage be considered for landscaping and roadside design. On this subject, H. C. Clemmer* in his paper "The New Federal-Aid Bill," said:

Roadsides play an important part in the development of our secondary highways as well as the Interstate System. Sufficient area to permit 'waysides' for picnicking and rest is essential on all but high-speed throughways. Over two-thirds of the right-of-way of the eight-lane highway and three-fourths of the six-lane highway will be in the category of roadsides. Approximately 25 acres per mile of this area will be susceptible to landscaping, or a total of over a million acres for the 41,000 miles of interstate and defense systems alone.

Under any degree of planning, design, and landscaping, this is a big job. It will take careful design control to conserve and protect existing desirable vegetation whenever possible to avoid the restoration costs. Once established, this million-acre "park" will require maintenance, and without proper planning and application this development of safety, beauty, and utility could become a terrific maintenance liability.

The new highway act recognizes the importance of acquiring complete rights-of-way as far in advance as practicable and makes funds available for this purpose. It is anticipated that a large part of this advanced right-of-way procurement will be in the form of increased width to accommodate future traffic lanes as the need arises. To the roadside designer this means that he must now plan and provide for two types of roadside management—permanent and temporary.

The access control requirements for the new Interstate System will necessitate a revised concept of providing for the service needs of the traveling public. On the old highway system practically all service facilities were at least administratively detached from the realm of highway design. On the new system, at least the basic needs of the motorist will have to be considered in the over-all planning and design as an integral part of the highway system. Provision for access to and from the necessary service facilities can, in most cases, be handled by frontage roads. However, in the case of much of the mountainous areas, frontage will not be the answer. Existing highway routes which are on the Interstate System now serve public campgrounds, picnic areas, and house-trailer camps which are located within National Forests. Many of the existing highways now located on designated interstate routes are not up to interstate standards, but the highway location now utilizes the only feasible route through the mountains. In some cases, topography so limits the flexibility of design that there is insufficient area to provide frontage roads. In such terrain, Forest Service campgrounds, picnic areas, and parks generally occupy relatively small riverside "flats" and hillside benches. Consideration should be given to inclusion of these developments as an integral part of the highway design cross-section. In serving the needs of the "complete highway", these areas would also continue to provide for the recreational enjoyment for which they were originally developed, without compromising the access requirements of the Interstate System.

Providing for the service facilities necessary under the controlled access features of the new highway bill will generally increase right-of-way widths and

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present more problems for the roadside designer. It will make little difference in this respect whether the service is provided through frontage development or as an integral part of the highway right-of-way cross-section. Such developments also require a special consideration relating to the conservation and protection of roadside vegetation because of the increased area involved in actual roadways to provide for deceleration, merging, and approach lanes.

AREA ADJACENT TO RIGHT-OF-WAY

The second general part of this presentation deals with the forest and conservation aspects of roadside design as related to areas adjacent to the Interstate System but generally outside the limits of the legal right-of-way. The following considers these areas as they affect the highway and, secondly, as the highway affects these contiguous areas.

There is a growing awareness of the need to study and consider the "express" highway also as a scenic route. Protection, conservation, and wise use of forests adjacent to the highway is of very real importance for its aesthetic contribution to the enjoyment of highway users.

Proper management of adjacent watersheds can materially contribute to the economics of highway design and maintenance. Watersheds in a stable, healthy condition will minimize runoff peaks and hold soil and debris movement to a minimum. A watershed denuded by fire or improper management can result in accelerated runoff and the movement of enormous quantities of soil, rock, and debris. To downstream highway developments this can mean plugged culverts and washed-out bridges, slides, mud flows, and fill loss and settlement.

In snow country, forest cover on areas adjacent to highways tends to minimize snow drifts and thus reduces the cost of keeping the highway open.

Highway designers have positive responsibilities relating to the protection and conservation of areas outside the right-of-way limits. The need for more thorough consideration of downstream highway drainage releases has been previously covered by another member of this panel. Roadside designers must consider the necessity for fireproofing rest areas, service areas, etc. Fencing game crossings or providing underpasses is essential for the safety of the highway user and the preservation of the wildlife of the area. In areas of heavy construction, bank stabilization is as important to downstream values as it is to the highway itself.

The importance of the interdependency of the areas inside and outside the limits of the right-of-way with reference to the forest and conservation aspects of roadside design should again be stressed. Awareness of these relationships is another step toward the "complete highway".

W. H. Simonson:

I was particularly interested in Mr. Usher's emphasis on the economics of construction and maintenance of well-planned and protected roadside development on the Interstate System.

DISCUSSION

Acquisition of Property—Maintenance Storage Areas

IURKA: I should like to ask Mr. Levin a question: How far does the Federal government go in participating in the acquisition of property on these highways in rela-

tion not only to parking areas, for which I think we know the answer, but for such service facilities as, for example, maintenance storage areas, sources of gravel for future maintenance, and, possibly, for maintenance buildings within the right-of-way? Could property be acquired under the law for those purposes?

LEVIN: We have just released a new memorandum on right-of-way which supersedes GAM343; that is "Policy and Procedure Memorandum 24-4.1." In general, I should say that the Bureau would not participate in items of this kind, since they probably would not come within the definition of highway right-of-way as such. We are still in the process of writing some of these "ground rules."

IZZARD: Would it not, under the basic Federal-aid law, be true that the state is obligated to provide buildings and a going highway department at its own expense and that the Federal government does not participate in any facilities that a highway department needs for maintenance operations?

LEVIN: Yes, that is a general principle. If it is strictly a maintenance proposition, I suppose that would not be deemed to be a right-of-way purpose within the definition of Federal reimbursement. I would say that anything relating to maintenance would be strictly the state's responsibility.

SIMONSON: Following up Mr. Izzard's comment, there is a requirement in the Federal-aid legislation that the states are obligated to furnish the staff and organization to carry on highway operations.

Zoning and Control of Advertising Beyond the Right-of-Way

WELLS: I also should like to ask Mr. Levin a question—one that he has referred to briefly and that he might amplify. My question is about the control that might be dictated by this law as it affects adjacent lands, let us say, in the sense of zoning for the control of advertising or of requiring easements in relation to watersheds, or whatever might occur beyond the limits of the right-of-way proper.

LEVIN: Here, again, it would have to depend on who is doing it. If the state is proposing it as a reimbursable expenditure (that is, if the state assumes that it is a highway purpose as such), I suppose we could participate in it to that extent. We have been doing that in the past. I do not know that any basic set of principles has been evolved on it. There probably is not anything in the new memorandum previously referred to on that subject specifically, and it has been left mostly for adjudication by our new Office of Engineering and the General Counsel's office in specific instances. However, as the chairman of this session has indicated, I think the new legislation is broadly conceived, just as all the Federal-aid highway legislation is conceived. It does not pinpoint details, but rather delineates general policies, leaving the rest to the administration by the Bureau, to the AASHO and its policies, and so on, to achieve the kind of modernized highway improvement that is needed. Existing Federal-aid legislation mentions right-of-way width only. Section 11 of the Federal Highway Act of 1940 provides that "construction likewise may include the purchase of such adjacent strips of land of limited width and primary importance for the preservation of the natural beauty through which highways are constructed, as may be approved by the (Bureau of) Public Roads." There is no specific Federal legislation on the control of property outside the right-of-way reserved for highway purposes.

Protection of Forest Roadsides

NEALE: Mr. Usher spoke about the forest conditions and the possibility of fires, which I think is very important on this Interstate System with more than a million

acres of roadsides. Has the Forest Service prepared any specific criteria on this for design and control of the forest roadside?

USHER: Yes, basic studies have been made on both physical types of firebreaks and the use of fire-resistant or fire-retardant plants. The common method of control of minor ground fires is by an area denuded of inflammable material. This might be done behind a planted screen within the right-of-way through use of an area that is harrowed, disked, or even bulldozed annually, if necessary, to keep it down to bare mineral soil. Again, this could create an erosion problem to be taken care of by some means, such as cross ditching, paved strips or ditches, etc. Firebreaks may also be maintained through the use of soil sterilants which prevent plant growth. Very little has actually been done on fire-retardant plants. One reason most of the big redwoods are here is that their bark is fire-resistant. The bark will smoulder, but very seldom burns. There may be others which, through testing, will be found to be of help in this matter.

Going a little farther, in the rest-stop areas where we provide a place to build a fire, we should provide water to put it out. Reduction of ground litter and debris is important close to areas where people stop and smoke or build fires.

Forest Service Right-of-Way Requirements

ASTRUP: Fortunately, in our state (Oregon), we do not go through much of the National Forest on the Interstate System, but does the Forest Service intend to change the present method of right-of-way permits? And should we anticipate Forest Service requirements for removal of inflammable material on the right-of-way?

USHER: As Mr. Levin stated, we are directed by law to cooperate with the Secretary of Commerce in granting rights-of-way on the Interstate System. I think that the Forest Service has been able to provide a satisfactory document which fulfills the legal requirements of the various states. Some states may have different legal requirements as to what they can accept as a right-of-way and on what they can spend state money. Perhaps you refer to our so-called special-use permit, which is a grant of use of the land. It is not a deed. There is now in motion machinery which will broaden the policy to cover a more permanent type of grant. Just exactly what this instrument will be, I am not informed enough to say. I have heard it discussed, and perhaps we could get you that information if you desire.

As to the removal of inflammable materials from the rights-of-way, as a public agency with a responsibility to protect and conserve the National Forests, we have insisted on debris removal to the degree which was felt necessary to protect the adjacent National Forest areas. I believe that our requirements would not go very far, if at all, beyond what the highway engineer would feel to be adequate for roadside cleanup. Perhaps there are areas of disagreement on that subject. However, unless such items as fallen dead timber or snags within the right-of-way limits are cleaned up during construction, it must be taken care of later, under maintenance. Removal of trash, downed timber, dead brush, trees scarred by construction, and that sort of thing is very little beyond the concept, as I understand it, of parkway design which is being applied to the Interstate System.

Windthrow Risk, Game Crossings, and Related Problems

GARMHAUSEN: I should like to ask Mr. Usher what he thinks will happen to wildlife or streams or even to the forest itself, with roads going through heavily forested areas. What effect might wind have on some trees remaining after the protection of surrounding trees has been taken away?

USHER: If we open up dense timber stands, such as the fir of Oregon and some of the native hardwoods of the East, so that the wind gets below the crown of the trees where it can blow through the timber, we sometimes have a large amount of windthrow. This is especially true if the wind comes after a storm which soaks the ground and loosens the soil around the roots. That is a normal risk that has to be taken into consideration at the time the stands are opened. We have the same problem each time we build a logging road. One of our purposes is to harvest the timber crop of the National Forest, and I see little difference from what we are accustomed to handling as far as windthrow is concerned.

Highways properly designed, with banks stabilized and erosion minimized, do not have an adverse effect on fish life. In some states there has been a requirement by the State Fish and Game people for baffles in culverts. Some fish apparently object to the undulating water currents that come through a corrugated pipe, and baffles have been installed to provide stilling areas. The fish go around the end of these baffles and rest above them before they make the next one. This has reduced the carrying capacity of the culvert to a small extent, and perhaps it is a factor that will have to be considered in the design of drainage structures. For the protection of the traveling public, as well as for wildlife preservation, it will often be necessary to fence rights-of-way and to provide adequate signing at known deer crossings. I think some of this type of protection is provided on mountain highways in nearly every state at the present time.

Land Use and Drainage Problems

GARMHAUSEN: Does land use affect design in any way? Do you give consideration to the soil? For instance, if an area adjacent to a right-of-way is not cultivated and there is quite a lot of drainage, can that in any way affect the design?

SUTTON: There are a great many effects on a drainage system, depending on the land use. For example, above a highway crossing there may be an area of woodland or brush that is not cultivated but is potentially good land. It may be an area where the appropriate drainage system would be tile drainage requiring a culvert 6 feet deep to get an outlet. Our concept of the proper planning for an agricultural area is to try to establish the land capabilities as the land is mapped and those maps are made available. As highway work is being done, we should try to anticipate the drainage and erosion control requirements, based on the capabilities of the land itself. Of course, from the standpoint of drainage requirements, the quantity of water that needs to be removed depends on the intensity of the rainfall, the soils, cover, and other factors.

Slash Timber Regulations

IZZARD: What regulations does the Forest Service have with respect to disposal of slash in logging operations, and do lands under the control of the state likewise have such regulations? The reason I ask that question is that a great deal of the damage in the floods in California last December was caused by drifts that came down the streams, and some of them were actually logs that were stockpiled right down in the stream bed.

USHER: Both the Federal government and the state forestry agencies have provisions for disposal of logging slash. State specifications are applied to the private land and, as minimum requirements, to Federal lands. Forest slash is not generally disposed of with an eye to beauty, but on the basis of economics and the reduction of fire hazard. In the past, it was the policy to pile and burn all logging slash below a certain diameter size to reduce the flash fuel that is left in the forest

after logging operations. It has now been determined that the same objective can be reached by lopping and scattering. Generally, there is more natural litter in a virgin stand than may be seen after a logging operation under present conditions, and even then forests do not look park-like after logging operations. Both state and Federal governments have prohibitions against deposits of slash in stream or natural drainage channels.

Going back to the recent flood, some of the logs had been impounded in streams and ponds within boom barriers, which broke during the flood. Thus, a lot of the logs came from so-called mill ponds and live streams, rather than from the forests. The present policy of the Forest Service in most areas is to lop and scatter logging slash. Adjacent to our campgrounds and recreational areas and adjacent to highways, the slash is piled and burned. "Lop and scatter" consists of limbing the tops of the trees and putting everything close to the ground to speed up deterioration through rot and to restore that leaf mould and litter to the soil. Obviously, there is more to be done in all areas. However, with consideration of the interdependency of the highway strip and adjacent areas, each considering the other, more concern and care will be given to problems relating to debris, possible debris loads in streams, and disposal of highway drainage.

Land Development and Runoff

IZZARD: On this matter of runoff, one factor that could make a tremendous difference is the case where swamp areas or lakes are filled in as a result of highway operations or the development of adjacent land. A very clear example of that is a lake area where we made some runoff analyses which indicated that, in a watershed, say 10 square miles in area, of which 10 percent is lakes or swamps, if those lakes and swamps were filled in, the rate of runoff might increase as much as ten times what it was before.

SIMONSON: Oftentimes that is what subdivisions do. Industrial areas are frequently built on low or swamp lands. Changes in land use must be anticipated by the design engineer.

TURKA: I should like to ask Mr. Sutton for a little clarification of one thing he said. It was in reference to getting native vegetation established on the slopes beyond the line of grass. I think he had in mind the mowing line perhaps, because my question would be: "Don't you people consider grass to be native vegetation?"

SUTTON: What I had in mind was the consideration, possibly, of some of the vines, particularly in the South. Of course, grass is native vegetation in some areas, but if it is not maintained in some areas, grass is taken over by brush and trees. What I was thinking of is the changes that might be made in getting on more highway right-of-way a natural vegetation requiring less maintenance.

Roadside Services

MILLER: I believe that Mr. Gordon implied in his remarks that people who needed food and drink, gasoline, etc., would have to leave the Interstate Highway in order to fill their requirements. On the New York State Thruway we furnish the facilities; they don't have to leave the highway. That is going to be quite a problem, isn't it, having 41,000 miles of limited access highway that the user will have to leave whenever he wants anything? Undoubtedly more turnpikes (toll roads) will be built in the future if this practice is insisted on.

GORDON: That point was brought up in Robert Moses' article in "Harpers" (December 1956). The question of providing gasoline, oil, water, etc., at the present time

is supposed to be taken care of as you stated. In other words, a system of signing will be required so that people will know, when they come to an intersection, that at that point they can leave the Interstate Highway to get what they need. What is going to happen where there are no intersections, is still open to question. Of course, in suburban areas, where there are what are called "frontage roads" in the legislation, there will probably not be any problem, because there will be gasoline stations and other facilities on the frontage road. They will not be on the right-of-way of the Interstate Highway, but they will be accessible from it. There is not going to be any problem in most of the built-up East, but west of the Mississippi, where intersections may be 25 or 30 miles apart, there are going to be difficulties.

Communications on the Interstate System

WELLS: If that type of facilities is not available, what about communications in those broad open spaces west of the Mississippi? Can a person use a telephone? How frequently would they be spaced?

GORDON: I think telephone or some kind of communication system will be needed on the Interstate Highways. That need probably is going to increase as one goes west until the Pacific Coast is reached where, again, cities and towns are fairly close together. There doubtless are going to be some developments in wireless telephones that may help in solving this problem. I noticed the other day, in a store downtown, a very nice unit that just hangs up on the wall like an ordinary telephone. You can both receive and send telephone calls from it. It might be that, in our rest areas, which we hope we are going to have at intervals of about 30 miles, we shall be able to work out some type of special communications. In the West we are going to need them.

ORLAND: With radio telephone limited as it is in its distance scope and with the Federal Communications Commission with its back against the wall as it is with channels right now, not only for radio but also for other means of communication, I wonder if this would not overstep and tread on their toes a little bit?

GORDON: Well, I have to use my imagination when I talk about that. We do know that there is a good deal of short-wave communication used by police departments. My thought is that we are going to need communications primarily for police and ambulance and that sort of help. For that, arrangements could undoubtedly be made to use these frequencies, which do have a limited range, but a range of 30 to 40 miles is enough to summon an ambulance in case of an accident or other emergency of that kind.

Landscape Features and Aerial Surveys

GARMHAUSEN: I should like to ask Mr. Gordon what he thinks of aerial design. Aerial photography will help in locating a road so as to preserve special features, of which one might not be aware otherwise. How can it help to make the line through some tree areas or some landscape features that you could incorporate in the design?

GORDON: A previous paper (Deakin) had a very nice aerial photograph showing a section of the Garden State Parkway. All those features that you would deal with in your design were right there in plain sight. You could see every stream and every tree, and all you have to do is enlarge those photographs a little bit with an enlarging stereoscope and most of those details will be visible from the regular paired photographs which are now supplied as a part of aerial surveys.

Wider Right-of-Way for Roadside Development

DU BOIS: I want to make a comment rather than ask a question. My thought about the impact of the Interstate System requirements on the roadside development problem is that there are to be wider rights-of-way than have commonly been used. There will be more area to do something with to please the administrators, and they will be more conscious that they should plan in more detail what kind of treatment they think is justified. Then, I believe Mr. Usher made the comment that, where the second lane is not to be built initially, there is the problem of temporary maintenance of roadsides in that particular area. This will differ from the maintenance of the remainder and much more important portion of the highway and will be more of a problem than it has been previously.

Use of Aerial Surveys on Garden State Parkway

DEAKIN: In relation to the use of aerial photography, I should like to make a comment in regard to Mr. Gordon's comment. First, we used aerial photos extensively in the location of the Garden State Parkway and the Palisades State Parkway, and, as he brought out, you can by examining the photographs, see about everything. By taking those and spot-checking the areas in which you are especially interested, you can make field trips to just those specific areas and check them more in detail. In that way, you save a great deal of time in designing and locating the highway and setting up the right-of-way. In fact, all our right-of-way was set up directly on the aerial photographs and then transferred to the aerial topographic maps.

State Legislation for Control of Access

GARMHAUSEN: We have been talking about Interstate Highways. I just wonder, Mr. Levin, if all the states have enough legislation now to carry out this assignment.

LEVIN: With respect to control of access, all the states do not have legislation. There are 45 states that have some laws, but even some of these states' laws have inadequacies. While the state may have authority to control access, it might be limited to certain areas or to certain mileages. For example, in Delaware up to this past year, the highway department had authority to control access only on the approaches to the Delaware Memorial Bridge. Delaware now has new legislation which limits the control-of-access authority to one county. It so happens that at this time, without regard to the extra thousand miles of Interstate Highways, all the Interstate Highways designated in Delaware—that is, its portion of the 40,000-mile system—are in that county. If, tomorrow, a section of the additional miles should be added in another county in Delaware the state would have no authority to control access. It is in such cases that the Federal machinery may need to be invoked, unless the state gets the additional legal equipment.

Legislation Against Encroachments on Right-of-Way

IURKA: I think that there are those of us who need some help in another respect. We built a highway recently which, although not controlled in access, went through a section of the country that was not built up, and so for the first couple of years there was no development along the route. We had quite a time getting some grass to grow there, but we finally got a good stand. Then the fish wagons and the peddlers' trucks began to stop along the side of the road, especially on weekends, and after one weekend the grass was gone. What provision is there for any control of that sort of merchandizing or misuse of the right-of-way on these Interstate routes? Sure, we have a law, but I believe that once in the past 20 years one of

our officials tried to kick off one of those boys, and it was a very sad thing for us.

LEVIN: From a Federal point of view, we have an over-all regulation which holds all Federal right-of-way to be inviolate against physical and functional encroachments, and some states which themselves do not have specific legal authority of that kind have used the Federal law, which is applicable to Federal-aid projects, to keep the right-of-way unencumbered. In most states there is a practical encroachment problem, but it is not too much of a legal problem; it is more a public relations problem.

Small merchants or private individuals are involved, and you don't want to make them mad at you. Some highway departments serve 30 days' notice, in a nice way, on some of the encroachments, trying to get rid of them. Then, if nothing happens, they get out the maintenance crews and try to do something about it in a little rougher kind of way. It is really related very closely to a public relations problem. But some states do not have enough legal equipment to control the right-of-way, and a good many states could use a strong or a stronger regulatory provision which would protect the rights-of-way against physical and functional encroachments.

SIMONSON: Mr. Iurka, you didn't mean to ask that question in connection with the Interstate System, did you?

IURKA: I can see that it might become a problem: a political problem or a public relations problem.

LEVIN: Wouldn't you think that, from a safety point of view, the traffic patrol would be able to take care of that, because normally there will not be even stopping on shoulders unless there is an emergency. In other words, it will be a matter of enforcement by the highway patrol. And it is up to the states to have sufficient manpower to enforce the safety requirements.

SIMONSON: Yes, on the Interstate System, I do not think there is any question, and I do not believe that the state highway departments or the Bureau would entertain any kind of encroachments on the National System of Interstate Highways. I think too much is at stake there; the National Defense has a stake in this thing too, and that is not to be taken lightly these days. I do not believe that on the National System of Interstate Highways, once it is built and designated, there will be any possible chance of encroachments of that kind. It will be too hazardous to try to stop on an Interstate highway with heavy volumes of fast-moving traffic.

Right-of-Way Over Public Lands

ASTRUP: May the provisions of the Federal-Aid Highway Act of 1956 with respect to control of access in Federal lands be extended to other than the Interstate System?

LEVIN: Let us take a look at that provision. I think it does not extend to other Federal-aid systems. Section 109 reads as follows:

...Whenever rights-of-way, including control of access on the Interstate System, are required over public lands or reservations of the United States, the Secretary of Commerce may make such arrangement...." I should say, offhand, that it applies almost exclusively to the Interstate System. Now that does not say that this provision is not going to have an influence on other Federal-aid projects and perhaps even on state projects. The same principle which makes sense in connection with Interstate projects is going to come to the surface very quickly: not only this principle, but also a

lot of other principles which are applicable for the first time to Interstate projects are going to have an important influence through the coming years on other Federal-aid projects and even on state projects. But Section 109(d), as now written, is limited to Interstate projects alone.

Speed-Change Lanes and Maintenance Operations

PARKER: My understanding is that service areas will not be permitted within the right-of-way, which apparently means that motorists must reach them by means of ramps at the crossroads. As far as rest areas are concerned, are acceleration and deceleration lanes to be provided so that they will be in the right-of-way? Also, will the same provisions be permitted for the construction of maintenance operations areas? Will they be provided with acceleration and deceleration lanes, or will they be required to be located so that they will be reached from the ramps?

GORDON: A policy is being considered at the present time, by the AASHO Committee on Planning and Design Policies, in regard to rest areas; I believe that they will adopt some of these standards which will require adequate speed-change lanes as needed for the traffic. In other words, where there are, say, 10,000 vehicles a day, or something of that sort, there should be speed-change lanes. The rest area would not be safe without them. As far as maintenance areas are concerned, the status of maintenance structures on the Interstate System is going to be worked out with each state as the problem comes up. I do not believe that the door is shut at all, but special care will be taken in the design of access to maintenance facilities. There will have to be maintenance facilities, particularly where there is a long distance between towns. Right now, that is one of those things that Mr. Levin says we are trying to work out as fast as they come along, and in advance if possible.

SIMONSON: Mr. Parker, there is another point along that line which I might mention in connection with your question. As Mr. Levin brought out, the law is very flexible. A good deal depends on the imagination and planning ability of the state highway department to work out a reasonable solution to a specific situation. I can see possibilities where two or three things might be worked out in a grand plan of development at a certain point where it can be warranted. Such a multipurpose plan would include the speed-change lanes to take care of a safety turnout and rest area. At the same time there is the question of truck weighing stations. Mr. Levin mentioned the requirement that no one can exceed a certain axle loading; that is going to need policing, and there will have to be turnout areas for those. Then there comes the question of maintenance areas. These three things then may be combined in one over-all plan: (a) the safety turnout and rest area for the motorist; (b) the weighing station to be sure that trucks do not exceed the weight load requirements of the legislation; and (c) the storage of materials, etc., for maintenance at a reasonably convenient location for a 25-mile section of arterial highway. I can see possibilities for economy in the development of all three in combination. There is nothing in the law that could prevent having the one set of speed-change lanes designed to take care of all three. As I see it, if a good plan can be submitted and shown to be sound in principle, such combined developments should be possible.

WALKER: It might be well to mention that on the WASHO test specialized instruments were developed for measuring truck weights instantaneously, while the truck is in motion. A signal system has been developed whereby, if trucks are overweight, they are slowed down by that special system.

MILLER: Everything that has been said indicates a higher maintenance cost per mile than the states could afford. Would there be Federal aid on maintenance?

SIMONSON: I might repeat a comment previously made by one of the panel members that presumably, in regard to maintenance, there is nothing in the 1956 law that changes the relationship between the states and the Federal government from that which now exists on the regular Federal-aid system.

Concept of Complete Highway Objectives

LEVIN: This Committee on Roadside Development, aside from my own connection with it, has done a superb job of bringing to the attention of the highway people busily engaged in the actual road building operation the need to do more than just build pavement; the Committee has called attention to the need to be aware of roadside land uses and to reconcile the uses of the highway with the uses of the roadside. I would encourage you to continue to be persistent in that objective. There are some who believe, with respect to this program, that we should build pavement only; others say we should build consistent with the objectives of the complete highway; that is, complete in the sense in which roadside development people have talked about it for many years. If you are persistent you will aid in the final realization of the Interstate System as a complete highway, complete with all these things that have been talked about in this discussion, and not just a strip of concrete that stretches for 41,000 miles from one section of the country to another.

NEALE: I should like to amplify what Mr. Levin has just said, especially to the end that the Interstate Highway System is to be built with 90 percent Federal funds and 10 percent state funds. The maintenance costs are to be met 100 percent from state funds.

IZZARD: I should also like to emphasize that plan for complete development and to amplify another point made by Mr. Gordon regarding the cooperation of landscape and hydraulic engineers with other engineers of the highway staff. I have felt for a long time that the maintenance of the highways depends largely upon how well one anticipates what nature is going to do to the roads and that, in addition to having a landscape engineer in on the initial stages of the location, you could also have a hydraulic engineer who can anticipate what the highway is going to do to the streams and what the streams are going to do to the highway. There is a lot of information available along those lines now, but until each state highway department sets up in its organization design sections which specialize on the problems created by floods, there will continue to be extensive damage done to highways as a result of ignoring the basic laws of nature.

Roadside Maintenance and Built-In Erosion Control

GORDON: We are very much interested in Mr. Miller's comments regarding the maintenance of Interstate Highways. Would you give us two or three examples of the ways in which you think the maintenance cost would be higher on the Interstate System than it would be on a normal system of the same standards?

MILLER: The Interstate System is certainly going to require more and much higher-quality maintenance. There are going to be access road accelerating and decelerating lanes that are not usual on the normal highways. Is the Bureau going to control the quality of maintenance? You now travel through some states and the maintenance is terrible. Are we to allow that on the Interstate System?

GORDON: I am not connected with the maintenance department, but I do think that maintenance is going to be a problem. It is another one of the things that will have to be worked out between the Bureau and the state. Naturally, you yourself would want a little higher standard of maintenance on one of these divided highways than on a two-lane highway out in the country.

I do want to add this thought. We believe that by increased cooperation among all the specialists and the location engineer, perhaps particularly the landscape engineer and the hydraulic engineer, we can cut down on maintenance. Running water extensively damages highway embankments; in recent years there has been severe damage to many highways as a result of stream erosion. In the original design of Interstate Highways, we are going to try to stop that erosion as far as it is possible to do so. As this built-in erosion control is put into the new Interstate Highway design, maintenance costs should definitely be reduced.

MILLER: I am glad you mentioned water. I was once asked the definition of an engineer, and I said he is a man who fights water 105 percent of the time.

SIMONSON: There is another point that may help to answer some of Mr. Miller's questions later: These Interstate routes are the most important from the standpoint of the concentration of traffic. Many states have a gasoline tax. I am not an economist, but I imagine that where there have been so many toll roads they must induce enough people to travel over them that they pay a profit; otherwise, it would be most difficult, or even impossible, to sell the bonds. If a road pays a profit, it must be due to the fact that people like to ride that road. And if it is so important a route, maybe you would agree that it would have a little higher standard of maintenance.

Then I should like to add that, along the line mentioned by Mr. Izzard for the hydraulic engineer, we have only scratched the surface in this economic concept of complete application of landscape design to highways as a whole. Perhaps Mr. Wright of Connecticut might have a specific comment to make on wartime experience in his state. During the war, when we were so pressed with shortages of men, materials, and money, he was forced to cut down on roadside maintenance in his state. After the war, it was found that he had cut his maintenance in half. By utilizing the principles of good landscape design and good management of the woody growth on roadside slopes, he had reduced his budget, as I recall, something like 50 percent.

MILLER: I think we will all admit that we owe a vote of thanks to all the authorities operating these so-called toll roads, because they have done a wonderful job of maintenance.

(QUESTION): In New York State it is our desire and intent to build in as much maintenance as we can. In other words, we prefer to have it done in the construction stage, rather than go back and spend more money maintaining the slopes, etc. Now apparently there seems to be some objection from the Bureau of Public Roads to spending money that way. We have a unique condition that permits it. But the question should be discussed at considerable length before we get much farther. I think that all the states are running into this problem.

SIMONSON: We appreciate your bringing this to our attention. The Bureau has always encouraged adequacy of design for minimum maintenance.

NEALE: At the Southeastern Association of State Highway Officials, Mr. Radzikowski served on the panel discussing this question of preventive maintenance. He stated very definitely that if the states did not build in the necessary maintenance in the Interstate System it would be their own fault. The money is there to take care of it.

SIMONSON: Thank you, Mr. Neale. The Public Roads staff are aware of this factor.