A Visual Approach to Redesigning the Commercial Strip Highway

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ABSTRACT

An argument for the need for a comprehensive unified approach to commercial strip highway development is presented. Specifically, the author calls for a visual approach that (a) can be easily understood by all involved parties, (b) addresses important behavioral and perceptual driver functions, (c) uses visual simulation, (d) includes comprehensive treatment of all landscape components, and (e) allows involvement of multiple parties. These five principles are illustrated with results of two case studies in New York State that are commercial strip highway environments.

With the near completion of large highway systems, more emphasis is being placed on maintenance activities or slight modification and upgrading of existing highways (1). Often the highways that are in greatest need of upgrading because of current traffic congestion and safety problems are set in an environmental context of mixed land use often termed the commercial strip. Agencies charged with upgrading such roadways within the commercial strip are frequently faced with the unenviable situation of reacting to local uncertainty about what the community wants. Does the local community want to

1. Solve the traffic problem; or
2. Retain existing or prior land use, scale, quality, and so forth; or
3. Retain or promote commercial viability as a shopping destination point?

All three of these objectives, to some degree, conflict with each other. As a result, many local highway improvement projects have been stopped or aborted in mid-process because of disagreement between the various parties involved in the planning process. The "old main street" and the "new main street or commercial strip" are both very sensitive environments to proposed structural changes whether they be roads, buildings, or signs.

The School of Landscape Architecture, State University of New York, has been involved in a number of commercial strip projects in the Northeast (2,3), as well as scenic highway studies (4). From these case studies it is evident that a comprehensive unified approach to mixed-use highway strip development is needed.

PRINCIPLES OF THE VISUAL APPROACH

A comprehensive unified approach should have a strong visual landscape component for the following reasons:

1. Visual approaches improve communication and can be easily understood by all parties;
2. Important visual questions are usually involved that are both behavioral (e.g., motorist's way-finding tasks) and perceptual (e.g., an area's imageability or sense of place);
3. Visual simulation (either static or dynamic) is useful in presenting alternatives for examination, analysis, or public debate;
4. Comprehensive treatment of all the landscape components, such as roadways (public), landscaping (public and private), buildings and signage (private), is needed; and
5. A visual approach allows, from all of the foregoing, involvement of multiple parties in the planning and design process, including federal and state highway agencies, local government, and private individuals and groups.

In this paper, each one of these five principles is illustrated with actual work from two case studies: one in Western New York (2) and the other a recently completed study in North Syracuse, New York (3).

LITERATURE REVIEW

There exists a wide array of literature in which aesthetics and highway design are addressed (4). Corridor location of highways (6,7) or scenic highway attribute identification and analysis are addressed (5,8-11), and there are a few studies in which the urban or developed roadway is addressed (12,13). There is interesting empirical, behavioral, and perceptual work on perceptual selection and memory of road views (14); the effect of duration of view (10); individual variations in road view descriptions (15); and the role of personality differences in judgments of roadside quality (16). There is also research on user attitudes about the levels of roadside maintenance (17), visitor attitudes toward secondary roads (18), and residents' viewpoints on environmental quality of city streets (19).

Finally, there are comprehensive approaches that attempt to incorporate aesthetic or visual resources into the highway planning process (20-22). There are also general articles on aesthetics and highway design (9,23-25), the application of which is questionable.

The intended approach is not so much to stress the visual or aesthetic resource, but to stress visual as a communication process. The application is neither design of a new highway nor documentation of scenic highways, but redesign of intensively developed commercial strips.

What is proposed is simply a reemphasis of the need to mesh the highway development process with the community development process. This concept falls neatly into line with the 3-C planning process--coordinated, comprehensive, and continuous. Although what is proposed here is more complex, to propose otherwise would invariably lead to further functional deterioration of commercial strip highways and increased development goal conflicts.

REVIEW OF PRINCIPLES OF THE VISUAL APPROACH

Principle 1: Understand the visual functions and amenity values of the highway commercial strip. Just as origin-destination studies are often conducted to understand the amount of traffic traversing a section of roadway, it is necessary to understand how the strip functions from an ecological psychology point of view. Figure 1 shows this perspective. Who are the primary users? Truck drivers and long-distance travelers? Visitors to the area? Or local commuters and potential shoppers? Are their needs similar or different? Do conflicts result, or, are their driving decisions and behavior quite different? With such a complex behavior spectrum, studies need to be conducted as the ecological diagram implies in order to understand the behavioral nature of the problem.

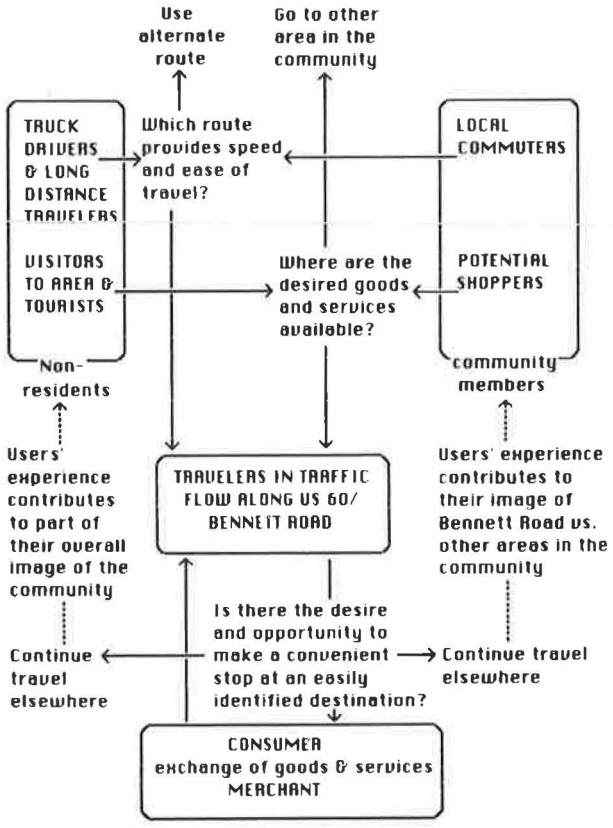


FIGURE 1 Ecological diagram of strip users *(2)*.

On an even more detailed level, actual behavior on the road can be examined for each of the highway user groups. For instance, how do they identify turning points? Do they rely on certain landmarks instead of signage? Can they find specific commercial establishments? Can they actually read commercial signage, or do they rely on the shape and color because there are too many letter characters to read at the distance and speed the driver is traveling (26)?

The driving experience is a dynamic one including many adjustments and decisions on the part of drivers on the roadway. To obtain a better understanding of what drivers see in complex visual environments,

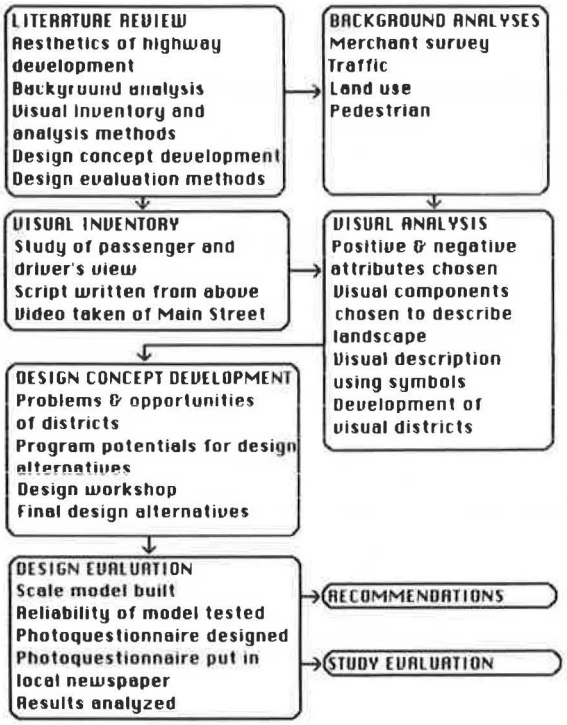
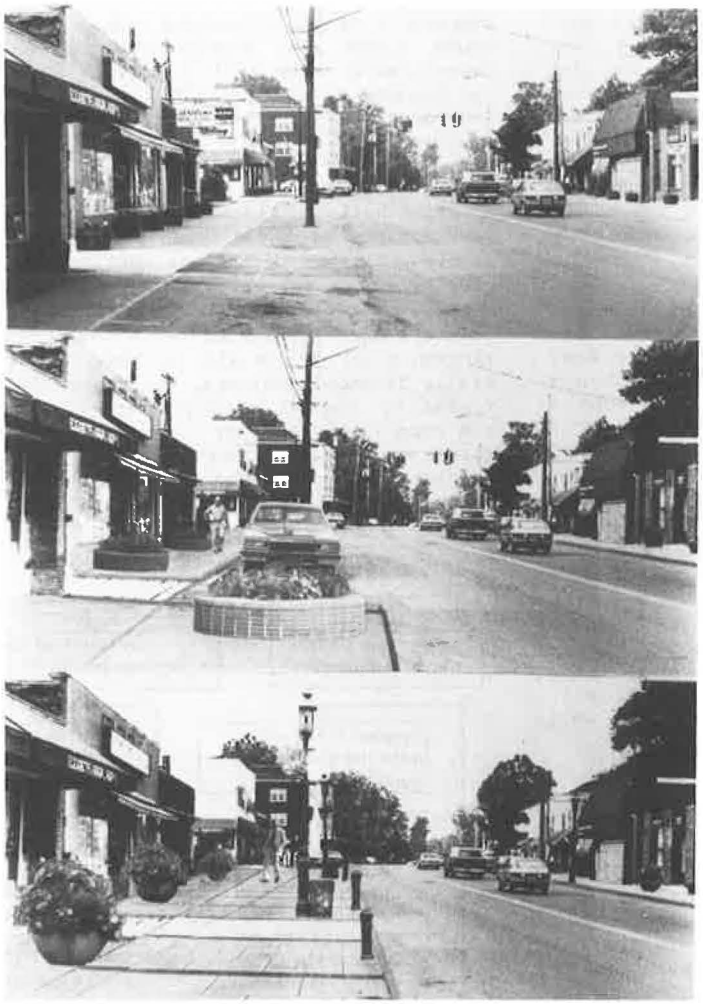


FIGURE 2 Flow chart of main street methodology *(3)*.

ACTORS	REASON FOR INVOLVEMENT
New York State Thruway Authority	Legal jurisdiction within 600' of of Thruway
New York State Dept. of Transportation	Legal jurisdiction of Route 60 right-of-way including design & maintenance
Chautauqua County Planning Agency	Knowledge of historical aspects, regional context, & local procedures
Local Municipalities	Political jurisdiction of adjacent properties
Local Land Owners	Legal ownership of adjacent properties
Chamber of Commerce	Support for new ideas, promotion of action
Community Development Council	Promote studies of potential change & facilitate coordinated action by decisionmakers (actors)
State University College of Fredonia	Provide local logistical support for study and faculty consulting
College of Environ. Science & Forestry at Syracuse	Provide technical expertise of both students and faculty
Users of the Site	Retail consumers exercise choice for specific goods and services in a community context

FIGURE 3 Actors of study and their reasons for involvement *(2)*.



Village Center Area 3

Proposed Alternative One
•No Change

Proposed Alternative Two

1. Signs would be removed unless hung flush with the buildings.
2. Curbs would be added with some on street parking eliminated.
3. Sidewalks would be extended away from the buildings and repaved.
4. Bigger planters would be added.

Proposed Alternative Three

1. Signs would be removed unless flush with the buildings.
2. Curbs would be added.
3. No on street parking would be allowed.
4. Sidewalks would have a textured finish and would be extended away from the buildings.
5. Planters would be added.
6. Street lights would be brought to a more human scale.
7. Utility poles and lines would be eliminated.

Response Form

Directions:
Please check the box which indicates the Design-Alternative you prefer for each area. Bring or mail this form to the Village Hall, 600 So. Bay Rd., No. Syracuse/The Star-News Office, 211 No. Main Street or drop it at Merchants Bank, No. Syracuse Free Library or No. Syracuse Pharmacy by Dec. 9.

Area 1-Taft Rd. Intersection Area

☐ Alternative 1
☐ Alternative 2
☐ Alternative 3

___ ___
Yes No Should the utilities be put underground?

Comments: _____

_____

_____

Area 3-Village Center Area

☐ Alternative 1
☐ Alternative 2
☐ Alternative 3

___ ___
Yes No Should the utilities be put underground?

Comments: _____

_____

_____

Area 2-Parochial Area

☐ Alternative 1
☐ Alternative 2
☐ Alternative 3

___ ___
Yes No Should the utilities be put underground?

Comments: _____

_____

_____

Where do you reside in relation to Main Street, North Syracuse?

☐ 0-3 miles ☐ 4-7 miles ☐ 7-10 miles ☐ 10 or more

Did you respond to this survey when it appeared in the Star-News before?

___ ___
Yes No

FIGURE 4 Sample black and white photomontage simulation with questionnaire *(3)*.

such as commercial strips, they were asked what they notice in the roadway environment (3). Drivers were given cameras to photograph what they notice, and they subsequently have developed video shooting scripts to help the research team record actual driver and passenger view sequences (27). Drivers were also asked to assess positive and negative attributes within these same view sequences (3). Many of the study steps are outlined in the North Syracuse flow shown in Figure 2. This study and others (10,15) enable investigators to better understand how drivers and passengers function in a complex visual environment.

Principle 2: Promote communication of multiple involved parties. Planning highways or highway improvements is quite complex because there are many different parties and jurisdictional questions involved. Figure 3 shows just how complicated such a project can become. This figure shows the role of 10 different types of involvements and more than 21 specific parties. A means of clearly communicating the descriptive aspects of the project, the project alternatives, and the impacts of each alternative is needed. This is a principle that has unfortunately been elusive for preparers of environmental assessments and environmental impact statements. Even though U.S. Department of Transportation (DOT) documents provide clear guidance for approaches to describing the scope of the project, especially those involving visual resources (28), aspects of the visual approach works for other resource areas as well (29).

Principle 3: The need for visual simulation of alternatives. The second principle leads to the third principle--the use of visual simulations of alternatives for examination, analysis, and public scrutiny. Visual simulation techniques, if carefully performed, can be used to realistically portray different highway development alternatives (30). This helps professionals, as well as publics, analyze and evaluate certain effects. Appropriate simulation of the highway visual experience has been stressed in other studies (10,15,20,29) as well.

Researchers at the School of Landscape Architecture have experimented with acetate overlays on color photographs, color photocopy with partial rendering (2), black and white photomontage (3), color photomontage (31), modelscope photography (32), modelscope video, and renderings on video freeze frame (3,27) images. The objective is to find satisfactory means of realistic and accurate portrayal of alternatives. (See Figure 4.)

Professionals and publics alike are interested in visual futures, not in plan form, but in a 3-dimensional spatial perspective that has a fair degree of realism (33). Beside debating points about how the alternatives appear visually, simulations facilitate discussions of other critical issues such as safety related to visibility and speed, appropriate land use and sign controls, and maintenance questions. Also, simulation is not limited to visual effects, but can be used to illustrate solar effects such as glare potential, shadow patterns, and wind effects (27,32).

Basic video inventory of moving sequences (27) have been found to be extremely useful for analyzing complicated highway strip environments (3) and black and white photomontages (see Figure 4) for use in gauging public reactions to alternatives (3,34).

Principle 4: A comprehensive treatment of all landscape elements is needed. When a project is separated from its landscape context, it is often difficult to analyze relationships or judge certain effects. For example, in one case, a community believed that if they invested funds in building facade improvements they would drastically improve the appearance of their village center. By doing modelscope video and simple photomontage, community leaders were shown that a greater improvement could be obtained by using plants than by altering building facades. In another case, simple curbing along a roadway would not only improve the road edge appearance, but also would aid drainage and eliminate indiscriminate parking. To understand these relationships, a holistic visual approach can be used.

Principle 5: Encouraging involvement of multiple parties. All the techniques mentioned previously and clarity of organization can encourage the involvement of multiple parties as well as identify appropriate roles. The latter can be observed in Figure 5 (Action Plan). There will be few, if any, large federally financed projects, but there will be projects funded by complex arrangements of agency programs and even involvement by private parties. Appropriate roles and action plans need to be identified if projects are to succeed and to ensure the meaningful integration of road improvement projects into community planning.

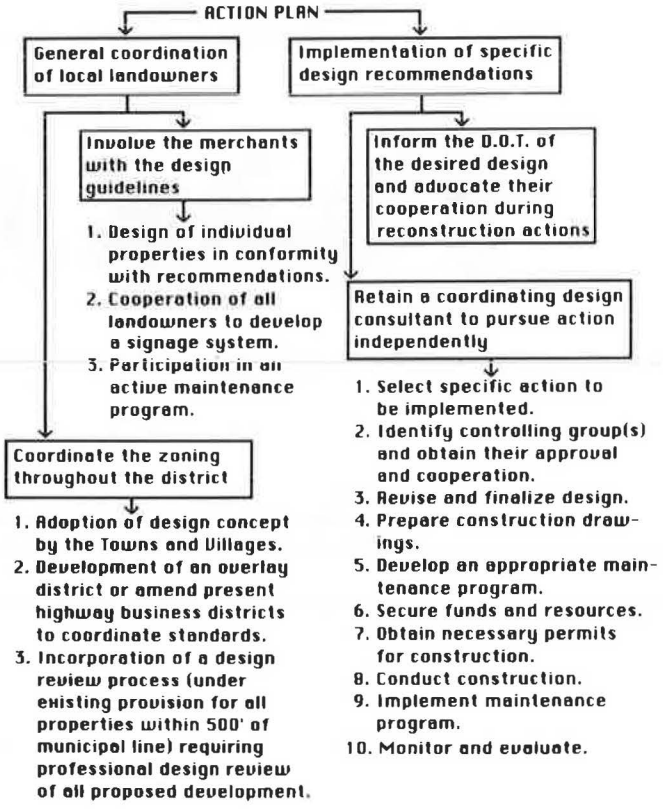


FIGURE 5 Outline of action plan *(2)*.

CONCLUSION

The highway commercial strip environment will be around as long as the automobile persists as a major transportation mode. The question is how can effective decision making and consensus be achieved for actions that affect complex environmental settings. A visual approach allows a more holistic and communicative means to be applied to this problem. It also facilitates environmental review and public disclosure obligations, hence, avoiding lengthy litigation (30,35) while holding open the possibilities of multiple party involvement.

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REFERENCES

1. D.M. Harvard and B.L. Chaplin. Highway Development. In Our National Landscape. Edited by G. Elsner and R.C. Smardon, Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif., 1979, pp. 44-47.
2. R.A. Lambe and R.C. Smardon. Managing Strip Development Within the Rural Countryside. Presented at the Council of Educators in Landscape Architecture Annual Meeting at Virginia Polytechnic Institute and State University, Oct. 24-27, Blacksburg, 1982.
3. R.C. Smardon and M.M. Goukas. Village of North Syracuse Main Street Assessment Study. Occasional paper ESF 84-010. School of Landscape Architecture, State University of New York, Syracuse, 1984.
4. J.P. Felleman and T.J. Nieman. The Incorporation of Esthetics Within the Comprehensive Highway Development Process. Council of Planning Librarians Exchange Bibliography 1141, Monticello, Ill., 1976.
5. R.C. Smardon, M.R. Volpe, and W. Price. St. Lawrence River Scenic Access Study. Occasional paper ESF 84-004. School of Landscape Architecture, State University of New York, Syracuse, 1984.
6. W.M. Melhorn and E.A. Keller. Landscape Aesthetics Numerically Determined: Applications to Highway Corridor Selection. In Highway Research Record 452, TRB, National Research Council, Washington, D.C., 1973, pp. 1-9.
7. K.J. Polakowski. Landscape Assessment of the Upper Great Lakes Basin Resources: A Macro-Geomorphic and Micro-Composition Analysis. In Landscape Assessment: Value, Perception and Resources. Edited by E.H. Zube, R.O. Brush, and J. Gy. Fabos. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1975, pp. 203-219.
8. H.D. Burke, G.H. Lewis, and H.W. Orr. A Method for Classifying Scenery from a Roadway. In Park Practice Development Guidelines, Vol. 22, No. 1, 1968, pp. 125-141.
9. D. Davidson. An Exploratory Study to Identify and Measure the Benefits Derived from the Scenic Enhancement of Federal and State Highways. Highway Research Record 182, HRB, National Research Council, Washington, D.C., 1967, pp. 18-21.
10. G.W. Evans and K.W. Wood. Assessment of Environmental Aesthetics in Scenic Highway Corridors. Environment and Behavior, Vol. 12, No. 2, 1980, pp. 255-273.
11. G.R. Jones, J. Ady, and B. Gray. Scenic and Recreational Highway Study for the State of Washington. Landscape Planning, Vol. 3, 1976, pp. 151-302.
12. D. Appleyard, K. Lynch, and J.R. Meyer. View from the Road. MIT Press, Cambridge, Mass., 1964.
13. W.G.E. Blair. Visual Success Story at a New Interchange. Environmental Comment, July 1980, pp. 10-19.
14. S. Carr and D. Schissler. The City As a Trip: Perceptual Selection and Memory in the View From the Road. Environment and Behavior, Vol. 1, 1969, pp. 7-35.
15. K.H. Craik. Individual Variations in Landscape Description. In Landscape Assessment: Value, Perceptions and Resources. Edited by E.H. Zube, R.O. Brush, and J. Gy. Fabos, Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1975, pp. 130-150.
16. G.H. Winkel, R. Malek, and P. Thiel. The Role of Personality Differences in Judgments of Roadside Quality. Environment and Behavior, Vol. 1, 1969, pp. 199-225.
17. G.D. Hampe and F.P. Noe. Highway Attitudes and Levels of Roadside Maintenance. In Our National Landscape. Edited by G. Elsner and R.C. Smardon, Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif., 1979, pp. 373-379.
18. D.M. Brancher. The Minor Road in Devon: A Study of Visitor Attitudes. Regional Studies, Vol. 6, No. 1, 1972, pp. 49-58.
19. D. Appleyard and M. Lintell. The Environmental Quality of City Streets: The Resident's Viewpoint. Journal of the American Institute of Planners, Vol. 38, 1972, pp. 84-101.
20. W.G.E. Blair, L. Isaacson, and G.R. Jones. A Comprehensive Approach to Visual Resource Management for Highway Agencies. In Our National Landscape. Edited by G. Elsner and R.C. Smardon, 1979, pp. 365-372.
21. P.L. Hornbeck, R.R. Forster, and M.R. Dillingham. Highway Aesthetics: Functional Criteria for Planning and Design. In Highway Research Record 280, HRB, National Research Council, Washington, D.C., 1969, pp. 25-38.
22. P.L. Hornbeck and G.A. Okerlund, Jr. Visual Quality for the Highway User: A Study of the Relation of Factors of Visual Quality to Route Design. In Highway Research Record 410, HRB, National Research Council, Washington, D.C., 1972, pp. 52-63.
23. P.M. Pearson and W. A. McLaughlin. Toward a Design Criteria for Highway Aesthetics. In Highway Research Record 232, HRB, National Research Council, Washington, D.C., 1968, pp. 9-15.
24. G.L. Peterson. Complete Value Analysis: Highway, Beautification and Environmental Quality. In Highway Research Record 182, HRB, National Research Council, Washington, D.C., 1967, pp. 9-17.
25. W. Zuk. Methodology for Evaluating the Aesthetic Appeal of Bridge Designs. In Highway Research Record 248, HRB, National Research Council, Washington, D.C., 1973, pp. 1-4.
26. W.R. Ewald, Jr., and D.R. Mandelker. Street Graphics. Landscape Architecture Foundation, McLean, Va., 1977.
27. J.D. Mertes and R.C. Smardon. Applications of Video (VTR) Technology in Landscape Planning, Design and Management. In Proc., Annual Meeting of Council of Educators in Landscape Architecture, University of Guelph, Canada, July 24-27, 1984, pp. 131-141.
28. Visual Impact Assessment for Highway Projects. Office of Environmental Policy, FHWA, U.S. Department of Transportation, 1981.
29. J.R. Pease and R.C. Smardon. The Scoping Concept and Citizen Involvement: An Opportunity for Rejuvenating NEPA. In From Checklists to Social Choice: Enhancing the Scientific Quality and Usability of Environmental Assessment. Edited by S.L. Hart, G.A. Enk, W.F. Hornick, with J.J. Gordon and P. Parreault, Westview Press, Boulder, Colo., 1984.

30. T.J. Atkins and W.G.E. Blair. Visual Impacts of Highway Alternatives. In Garten and Landschaft, Aug. 1983, pp. 632-635.
31. T.R. Day. Simulating Vegetative Management Techniques Utilizing Color Photographic Montage. In Proc., Annual Meeting of Council of Educators in Landscape Architecture, University of Guelph, Canada, July 24-27, 1984, pp. 231-238.
32. R.C. Smardon. Urban Visual Impact Assessment and Design Evaluation Through Simulation. UD Review. Vol. 6, Nos. 2, 3, 1983, pp. 12-15.
33. R.C. Smardon. Assessing Community Image: Tools for Perception and Consensus Building. Presented at Environmental Preference and Landscape Management Symposium, Connecticut College, New London, 1983, pp. 12-18.
34. G.J. Willmott, R.C. Smardon, and R.A. McNeil. Waterfront Revitalization in Clayton, New York. Small Town, Vol. 14, No. 3, Nov.-Dec. 1983, pp. 12-19.
35. R.C. Smardon. When Is the Pig in the Parlor? The Interface of Legal and Aesthetic Considerations. Environmental Review, Vol. 8, No. 2, 1984, pp. 147-161.

Design and Construction of Highway Underpasses Used by Mountain Goats

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ABSTRACT

US-2 was reconstructed in Glacier National Park, Montana, past a natural mineral lick and crossing area regularly used by mountain goats (Oreamnos americanus). A bridge was built over the highway as an underpass for goats (underpass dimensions = 12 to 28 ft high x 90 ft wide x 44 ft through). A second bridge over a stream crossing located 200 ft to the east was improved for mountain goat underpassages. Cyclone fencing 8 ft high and reinforced earth walls 8 to 24 ft high forced goats to use the bridges in a 500-ft crossing zone. Most crossing goats (99.4 percent) used the two bridges. Mountain goats were disturbed less after the bridges were built. Goats extended their season of visits to the lick into fall and winter, and individual goats doubled their number of lick visits per year after the bridges were built.

US-2 enters the southern tip of Glacier National Park for 3.6 miles from Walton to Nimrod. The highway through this steep, narrow canyon was sinuous, steep, and prone to more accidents and winter snow removal problems than adjacent sections (1). Adjacent sections of US-2 were reconstructed and widened in 1967, further contributing to a speed bottleneck in the Walton-Nimrod section.

Before highway construction in 1980-1981, a population of approximately 95 to 120 mountain goats (Oreamnos americanus) from Glacier National Park and 20 to 45 from the adjacent Flathead National Forest crossed US-2 in this area to visit a natural mineral lick (2). Highway crossings occurred primarily from April to August of each year. Goat mortality was low, apparently because of slow vehicle speeds (25 mph) past the 500-ft long goat crossing zone. However, 13 near hits of goats by vehicles were observed in 1975, and increased goat mortality was predicted should highway speeds substantially increase (2). In spite of little advertisement and only primitive access, visitation to the goat lick view area in 1975 was estimated at 66,000 visitors in 24,000 vehicles (2). Passing traffic and GNP visitors in the area disturbed goats. Many initial highway crossing attempts were unsuccessful, some goats altered their initial crossing route, and others hesitated on the highway edge or ran back from passing vehicles (see Figure 1). Three separations of nannies from their kids were observed in 1975, which could have ultimately led to kid mortality. Highway crossing success by mountain goats was lowest when both passing traffic and visitors in a west pullout were present (2). Visitors parking on and walking over the roadside presented additional highway safety hazards. FHWA funded preconstruction studies and construction monitoring of the mountain goats. Concurrence by the National Park Service and other responsible agencies and public support to proceed with reconstruction was received (1). The