

Designing Scenic Byways in Virginia

LESTER A. HOEL AND MICHAEL A. PERFATER

Presented in this paper is a description of the scenic byways program in Virginia, which was initiated in 1966 and by 1990 consisted of 629 mi of designated roadway in 28 counties. Included is the legislative definition of scenic byways and the procedures used by the Commonwealth in designating certain roads as scenic. The key factors to be included in road design and the principal elements considered in the design process are examined in this paper. Also discussed are existing design standards, including American Association of State Highway and Transportation Officials guidelines, Transportation Research Board studies, and Federal Highway Administration requirements. It is pointed out that although Virginia has adopted an approach for geometric standards similar to that recommended in Transportation Research Board *Special Report 214: Designing Safer Roads*, special design considerations and elements are not provided separately for scenic roads. A team approach (that includes traffic, highway, and landscape professionals) is recommended in this paper to ensure proper implementation of a design process for scenic byways.

Virginia has a program that provides for the designation of certain scenic roads as a "Virginia Byway." This program does not require the application of any special technical requirements for these roads to be designated, maintained, or modified.

Presented in this paper are the results of a study designed to determine whether special design considerations should be required for Virginia byways by virtue of their use, and if so, what highway elements would be affected if special design considerations were found to be appropriate. The study also considered the degree to which current standards provide for special design considerations. The scope of the study was limited to roads that meet the criteria for designation as Virginia byways (i.e., roads with a low traffic volume and a low speed limit that also have a particular aesthetic, historic, or cultural value). The design elements considered were restricted to the travelway and the adjoining right-of-way.

In 1964, the Virginia Outdoor Recreation Study Commission was formed. In 1965 it published a report entitled *Virginia's Commonwealth*, which recommended the establishment of a long-range outdoor plan and a state scenic roads network. The General Assembly considered the recommendations of the commission and enacted legislation, including the Virginia Byways Act. Unlike the proposed federal scenic roads system, the legislation imposed no restrictions on existing land use, as is evidenced by the following excerpts.

S.33.1-62 Designation. The Commonwealth Transportation Board is hereby authorized to designate any highway as a scenic highway or as a Virginia byway. This designation shall be made in cooperation with the Director of Conservation and Historic Re-

sources. Prior to designation, the local governing body and the local planning commission, if any, in each county or city wherein the proposed scenic highway or Virginia byway is located shall be given notice and, upon request by any of the local governing bodies, the Commonwealth Transportation [Board] shall hold a hearing in one of the counties or cities wherein the proposed scenic highway is located. (Code 1950, S.33-43; 1966, C.11; 1970, c.322; 1974, c.739).

S.33.1-63. "Virginia Byway" defined; preference in selecting. For purposes of this article, a "Virginia Byway" is defined as a road designated as such by the Commonwealth Transportation Board having relatively high aesthetic or cultural value, leading to or within areas of historical, natural, or recreational significance. In selecting a Virginia Byway, the Commonwealth Transportation Board and the Director of Conservation and Historic Resources shall give preference to corridors controlled by zoning or otherwise so as to reasonably protect the aesthetic or cultural value of the highway. (Code 1950, S.33-43.2; 1966, c.11; 1970, c.322; 1984, c.739.)

The legislation did not specify standards or criteria to be applied in the selection of scenic byways. The Commission on Outdoor Recreation (now the Virginia Department of Conservation and Recreation [VDNR]) developed selection criteria and procedures, which were adopted by the commission in December 1972 and by the Virginia Highway Commission in January 1973 (1).

CRITERIA AND PROCEDURES FOR DESIGNATING A VIRGINIA BYWAY

Virginia contains approximately 629 mi of officially designated byways located in 28 counties (Table 1). In order to be considered for designation as a Virginia Byway, a segment of road must substantially meet the test of the following eight criteria (1):

1. The route provides important scenic values and experiences;
2. There is a diversity of experience as in transition from one landscape to another;
3. The route links together or provides access to significant scenic, scientific, historic, or recreational points;
4. The route bypasses major roads or provides opportunity to leave high-speed routes for variety and leisure in motoring;
5. Landscape control or management along the route is feasible;
6. The route is susceptible to techniques to provide for user safety;
7. The route contributes to good distribution within elements of the Virginia byway system; and
8. Preference shall be given to those corridors with controlled (or other) zoning so as to reasonably protect the aesthetic or cultural value of the highway.

TABLE 1 Virginia Byways

Date of Designation	Route	County	Length (Miles)
1974			
June 20	193	Fairfax	12
August 21	5	City of Richmond, Henrico, Charles City, James City, City of Williamsburg	54
1976			
August 19	20	Albemarle	17.0
August 19	6	Albemarle, Nelson	35.0
August 19	151	Nelson	18.0
August 19	56	Nelson	18.0
1977			
January 27	39	Rockbridge	20.0
October 27	39	Rockbridge, Bath	36.0
1979			
June 21, 1979	623	Tazewell	10.0
July 14, 1979	723	Frederick, Clarke	10.0
1983			
December 17	250	Albemarle, Nelson	17.0
September 15	802, 245, 626	Fauquier, Culpeper	25.0
1986			
May 15	785	Montgomery, Roanoke	18.0
1987			
January 15	6, 650	Henrico, Goochland, Fluvanna	60.0
January 15	130	Amherst, Rockbridge	32.0
July 16	601, 676, 614	Albemarle, Orange	11.0
November 19	20, 22, 231	Albemarle, Orange	36.2
1988			
May 19	15, 665, 662, 719, 704, 690, 734	Loudoun	71.0
August 18	231	Orange, Rappahannock, Madison	39.0
1989			
July 20	659	Halifax	16.0
1990			
February 15	617, 673, 711	Chesterfield, Powhatan, City of Richmond	25.0
May 17	624, 652, 621, 633, 620, 652, 655, 628, 622, 627, 608, 612, 626, 255	Clarke	37.5
May 17	606, 628, 641, 647	Rappahannock	11.0

VDCR and the Virginia Department of Transportation (VDOT) are jointly responsible for designation of scenic byways. First, a study of a potential Virginia Byway is initiated, which either implements the Virginia Outdoors Plan or responds to a request from a local governing body. Second, an onsite inspection of the route is made by VDCR and VDOT to determine if it meets the previously listed criteria. Third, a resolution or other assurance is then requested from the local governing body that states their interest in being granted a scenic designation.

If the criteria for designation appear to be met, then each agency has specific responsibilities for coordinating with other organizations and localities; requesting approval for designation; and finally for conducting annual inspections of maintenance and improvements. The responsibilities of each agency are as follows:

- VDCR coordinates with VDOT, the Virginia Outdoors Foundation, and other appropriate state agencies to determine the location and significance of historic sites or other natural resources in close proximity to the corridor in question.

- VDCR ascertains whether local zoning and comprehensive planning programs of the locality and the planning district commission in which the road proposed for designation lies are consistent with the management objectives established for Virginia byways.

- VDCR recommends to the Commonwealth Transportation Board through the Commissioner of the Department of Transportation that the proposed road or road segment be designated a Virginia Byway.

- The Commissioner's office submits the proposal for byway designation to the Commonwealth Transportation Board for their action.

- Once the Board takes action on the designation request, VDOT advises the Director of the VDCR of that action.

- VDOT works with local governing agencies to achieve its objectives. When the road is designated as a scenic byway, VDOT conducts annual inspections of the maintenance of and improvements to the route.

The characteristics of scenic byways considered in this study are derived from the wording of the legislation that created Virginia's scenic byways (1).

The route bypasses major roads or provides opportunity to leave high-speed routes for variety and leisure in motoring and the route links together or provides access to significant scenic, scientific, historic or recreational points.

Thus, scenic byways are low-speed, low-volume roads that serve as alternative routes among or to points of interest. The legislation requires that the designated roads "substantially meet the tests" of the eight criteria listed previously, but they do not have to meet all of them (1). Thus, even within the limited scope of this single program, there will be a variety of types of scenic road.

KEY FACTORS TO BE CONSIDERED IN DESIGNING SCENIC BYWAYS

Design is only one element of the scenic road picture (2). The road itself is a necessary, although not sufficient, condition for a scenic byway to exist because without it there would be no vehicular traffic. Scenic byway enthusiasts often take the roadway for granted while concentrating on other issues such as aesthetics, easements, and economics. Scenic byways can be viewed as ordinary roads in extraordinary settings deserving of no special engineering consideration in themselves, or as roads that deserve special consideration by virtue of their form and function in order to ensure that they serve their intended purpose well and safely.

Four factors need to be considered when scenic byways are being designed: (a) the driver, (b) the vehicle, (c) trip purpose, and (d) the potential for conflicts with nonmotorized transport. It is the combination and uniqueness of these factors that causes scenic byways to differ from other low-volume roads in the state.

Drivers

If the scenic byway is a leisurely paced alternative to a high-speed major route, most through commuter and commercial traffic will usually select the major route, and some vacationing visitors will select the byway route. Although differences in the demographics of the driver population on scenic roads are likely (e.g., older drivers tend to travel on weekdays during the school year, whereas younger drivers travel on weekends), the major difference among the driver population is their familiarity with the road. The first-time visitor typically does not know what lies ahead with grades, clearances, passing zones, and other features of the road, whereas a driver who lives in the area will be accustomed to the route. The familiarity issue does not tend to be as prevalent on primary routes because roads within this system are fairly consistent in their design. On scenic roads, however, the familiarity issue can be major because these roads often tend to vary significantly in design, use of signs, geometrics, and speed limits.

Vehicles

The increasing popularity of recreational vehicles, both self-propelled and towed, also has implications for scenic road

design. The increased eye height of the driver provided by most of these vehicles benefits sight distance, which helps the driver who may be unfamiliar with the route. However, the difficult geometry often encountered on scenic roads can provide some degree of difficulty to the oversized recreational or tourist vehicle. Narrow lanes and bridges, hairpin turns, low or unpaved shoulders are often extremely difficult for such large vehicles to negotiate. Although the low-speed limits and indirectness of the routes tend to cause trucks to avoid using them, the same avoidance cannot be expected from tourists, no matter the size or type of vehicle in which they are traveling.

Purpose of Trip

Many travelers on a scenic byway will be driving specifically to enjoy the trip and the environment. These travelers typically wish to travel at a speed that enables them to comfortably view the features that make the route scenic or historic. Thus, periodically, drivers on scenic roads will tend to divert their attention from the road itself to these features; however, sightseers traversing the scenic byway at a leisurely pace are usually not the only travelers on the road. Because scenic roads are not classified as parkways (except in a few instances), they are not functionally restricted and thus must also serve motorists who use them for access to homes, farms, and commercial centers. It is these conflicting trip purposes that can cause difficulty for both the nontourist and the tourist driver. The nontourist or local driver wants to travel without incurring excessive delays created by tourist traffic and without being subjected to artificially low speed limits that are created for tourist traffic. On the other hand, the tourist driver wants to travel at a leisurely pace and is often focused on the scenic corridors rather than getting from one point to another quickly.

Conflicts With Nonmotorized Transport

In urban settings, the planner primarily seeks to eliminate conflicts between vehicles as well as those between vehicles and pedestrians. On scenic byways, especially those in rural settings, the conflict tends to be between vehicles and bicycles, farm equipment, and logging and coal trucks. Although such conflicts can be found on all rural roads, they tend to be even more prevalent on scenic roads. These conflicts are difficult to resolve because additional investments in shoulders, bicycle paths, sidewalks, and pedestrian overpasses may be required. As a minimum, lane striping and warning signs may be used.

DESIGN ELEMENTS FOR SCENIC BYWAYS

Scenic byways appear to represent a special category of road and thus warrant special design considerations that must be translated into substantive design elements. There is no single or unique set of design considerations suitable for all scenic roads. Each road must be evaluated individually, and the design considerations must be translated into elements that

are appropriate and practical. The principal elements planners should consider are as follows:

1. *Informational signage.* Signs that furnish information to visitors on scenic byways should be consistent and adequate. Informational signage on newly constructed Interstate and arterial highways is usually adequate and follows established guidelines; however, it is often nonexistent on old (especially historic) roads, where complete and accurate information is especially important. Also, in view of the fact that a significant proportion of scenic road users are older drivers, special attention to letter size and brightness is needed.

2. *Oversized vehicles.* The size of vehicles traversing the road will influence design features such as lane and shoulder width, pull-off design, and passing opportunity, because these vehicles are wider, have less power for acceleration, and have a tendency to off-track on short curves. Even though sight distance might be enhanced by the increased eye height of the drivers of oversized vehicles, if roadway cross section or grades are difficult, it may be necessary to restrict access to certain scenic roads or sections of them to classes of vehicles that can maneuver on them safely. Roads that carry such restrictions would have to be identified and signed accordingly.

3. *Suitability of the road for the purpose of the trip.* To allow the driver to achieve the purpose of the trip, that is to enjoy the features that render the road scenic without sacrificing safety, certain design considerations appear necessary. Posted speed limits appropriate for the road geometries, pull-offs, passing opportunities, overlooks, and clearing of vistas are important elements to consider. Historical markers, area information signs, and other items that contain written material should be placed where there is sufficient room for drivers to stop and read the message without interfering with moving traffic.

4. *Bicycles and pedestrians.* It is especially difficult to accommodate nonmotorized traffic on many low-volume historic or scenic roads with narrow lanes; low, unpaved, or narrow shoulders; and limited sight distances. In the case of Virginia Byways, it is often not practical economically or aesthetically to widen lanes and add shoulders. Although the need to accommodate pedestrians, bicycles, and farm equipment traveling on scenic roads is universally recognized, the appropriate design elements to do so are very much a matter of debate.

ADOPTION OF DESIGN STANDARDS IN VIRGINIA

Geometric design standards are provided in VDOT's *Road and Bridge Standards* (3), which is based on the American Association of State Highway and Transportation Officials' (AASHTO) design guide, *A Policy on Geometric Design of Highways and Streets* (1984) (4). The AASHTO guide (referred to as the Green Book) is the nationally recognized and accepted standard for new construction or reconstruction of highways. These standards are particularly appropriate for major reconstruction projects of existing roads.

The difficulty with the application of these standards to both scenic byways and other existing roads became clear at

the time the Federal Highway Administration (FHWA) authorized the use of Federal-aid funds for resurfacing, restoration, and rehabilitation (RRR) projects in 1983, Part 625 of Title 23 CFR (23 CFR 625) was revised to permit the use of lesser standards if these standards had been developed and adopted (47 ER 25263). Reconstruction had long been authorized with these funds. States found they could ill afford to use Federal-aid funds for RRR projects because of the requirement that the entire project would have to be brought up to current design standards if such funds were used. Because current design standards are employed for new construction projects, the aforementioned requirement created a situation in which relatively minor repairs or improvements had to become major reconstruction projects. What many states did was to use their own funds and apply Federal-aid funds to other highway projects.

The nation's state transportation officials, the FHWA, and Congress were aware of the difficulties generated by the RRR funding requirement. In 1977, AASHTO published the so-called Purple Book of RRR standards, which were opposed by safety organizations and the FHWA Office of Highway and Safety because they were considerably less stringent than AASHTO policies for new construction. Consequently, they were never adopted. In 1978, the FHWA proposed a more conservative set of RRR standards (5), which again were not adopted. In the 1982 Surface Transportation Assistance Act, Congress directed the National Research Council to examine the question of appropriate standards for RRR projects. This work was performed by the Transportation Research Board (TRB) and was published in 1987 as *Special Report 214, Designing Safer Roads* (5). Examined in the TRB report were the safety implications of a series of design elements and an approach was proposed that maximized the cost-effectiveness of investments in road improvements. In many respects, the standards recommended in *Special Report 214* are modifications of the proposed 1978 FHWA standards. Two findings brought forth in the TRB study are relevant for Virginia: (a) it was stated in the TRB study that the standards are not absolute and that every project must be examined on its own merits, and (b) the threshold for the low-volume (or more exactly, the lowest-volume) road category was raised from 400 to 750 average daily traffic, thus more mileage of rural and scenic roads became included in this category in Virginia. Recommended in the TRB study were minimal standards for low-volume roads and higher standards for higher-volume roads, on the principle that investing in improvements that will enhance safety on high-volume roads is most cost-effective.

The FHWA had consistently been able to grant exceptions to standards where justified on specific projects, and as early as 1983 had suggested to officials in each state that they propose (for FHWA approval) special standards for RRR projects in their state. In October 1988, the FHWA issued a technical advisory on the subject of RRR standards (6). This advisory promulgated what is, in effect, a condensed version of the TRB report (6). It suggested to the states that they adopt one of the following courses of action for RRR project standards: (a) the states could continue to use new construction standards, (b) they could adopt the standards contained in the technical advisory, or (c) they could propose different standards.

In Virginia, until recently, the principal design criteria applied to rural low-volume roads were based on traffic volume, roadway width, and surface type. Highway geometrics were taken into account when repairs or improvements were being considered (1) and had been applied subjectively by VDOT inspectors on minor projects and by the project engineer on major projects. In December 1988, however, VDOT appointed a committee to look into the question of appropriate standards for RRR projects. This group met regularly and proposed that a set of standards similar to those in the TRB report be adopted. They went into effect on June 1, 1990.

CONCLUSIONS

In order to serve their purposes safely and effectively, scenic byways require consideration of a number of operational characteristics. These characteristics include the presence of a significant segment of drivers who are unfamiliar with the road, a high proportion of over-sized vehicles, and the desire to travel at leisure and take in the features of the road that classify it as scenic. These characteristics can be dealt with (or addressed) by the inclusion of specific design elements, such as wider-than-normal lanes on tight turns, paved shoulders, overwidth shoulders for safety pull-offs, increased passing opportunities, special informational signage, and appropriate posted speed limits.

Neither the special characteristics of these roads nor the respective design elements that address them are provided for in the standards currently used for construction, improvement, or analysis of scenic roads by Virginia. Further, no current state or federal scenic roads program addresses the design and evaluation requirements for a scenic byways program such as Virginia's.

Regarding geometric standards for low-volume scenic byways, the RRR standards contained in *TRB Special Report 214* are relevant to such roads undergoing minor improvement. When any road is improved, if it conforms to these standards, it is also considered adequate for the given level of service, volume, speed, and truck mix. Similarly, an existing road segment that meets the same RRR standard is considered adequate and acceptable. However, not every road or every scenic byway must be evaluated in terms of RRR standards. Nonetheless, the TRB study is an appropriate reference for those evaluating a road segment with special design considerations in mind or if standards for certain geometric and cross-sectional factors are required.

RECOMMENDATIONS

The following recommendations were presented to VDOT management regarding the design of scenic roads in Virginia (8).

The special design considerations described herein should be taken into account in the analysis, evaluation, modification, or

maintenance of existing or proposed Virginia scenic byways. To ensure proper implementation, traffic engineers, planners, and design engineers involved in evaluating, planning, and designing Virginia's scenic byways should be instructed as to what these considerations are and how specific design elements that deal with them should be employed. VDOT procedures should require the input of landscape architects when changes to the road or roadside are contemplated on a designated scenic byway. This requirement need not restrict the responsible engineer from making needed changes or improvements, but it will ensure that preferred alternatives from an environmental/scenic view perspective are considered.

Special informational signage should be used to inform visitors in advance about both upcoming scenery and the characteristics of the road itself (i.e., geometrics, grade, speed limit, surface conditions, etc.)

The RRR standards recently implemented by VDOT should be examined by other states as to their usefulness as a tool for the evaluation of existing scenic roads. They could be used as the standard for scenic byways and modified as necessary to reflect special design considerations that may arise.

In late 1990, the FHWA released 26 case study summaries from a National Scenic Byways Study. These reports became available subsequent to completion of the Virginia study. Since several of them appear to contain information that could be relevant to Virginia, they should be reviewed by those involved in work on Virginia's scenic roads program.

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