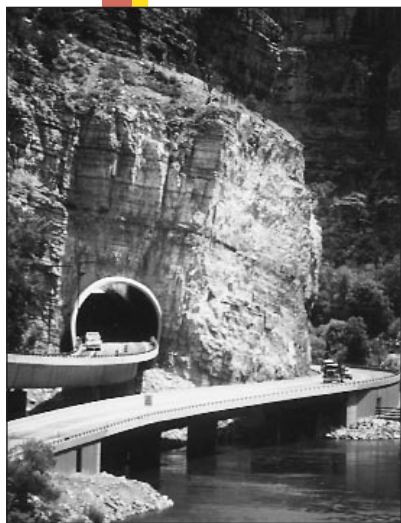


# Lessons from the Road



## Case #2: Design & Maintenance for Byways



A good byway is sculpted to fit the land-

Scenic byways are much more than the shortest route between two points. Beyond moving people and goods, byways must provide safe transportation; showcase natural, cultural, and historic qualities; and generate revenue through tourism and economic vitality. Accordingly, byway design, maintenance, and redevelopment plans must accommodate even more needs than ordinary roads. Byways must respect the landscape;

satisfy travelers, local residents, and businesses; and uphold the integrity of their intrinsic qualities.

Roadway design and maintenance are rapidly changing fields, and scenic byways can pose special challenges for transportation

agencies traditionally governed by standardized design manuals and maintenance practices. Byway advocates can encourage roadway designers to satisfy safety, efficiency, and resource protection priorities by understanding what design standards do—and do not—dictate, and by working with highway engineers. This is the central message of a recent Federal Highway Administration book, *Flexibility in Highway Design*. It offers examples of innovative designs that meet engineering standards and describes several road types that can serve as scenic byways.

### About Lessons from the Road

This case study features lessons learned by scenic byway advocates across the country that are applicable to many scenic byway initiatives.

Scenic byways are public roads with special scenic, historic, recreational, cultural, archeological, and/or natural qualities that have been recognized as such through legislation or some other official declaration.

Nomination guidelines for National Scenic Byway designation require a series of planning and management elements. Some byway efforts lead to nomination, and possibly national designation; the rest choose other paths for implementation. These case studies show how various byway managers address planning and management issues in distinctive ways.

Each case study in this series concludes with a resource list of helpful publications and details on how to contact the National Scenic Byways Clearinghouse.

Good luck with your byway.

#### The Series

1. Mapping
2. **Design and Maintenance**
3. Assess Intrinsic Qualities
4. Telling the Story
5. Conserving Intrinsic Qualities
6. Visitor Experience & Services
7. Manage Development
8. Signage
9. Marketing
10. Public Involvement
11. Action Plans
12. State Program Management

# A Highway Designer's Lexicon

To work with professionals, you must speak and understand their language. Here is an introduction to a few of the most common expressions, drawn from *Flexibility in Highway Design*.

Roads are sorted into “functional classifications” according to the character of the traffic and the amount of access allowed: Arterial, Collector, and Local. This important distinction dictates certain ranges of design features, such as lane and median widths, shoulder types, and design speeds (maximum speed limits).

Highway improvement projects are classified, too, as follows:

- ✓ **New Construction:** a new highway facility where nothing of its type currently exists. Examples: a bypass or an access road to a new park.
- ✓ **Reconstruction:** major change to an existing highway within the same general right-of-way corridor.
- ✓ **“3R” Projects** (shorthand for Resurfacing, Restoration, and/or Rehabilitation): improvements to existing roadways: resurfacing pavement, structural and joint repair, minor lane and shoulder widening, minor alteration to vertical grades (slopes) and horizontal curves, bridge repair, and removal or protection of roadside obstacles.



Oregon DOT rehabilitated these stone walls on the Historic Columbia River Highway rather than replace them.

- ✓ **Maintenance:** actions necessary to keep an existing highway in good condition: repainting lane and edge lines, removing accumulated debris from drainage inlets, repairing surface drainage features, mowing, and removing snow.

## Highway Development Stages

It is also important to understand the process through which a roadway project passes; the earlier you get involved the better. Here are the steps, in order:

1. **Planning:** State, regional, and local.
2. **Project Development:** purpose; need; alternatives (including “no-build” and traffic management); and mitigation.
3. **Final Design:** design concept, scale, and design details.
4. **Right-of-Way:** acquisition.
5. **Construction (and Maintenance).**

### Tips for Success

“... a successful highway design process includes the following:

- ✓ Early and continuous public involvement throughout the project.
- ✓ The use of visualization techniques to aid the public.
- ✓ Early and continuous use of a multidisciplinary design team.
- ✓ The application of flexible and creative design criteria.”

—Flexibility in Highway Design

## “The Green Book”

*A Policy on the Geometric Design of Highways and Streets*, known more simply as “The Green Book,” is published by the American Association of State Highway and Transportation Officials. *The Green Book* provides guidance on dimensions of roadways, including widths of travel lanes, width and shape of medians, and size of turning radii, among others. At times, it can seem as though *The Green Book* sets standards for everything.

However, many design issues are not directly addressed in *The Green Book*, such as:

- ✓ Defining the problem and the project
- ✓ Setting project boundaries
- ✓ Aesthetic treatment of surfaces
- ✓ Incorporating local context features
- ✓ Selecting guardrail and bridge rail types, and materials

- ✓ Landscape design
- ✓ Selecting light fixtures

### The Designer’s Challenge

“Design involves the difficult process of merging these previously determined design decisions with the appropriate design criteria used in *The Green Book*, working within the existing environmental and other important constraints, and using a designer’s best judgment and experience to make decisions.”

—Flexibility in Highway Design

## Design Challenges

Whatever the size and character of the road, its designers face certain challenges to preserve its best qualities when it is redeveloped. They must determine which landscape features critical to local character need to be preserved. Byway designers must adapt to the challenging landscape of the route, even if it stretches through several towns, and must consider the state’s long-range transportation plans, all while involving local input. They also must meet safety and engineering challenges, and must consider how these will affect the scenic character of the roadway.

Most successful scenic highway projects involve a broad range of citizens, special interest groups and representatives from government agencies that have jurisdiction over the byway and surrounding lands. (To learn more about public involvement strategies, see Case #10.) A diverse planning group helps

win public approval and perhaps funding. It also can contribute information important to designing the byway.

For example, the group may know that farmers need to move slow farm equipment on the road, or members of the local historical society may have information about a little-known historic site on or near the planned right-of-way. Local hunters may know the migration patterns of deer and elk which would present hazards if the road crossed their path. Representatives from town planning departments know which zoning patterns will change the look of the landscape and require new traffic patterns in coming decades.

### Creative Necessity

“If highway designers are not aware of opportunities to use their creative abilities, the standard or conservative use of the *Green Book* criteria and related State standards, along with a lack of full consideration of community values, can cause a road to be out of context with its surroundings. It may also

## Design Challenges You Can Solve Together

Bringing State transportation professionals into scenic highway planning at the beginning is critical to building a realistic plan and sometimes results in the community's preservation goals becoming the shared goals of the State transportation department. Highway planners can describe safety requirements of the roadway and the road's required structural and budgetary framework. Here are a few issues they must consider as highway designers and managers.

### Trees and Vegetation

Trees are often among the best scenic features of a corridor except when they throw shadows on the highway, causing icy spots in winter on an otherwise dry road.

Certain kinds of roadside vegetation attract deer and other wild animals, which can be lethal to animals and drivers.

### Clear Zone

All roads require cleared setbacks of varying widths where no trees larger than 4 inches in diameter can remain. This provides vehicles that veer off the road with a chance

to correct or stop before hitting an immovable object. However, larger trees may be allowed if the shoulder of the road slopes up, or there are guardrails.

### Maintenance

Shrubs that enhance the roadside can retain windblown litter. Shrubs planted thickly to screen development may pose difficulties for maintenance crews.

By understanding such requirements and constraints, community groups can work with highway planners for realistic and creative solutions. The scenic highway designs discussed on pages 5 and 6 show solutions generated by people working together.

## Local Character & Highway Design Mix

Large physical features often embody the qualities that people want to preserve along a scenic route. However, small features—such as a historic architectural style, building materials, local stone in walls, an old bridge, trees that give character and shade, and lamp posts that define an era—also contribute to local character.

### Alignment

Alignment is the path of a road across the landscape. Travelers notice alignment when it leads up to dramatic views and vistas, or turns gracefully around a bend to reveal a historic town or plunging river. The landscape's beauty can be marred when the alignment cuts through land forms rather than following natural contours, or when highway structures obscure dramatic views.

### Scale

The size and mass of the highway as it passes through the landscape has a powerful effect on the traveler's aesthetic experience. When two-lane roads are improved to accommodate faster speeds and more vehicles, national safety standards require wider clear zones, lanes, and medians. Applied strictly by the book, such improvements can create a road that overwhelms the landscape.

## Lessons Learned



This newly constructed road achieved wider shoulders, yet retained important roadside vegetation.

### Creative Solutions

The Paris-Lexington Road in Kentucky traversed farmlands and wooded savannas. When the State highway department began planning to expand the road 25 years ago, community groups successfully fought plans for a large straight roadway that ignored the character of the country landscape.

After years of conflict, the State hired a consulting group of landscape architects that drew community groups into a successful design process with the DOT engineers.

Creative solutions emerged for a design that deviated from the standard approach. They saved stately trees in the clear zone by adding guardrails, and diminished the massive expanse of the roadway by separating the opposing lanes of traffic. The size and location of drainage ditches varied to match actual drainage needs rather than standard specifications and this made the road appear narrower.

Instead of fully paving the shoulder, designers introduced paving blocks that provide a firm surface but include openings for grass to grow through the concrete. These and other adaptations to the road's setting helped the Byway maintain its traditional country road character while meeting contemporary engineering requirements.

### Byway Adoptions

In the Quiet Corner of northeastern Connecticut, the Route 169 Scenic Byway has an “adopt-a-byway” program which grants a permit for access to the corridor for community groups. They perform additional maintenance to produce a “manicured” look that is important to the Byway image.

### Managing Scale

One way to keep highway scale in pleasing proportion to its surroundings is to visually separate opposing lanes of traffic so that people see only the lanes on which they are traveling. The roads can be separated by a median wide enough for trees and vegetation (and any required clear zone) that will block visibility of opposing lanes.

Lanes can also be constructed at different heights along a slope so travelers see only a steep bank and perhaps some vegetation. When the road runs through terrain where wildlife is plentiful, separated and elevated highways not only support scenic goals, they also provide space under the elevated highway for streams and protected riparian zones upon which wildlife depend.

### Lessons from Flexibility in Highway Design

- ✓ Use the flexibility within *The Green Book*, and State and local policies.
- ✓ Be prepared to reevaluate decisions made during the planning phase.
- ✓ Lower design speed when appropriate.
- ✓ Undertake only resurfacing, restoration, and rehabilitation (“3R”) improvements rather than major changes to the roadway itself.

## Another Lesson: It Works If You Work Together

The 100-mile Mountains to Sound Greenway on I-90 in Washington State illustrates the benefits of a cooperative relationship with the State Department of Transportation (DOT). The non-profit Mountains to Sound Greenway Trust appointed DOT officials to its Board of Directors at the beginning of the project. After participating in developing goals and

projects, DOT secured a federal grant for planning that would guide the DOT's role in enhancing and maintaining the scenic highway. The resulting official DOT Implementation Plan commits the State agency to uphold Greenway goals; calls for separated road alignments where possible in new construction; stipulates a consistent style in roadside furnishings; coordinates the planning of future rest areas with key tourism and recreation sites; and designates appointment of a Greenway Coordinator within the DOT office to maintain communication and compliance with the plans. Additional benefits accrue to the community group in the form of the plan's detailed documentation and mapping of viewsheds, wildlife corridors, trails and historic features.

### Additional Resources

Community groups can get a detailed look at the highway planning process in a book called *The Transportation Project Planner*, published by the Surface Transportation Policy Project, (202) 466-2636.

*Flexibility in Highway Design*, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., July 1997, Publication No. FHWA-PD-97-062, HEP-30/7-97(10M)E.

*A Policy on the Geometric Design of Highways and Streets* (known as "The Green Book"), American Association of State Highway and Transportation Officials (AASHTO), Washington, D.C., 1995.

Contact the National Scenic Byways Clearinghouse for these and other resources (see below).

### About this Series

The National Scenic Byways Program of the Federal Highway Administration and the Rivers, Trails & Conservation Assistance Program of the National Park Service collaborated to research, write, and produce **Lessons from the Road**. The series was written in 1998.

For information on resources mentioned in this series, contact the National Scenic Byways Clearinghouse: 1-800-4-BYWAYS (1-800-429-9297), press 2, or visit our website at [www.byways.org](http://www.byways.org).

The Rivers, Trails & Conservation Assistance Program works beyond national

park boundaries to bring conservation assistance to communities, serving as a catalyst for tangible results.

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