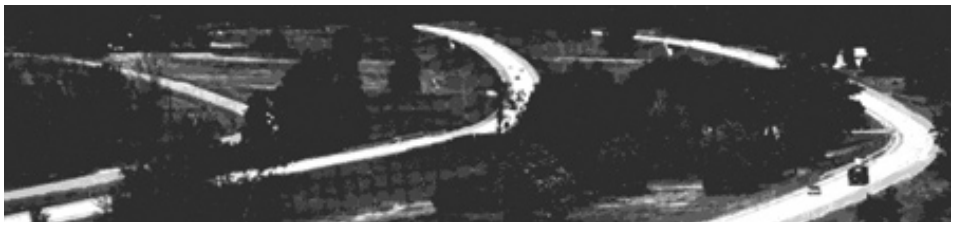
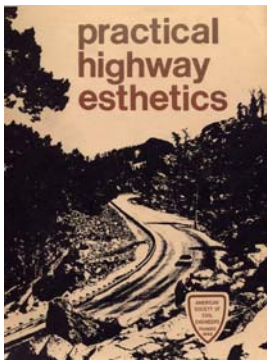
PRACTICAL HIGHWAY ESTHETICS





American Society of Civil Engineers (1977). *Practical Highway Esthetics.* New York, NY.

ABSTRACT

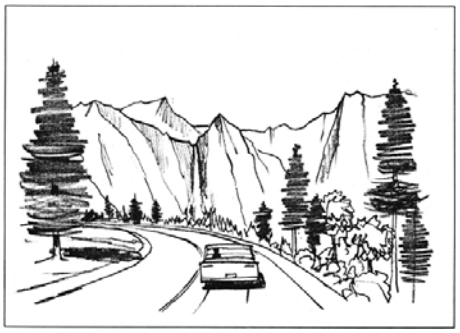
This book was written by the Committee on Geometrics and Esthetics of Highway Location and Design by the Highway Division of the American Society of Civil Engineers. Frederick W. Cron, an FHWA retiree, was its principle author. At the time of publication, Bob L. Smith from the Department of Civil Engineering at Kansas State University was the committee chairman. A literature search for other titles by these two engineers reveals several other related articles.

The book is the result of a literature review by committee members, including a review of books, papers, organizational memoranda and in-house notes for integrating the geometric design of roadways into a three-dimensional landscape. The book was intended to be used as a manual for teaching the aesthetics of highway design to engineering students and as reference guide for the practitioner. Although the principles described in the book can be applied to urban roadways, its primary purpose, according to the authors, is to provide techniques for improving the daytime appearance of rural highways.

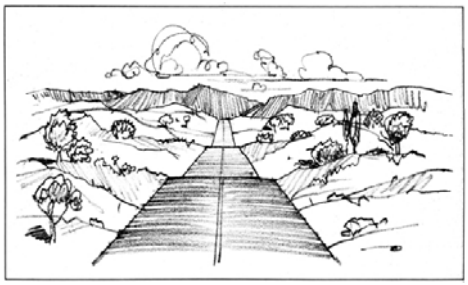
This 79-page book is divided into twelve chapters, plus a forward and introduction. Each chapter has a bibliography. The content of each section is outlined below.

The Introduction suggests the principles for designing roads that are integrated with the topographical character of the landscape in which they are constructed, including:

- Create roads with a variety of outward views to increase driver attentiveness and, therefore, safety.
- To avoid excessive grading, let the landscape be an important consideration when determining design speed and other geometric criteria.
- Grade roadways so that their geometrics are visually consistent with the topography of the surrounding landscape. In other words, grade roadways so that they appear to be the result of a natural process.

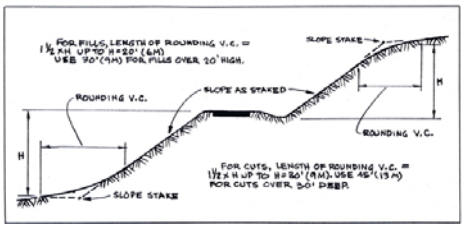


- Design the roadway with a smooth, continuous, three-dimensional ribbon-like appearance without bumps or kinks from the perspective of a driver. Coordinate alignment, profile, and super-elevation improves aesthetics and safety during the day and night.
- Use vegetation in the right-of-way to control erosion, re-integrate the roadway with its surroundings, and to screen unsightly views. Strive to preserve existing vegetation.
- Acquire sufficient right-of-way to properly integrate the road into the landscape.
- Use materials and forms that integrate structures and appurtenances with the landscape.



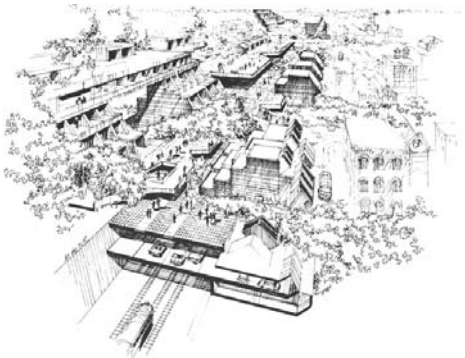
Chapter 1: The Outward View discusses scenery from the viewpoint of the driver. A road exists in a landscape. Usually the landscape is common, although occasionally, it is visually spectacular. For driving, the landscape can provide variety, increasing driver attentiveness. If the road is properly located, the landscape can provide a sense of harmony that drivers translate into a sense of security, decreasing anxiousness.

Chapter 2: Esthetics, Driver Behavior and Highway Safety discusses the relationship between aesthetics and highway safety, and how these factors affect driver behavior. A roadway that appears safe can also contribute to the enjoyment of scenery by motorists. Measures such as smooth alignment, wide recovery areas, flat slopes, and rounded ditches can make a highway more aesthetically pleasing, as well as safer. Monotonous geometry can diminish driver alertness, introducing potential safety problems. On the other extreme, hazardous characteristics such as steep side slopes with little or no recovery areas can instill fear and prevent the driver from enjoying otherwise beautiful scenery. One solution to monotony is to provide variety through landscaping and other measures.



Chapter 3: Fitting the Highway to the Terrain discusses the importance of designing highway geometry to fit the natural terrain as much as possible, minimizing cut and fill. The use of structures such as bridges and walls to minimize cut and fill is covered, as well as the importance of visual scale, defined as "the relationship between sizes of differing objects or areas, which can be seen in such a way that the visual impact of one can be compared with the other."

Chapter 4: Continuity of Line and Grade describes the importance of continuity and predictability in highway geometry, including both horizontal alignment and vertical profile. The aesthetics of coordinating horizontal and vertical curves is covered. Within the limits of driver's view, the highway should appear smooth, continuous, and predictable.



Chapter 5: Highway Location discusses the process of determining the physical position of the roadway. As the second of three engineering phases—reconnaissance, location, and design—that precede construction, location typically establishes the roadway centerline so that field information necessary for final design can be obtained. Highway location can be established directly in the field or by using topographic mapping that encompasses a corridor within which the roadway can be located.

Chapter 6: Merging the Highway into the Landscape includes information about using grading, vegetation, and other methods to merge a new roadway into an existing landscape. Slope transitions, erosion control, earthwork balance, and proper treatment of channels and culverts can be used to smoothly merge the roadway and the landscape.

Chapter 7: The Right-of-Way discusses the area of land reserved for the elements of the roadway cross-section and appropriate border areas. While right-of-way limits have historically been based on uniform strips centered about the highway centerline, a preferable approach is to tailor the right-of-way limits to the structural and aesthetic needs of the highway. The visual importance and protection of border areas is also discussed.

Chapter 8: Highway Vegetation stresses the importance of roadside vegetation in helping provide physical permanence and stability to the highway. This includes proper clearing during construction to preserve vegetation when possible, along with the use of groundcover and landscape plantings to provide roadside vegetation. Vegetation, while important, should not introduce hazardous obstructions or otherwise adversely impact safety.

Chapter 9: Highway Structures and Road Furniture discusses bridges, walls, tunnels, and furniture such as signage and guardrail placed in the right-of-way by highway authorities. For most structures, the preferred aesthetic treatment is to make the structures as inconspicuous as possible, although certain significant bridges warrant prominent display. Guardrail and other barriers along the highway are often required for safety, but the preferred aesthetic solution is to design so that guardrail is not required.

Chapter 10: Improving the Appearance of Existing Highways provides suggestions for bettering the appearance of highways already in existence. Opportunities for improving highway appearances often occur when a roadway requires widening or reconstruction. Geometric improvements, plantings, sidewalks, and other measures can be included in these projects to improve highway appearance. These measures can also have other benefits such as reducing future maintenance burdens.

Chapter 11: Three-Dimensional Coordination of Vertical and Horizontal Alignment provides guidance for designing roadways with pleasing three-dimensional appearances. Topics include coordination of horizontal and vertical curvature, providing adequate sight distance while limiting the length of highway visible at one time, and transitioning cross-sectional dimension changes. Methods are presented for modeling and projecting designs onto various mediums, although many of these methods are now outdated with the advent of computer-aided design (CAD).

Chapter 12: Contoured Grading Plans discusses the preparation of contour plans to indicate grading of areas adjacent to highways. A properly prepared grading plan can help ensure that areas adjacent to roadways merge smoothly into the natural terrain. Grading plans are often required at ramps and interchanges, and may be warranted in other areas as well. Some of the techniques presented are now outdated with the advent of CAD, but many of the basic principles still apply.

SUMMARY

This book covers many of the basic principles of aesthetic design for roadways, and upholds the importance of balancing safety criteria with aesthetic criteria. Some of the detailed techniques are outdated, but many principles are still applicable.

KEY WORDS

Applicable Project Delivery Stages: Scoping, Planning, Design

Applicable Transportation Professionals: Highway Engineers, Structural Engineers, Planners, Urban Designers, Architects, Landscape Architects, Historians, Artists

Applicable Transportation Modes: Vehicular, Bicycle, Pedestrian, Transit

Transportation Topics: Aesthetics, Highway Geometrics, Alignment, Profile, Grading, Vegetation, Rural Roads, Scenic Highways, Landscaping, Transportation Enhancements, Flexibility, Lighting, Balance, Furniture and Fixtures, Concept Development, Community, Structures