# SAFETY, HEALTH, and WELFARE THROUGH ROADSIDE DEVELOPMENT

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# **Connecticut Turnpike**

The Connecticut Turnpike, a modern all-purpose limited access expressway, 129 miles long, now under construction to connect New York's New England Thruway with US 6 at the Rhode Island state line, required dynamic thinking. Varying with the local traffic requirements, it will have from two to eight traffic lanes. Through the cities and residential areas there normally will be six lanes between the New York line and New Haven. It will have a normal right-of-way of 300 feet, normal traffic lanes of 12 feet, normal shoulder widths of 10 feet, and medians with a width varying from 8 to 30 feet.

Previously, highways have bypassed cities and towns. Traffic requirements and the general economic development of the areas traversed caused the Connecticut Turnpike to be located through urban and industrial areas. Where possible, smaller communities were bypassed. High-speed highways passing through urban and suburban areas require consideration of the user and also of the health and welfare of the adjacent population.

### THE CONCEPT

The Connecticut Turnpike will present to view a constantly changing scheme and pattern of living throughout its entire length. Along its course there are three distinct areas: industrial and urban, residential, and rural. The impact of this highway upon the adjacent population will be considerable. Roadside development will have a material effect on the adjacent landowners and communities.

Roadside planning commenced at the beginning of the highway design stage. The result is a functional design with a purpose. The entire Turnpike was thoroughly analyzed, and roadside development was approached as a definite necessity. It has become an integral part of the over-all design.

#### THE CRITERIA

The approach to landscape planting gives major considerations to the following factors:

1. Safety: Higher developed speeds dictated the need for additional engineering and safety features such as sight lines, screens, and stopping sight distances.

2. Screens to separate highway and adjacent property through use of planting barriers.

3. Sound attenuation, by the use of planting to reduce roadside noise and confusion from the highway and adjacent areas.



Figure 1. On areas where the Turnpike is on fill, it will be necessary to place trees down off the slope and nearer to the screened object than is considered best design practice.

- 4. Glare, by providing a screen for opposing traffic.
- 5. Monotony. The need for an attractive, scenic route has not been overlooked.



Figure 2. Sound deadening and screen planting in cut areas call for the use of evergreen trees, minor trees, and shrubs to give effective depth.



Figure 3. Plan for the lunchroom-service station emphasizes a low planting in front of the building and within the view-line limits. All other planting will act as a screen for adjacent conditions.

Preservation of existing vistas and additional planting to aid in counteracting deadly monotony and hazardous fatigue has been emphasized.

6. Economy of maintenance, to permit maximum use of mechanical equipment.



Figure 4. The Milford interchange illustrates a large area combining both rural and residential adjacent areas.



Figure 5. The Westbrook interchange calls for rural-area planting. Only in specific areas will any screen planting be necessary.



Figure 6. Plan for planting for a residential and industrial area in Stamford where a city atmosphere prevails.

#### THE PLAN

## A Thorough Analysis

Many preliminary field trips were made along the alignment of the highway previous to the actual purchase of the right-of-way. After the actual alignment of the highway had been staked, a mile-by-mile inventory of all existing conditions relating to roadside development was made. All characteristics were noted and recorded in reports and on preliminary designs at 200 feet to 1 inch. Notes were made on the plans of the requirements of a specific area and the relationship of the importance of the area.

## Preservation of Natural Growth

The mile-by-mile inventory required that any existing plant material be thoroughly checked as to the feasibility of saving this material. A number of areas were found which are at present serving as screens between the adjacent property and the railroad, and the location of the highway. In many cases, the contracting engineers worked very closely with the roadside-development consultants to make certain that existing screen areas would remain and that all drainage and construction problems would not mar these areas.

# Control Clearing of Alignment and Interchanges

Sight-line considerations have played an important role, both from the point of view of clearing existing material and in the design of the roadside development program. Sight-line conditions were given top priority and no existing or proposed



Figure 7. The adjacent maintenance area will be screened from the Turnpike by the use of shrubs and trees. The fact that the Turnpike will be in cut will aid the screening effect.

planting will be allowed within this zone. The design standards are as follows:

1. A 60-mph design speed zone requires a minimum sight distance of 500 feet.

2. On inside-loop ramps, with a design speed of 30 mph, a minimum sight distance of 200 feet is required.

3. At intersections of secondary roads with no traffic lights, a sight-line distance of 150 feet to 200 feet is required.

# Screen Planting of Fill Areas

A great portion of the Connecticut Turnpike is on fill and through urban and residential areas. The areas available for screen planting are limited.

No major trees can be less than 35 feet from the edge of the pavement, shrub plantings no less than 8 feet from the edge of the shoulder, and marginal plantings of ornamental trees not less than 15 feet from the edge of the shoulder.



Figure 8. Planting on the "on" ramp of this interchange will stress sight lines, whereas the planting on the "off" ramp will stress traffic separation.

In addition, the type of fill found in Connecticut is very sandy in nature and presents additional problems in trying to plant such areas.

Because of these factors, most of the screen and sound attenuation plantings will consist of a majority of evergreen trees, interspersed with major deciduous trees. With the planting limitations necessary for the safety of the motorist, the plantings will have to be located near the object to be screened. Because of this required depth from the highway, adjustments will be made in the plantings so as to achieve the maximum reduction of sound. Plant barriers located in this manner will tend to minimize sound and provide a protective barrier for the adjacent residents.



Figure 9. A plan for supplementary screen planting in rock cut areas. The excellent boring information made possible the planning of planting areas above the rock cut.



Figure 10. Detailed plan for planting on the median calls for shrubs and a minimum of minor trees only.

### Screen Planting in Cut Areas

Planting in the cut areas will require an entirely different approach. Cut areas have an additional problem in that any planting at the top of a slope on the south side of the highway would tend to encourage icing of the highway in winter weather, especially if evergreen trees are used. Because of this factor, shrub beds will be used with a moderate amount of deciduous trees. Where evergreen trees are required, the planting will be set back from the top of the slope in order to prevent winter shadows being cast across the highway. Major planting, however, will consist of shrubs and minor trees at the top of the slope.

A partial sound barrier will be provided by the cut area itself and will be supplemented by the roadside development design plan.

## Rock Cut Areas

Certain areas traversed by the Connecticut Turnpike are through ledge rock. Most of the hills of Connecticut run north and south. The Connecticut Turnpike generally runs east and west or northeast.

The State of Connecticut provided excellent cross-sections and boring information. The areas where rock would be encountered were compiled and thoroughly considered in the design stage.

#### Rock Fill Areas

Little could be learned about where the rock from the cut areas would be placed. A thorough field check was made, locating where the rock from the cut was being concentrated either to the east or west of the cut areas and being placed in 3-foot layers with a minimum of cover over the rock fill areas. No planting was deemed advisable in such areas. As most planting by design is either at the top or toe of the slope, there will not be too many areas where the rock fill will prove to be a problem.

# Planting in Industrial and Urban Areas

A number of large cities, such as Stamford, Norwalk, Bridgeport, and New Haven, are traversed by the Connecticut Turnpike. The highway cuts through low-income dwelling areas and through valuable industrial areas.

The problems presented in both areas involved two factors: (a) the highway in these areas is entirely on fill and (b) the Turnpike through Westport, Fairfield, Bridgeport, and Hartford is to be on sand fill obtained by hydraulic dredging.

No attempt will be made to make use of screen or sound attenuation plantings in these areas; there just isn't room. In addition, the type of plant material to be used had to be thoroughly analyzed for hardiness, because much of the location lies in an area which has a large amount of industrial fumes which are detrimental to growth. All these factors placed many restrictions on the choice of plant material.

## Planting in Urban and Suburban Areas

Although the type of residential area varies from estates to a great majority of middle-income homes, the same treatment will be applied to all. Of primary importance through a residential area is the protection of the adjacent homes from noise, lights, etc., by planting. It is assumed that land values of adjacent property owners will be enhanced. The attractive character of the neighborhood will be maintained.

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Figure 11. Detailed plan for railroad screen planting in the Bruce Park area of Greenwich.



Figure 12. Plan for screen planting where the Old Greenwich interchange will merge and parallel the existing Post Road.

## Planting in Rural Areas

The portion of the Turnpike from the Connecticut River to the Rhode Island line passes through rural areas. Thus, the emphasis will be placed on planting only where necessary. At interchanges and at locations where screen and headlightglare plantings are required, however, planting will be done to blend in with the natural landscape.

# Median Screen Planting along Horizontal Curves Only

Certain restrictions were placed on median planting. From a safety point of view, no major trees will be used. Only suitable hardy shrubs and a minimum number of minor trees will be planted to yield under collision impact. In addition, there is a minimum plant setback of 5 feet from the pavement for maintenance personnel safety. Because of the median location between two ribbons of bituminous concrete or portland cement concrete, completely exposed, emphasis will be given to the use of mulch and hardy shrubs.

Staggered and overlapping masses of planting will be used to reduce monotony.



Figure 13. A sound deadening and screening plan, with the Turnpike on fill and passing through a residential area in Old Greenwich, Conn.

# Railroad Glare

Between Greenwich and Branford the Turnpike parallels and runs adjacent to the New Haven Railroad. Because of the proximity of the railroad to the Turnpike, locomotive headlights might cause confusion and glare to the motorist. Therefore, it is imperative to screen this off. Large evergreen trees will be used for safety through immediate effect.

## Interchanges

Although interchanges were approached from an aesthetic point of view, there are many areas where sight lines and safety are of prime importance. To achieve

safety on the exit ramps, mass planting will be used to divide the exit ramp traffic from the Turnpike. On ongoing ramps no planting for 500 to 600 feet from the Turnpike will be permitted. Sight lines in this case are considered of paramount importance.

In addition, bridge plantings will be limited by sight lines from the bridges to the exit, and ongoing ramps.

However, despite the restrictions, plans for a very pleasing aesthetic planting have been developed. Interchange plantings in the great majority of cases will embody sound deadening and screen planting, to protect the adjacent properties.

## Safety

The most important consideration is safety for the motorist. Plantings will avoid the introduction of highway shadows, giving the appearance of moving obstacles or illusionary effects.

Wind-tunnel effects will be avoided. Plantings close to the highway may result in a trough which, when located on side slopes adjacent to valleys, cause a quickening of the flow of air. Up drafts thus created might result in lowering the pavement surface temperature to a point of freezing while approach sections would remain clear of icing.

## Objective: Safety, Health, and Welfare

Today's objective in roadside development design is to provide safety, health, and welfare. This is to be accomplished by analyzing the entire length of the Turnpike and commencing roadside design simultaneously with the highway design stage from the beginning through its completion.

## DISCUSSION

NELSON M. WEILS, Director, Landscape Bureau, New York State Department of Public Works-The Federal-aid highway program presents a new field of responsibility to those engaged in the work of roadside development.

Many roadside development features have evolved through the efforts of many attending this session. Your findings have been reported at these meetings for the benefit of others. I refer to such topics as designing land forms for drainage and good appearances. We have learned how to establish turf successfully. We have learned the over-all requirements of wayside resting places and how to design them. Because of our knowledge about plants, we have had an increasing responsibility in protecting existing vegetation, and we are able to design plantings for many special situations and objectives.

Each of these aspects of roadside development, together with the related subjects of efficient methods of having them constructed and how best to maintain them, has comprised our list of interests.

They have been tried in every type of soil, exposure, altitude, and moisture range of these United States. Naturally we expect to keep working with them, and we should progress in making them more useful, less costly, and more attractive as time goes on. It can be fairly said that we have a good working knowledge and are prepared to expand their application to the wider rights-of-way and the tremendously increased mileages of our new Interstate program.

I wish to call attention to another field of roadside development where we do

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not have this extent of background experience and which is now a challenge to the planning abilities of our profession. I refer to the urban arterial routes. These are likewise a part of this tremendous Federal-aid program.

These routes will interlace the cities and villages of this country. They will cause at least the partial rebuilding of many of our cities. Stark highway pavements serving only as routes of travel can cause degrading effects on their environment. We have seen this happen again and again where, even with limitedaccess provisions but no landscaped barrier provided, the adjacent properties become what has been termed sordid ribbon developments.

On the other hand, if these roadsides are properly developed or even the triangles and left-over parcels of land which border the normal rights-of-way are developed with a belt of vegetation and good landscape appearances, they will serve as a buffer between the traveler and the community, and we shall see untold social and economic benefits. Such benefits will continue for generations.

New York City is one of the few places where this kind of roadside development has progressed. Cul-de-sac areas have become miniature neighborhood playgrounds. Dead-ended streets have become attractively shaded sitting places. Rows of trees have somehow survived the reflected heat from pavements and skyscrapers to relieve the artificiality of the city highway.

The development of these city roadsides calls for the combined efforts of many designers. Landscape architects, having been trained in planning the development of land for man's use, are prepared to help the highway engineers in this relatively new field. Fences, curbs, pavements in useful and attractive patterns, benches, and shade trees are some of the elements of these designs. It is basically designing the best use of the land for the urban area as well as its best appearance from all angles of view.

This work is imminently important. It should be included in the earliest stages of planning. It will be impossible to come back at a later date and add these necessities of a good urban route. But to have foreseen the values of these roadside elements, acquired the land which will be necessary to accommodate them, scheduled the funds for their accomplishment, and made agreements with the city fathers for their subsequent maintenance are vastly more significant than expending our abilities on more and more miles of what may already be beautiful rural scenery that needs no artificial plantings.

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