

THE NEW STANDARD

The practice of environmental mitigation has evolved into a set of similar experiences for communities across the Nation. Planners are understanding ways to resolve the seeming conflicts between mobility and the desire to protect the environment. Any community that needs new highways now has available to it a body of knowledge developed over more than two decades by highway design professionals and involved citizens.

The videotape *Highways and the Environment: Innovative Mitigation* describes three projects which are examples of the innovative ways State and local highway authorities addressed transportation and environmental concerns. They don't begin to cover all the issues. But they do show how new approaches can work and have worked. Design professionals will find these examples useful prototypes from which they can build their own base of community support. Just as communities and terrain are unique, so are the processes that will build consensus for a particular alignment and design. Part of being a professional is helping a community understand the mitigation tools at its disposal. For everyone, environmental mitigation is now standard operating procedure.

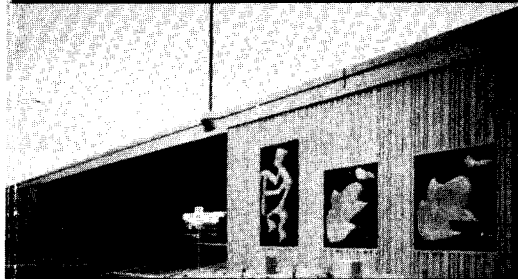
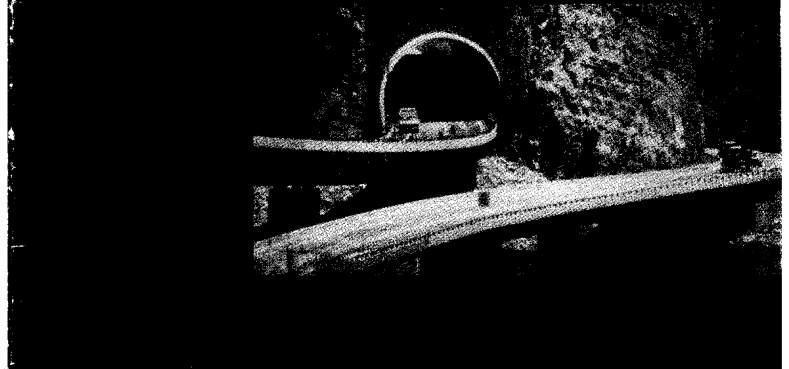
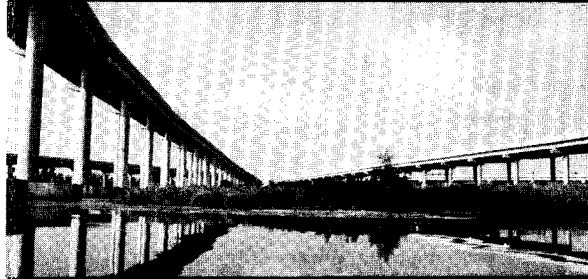
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HIGHWAYS and the ENVIRONMENT: Innovative Mitigation



EVOLVING VALUES

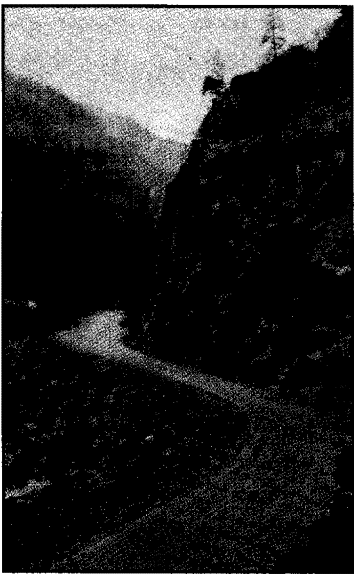
Like so many public works, highways are a reflection of their times. A road built in 1930 met distinctly different needs from ones built in the '50s, '70s or '90s. Different technologies were available; different public mandates were met.

We are now experiencing the culmination of an evolution that began with the end of World War II. With peacetime, Detroit assembly lines converted from tanks and trucks to passenger cars. There was a huge pent-up demand. People began to demand access, from anywhere to anywhere.

A new public value began to take shape. Mobility became essential! Fast, efficient travel became a national priority. Mobility needs dominated highway construction during the '60s and '70s.

But another, sometimes competing, value began to emerge: the environment. More and more people questioned impacts on their surroundings. What was the effect on wetlands, scenic vistas, communities and wildlife? Did highway designs consider the optimum trade-off between the dual needs of mobility and protecting the environment?

Congress passed the National Environmental Policy Act (NEPA) in 1969. Today, pondering such questions and integrating their answers into highway designs are common practice. Environmental mitigation is here, and it works.



MITIGATION



Mitigation—lessening the impact of highways passing through the environment—became a watchword in addressing the sometimes conflicting needs for mobility and environmental protection. Like the values that brought it

into being, the process of involving the community in mitigation evolved. As governments, citizens, environmentalists and professional highway engineers worked to reconcile competing needs, they found solutions that could be passed on to other communities. Three projects were selected from a nationwide study of successful mitigation to demonstrate some of the lessons learned. Each community had very different problems, and these were addressed with unique solutions.

THREE EXAMPLES

I-310 Near New Orleans

By the late '60s, Interstate 10 and U.S. 90 formed major east-west arteries through New Orleans. Plans were well underway to build a new north-south connector. Contractors had begun construction on its bridge over the Mississippi. The new route would give highway access to large areas of swamp and, people felt at the time, encourage future development in the swamp.

The new NEPA required the Federal government to prepare environmental impact statements (EIS) for its projects having significant impacts on the environment. While such a

document existed for the I-10 connector, many thought it didn't fully consider alternative routes that might do less harm to the environment.

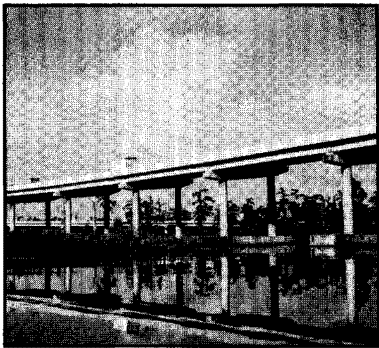
Litigation by some local groups brought a temporary halt to design. Environmental organizations pointed out recent research that stressed the value of wetlands to all aspects of the environment. Shrimpers considered the marsh a vital breeding ground for the larvae upon which shrimp feed; ecologists recognized the roles a marsh plays in filtering pollutants and preventing floods. And, the marsh was beautiful. After hearing these arguments, the court ordered a new EIS to address these questions.

The court also appointed three environmental experts to represent the environmental issues of importance to the plaintiffs. The experts worked with the Louisiana Department

of Transportation to draft the new EIS. The "process" was set up so that the experts could suggest alternatives to any specific proposal under discussion, and the State had to

determine the cost and seriously consider the proposals. Several proposals ended up in the final project.

The EIS considered and established a priority for seven potential routes. A "no build" option represented the ultimate environmental protection. On the other extreme was the original proposal. The EIS also included routes that avoided the marsh entirely and placed the road on an adjacent swamp. The routes followed the natural contour of the swamp, which helped blend the roadway into its surroundings.



Other options included eliminating unnecessary interchanges.

The group also proposed engineering solutions. Nearby I-10 had been built by dredging a barge canal through a similar marsh. Building the roadway from this canal had permanently altered the ecosystem. For the connector, the advisors wanted a method that would minimize the potential impacts of the highway. Therefore, they proposed an innovative design using "end-on"



construction. Ultimately all parties involved agreed to proceed using this new technique. This method required crews to place the first pier of the elevated highway in a traditional way. But from there on, they built each new pier from the previous one. As the next new pier was completed, a roadway section—prefabricated off-site—would be placed between the two. Construction disturbed nothing on the ground other than tall trees that would be directly under the roadway.

As it stands completed, Interstate 310 allows motorists to pass through the beauty of a natural ecosystem. Plants and animals remain undisturbed. This community's need for mobility and environmental protection has been satisfied.

Interstate 70 through Glenwood Canyon, Colorado

While the New Orleans project dealt with wetlands, completion of Interstate 70 through Glenwood Canyon affected one of the most scenic canyons in the Rockies. This presented some of the more difficult engineering chal-

lenges in highway construction history. Glenwood Canyon is extremely narrow. The Colorado River takes most of the limited space. Also, traffic on old U.S. Route 6 would have to continue throughout construction. An operating railroad passes through the same canyon. Many people thought it impossible to build a roadway to Interstate standards in such a crowded place, and still not mar the beauty.

This 20.2-kilometer (12 1/2-mile) segment was the last major link to be completed on I-70. Its completion was the golden spike in our coast-to-coast highway network.

The Glenwood Canyon project occurred at about the same time as the connector project in New Orleans. The State had an existing route plan that was challenged under the NEPA. And, as in Louisiana, citizens were included as active participants in developing a new EIS that addressed a broad range of considerations. But there the similarities ended.

Glenwood Canyon was a massive undertaking. The proposed project was expected to have devastating effects upon the canyon—its recreational features and its scenic features. Citizens and environmentalists strongly opposed the project.

Planners considered alternative routes, including a “no build” option—continuing to use the old highway. After examining each build alternative, all agreed that the least environmentally damaging route was along the river in the bottom of the canyon. All parties agreed, too, that environmental mitigation would make this



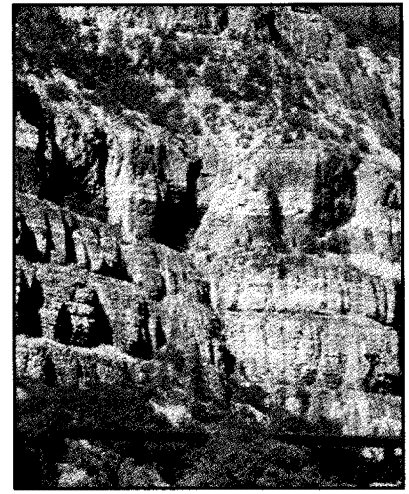
new highway a pleasing follow-on to the old highway, and it could follow essentially the same route.

The Governor appointed a Citizens Advisory Committee (CAC) to work with highway

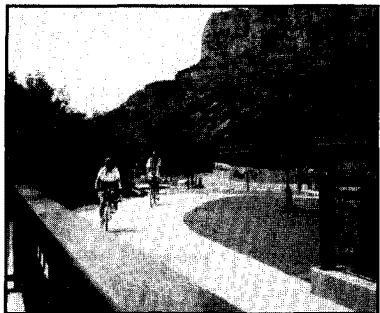
planners. To further enhance its ability to be heard, the State also gave the CAC direct and almost unlimited access to the two principal designers. These two designers were able to carry CAC concerns into the sophisticated world of engineering and design.

A multidisciplinary Design Team planned the project. All of the members of the CAC were on that team as well as highway designers, representatives of State wildlife and ecology agencies, the Army Corps of Engineers, recreational specialists, geologists and landscape architects. Citizens had equal rank with professionals. The design team “modeled” all design options in the actual environment in which they were to be placed. Sometimes, this meant superimposing design ideas over photographs or computer-generated scale drawings. Other times, it meant building actual prototypes and taking the entire Design Team to the site to evaluate its appropriateness.

As the planning progressed, opposition to the project declined. Frequent public hearings and news coverage demonstrated that the State was listening to all parties. As details were publicly presented, skeptics began to see that the scenic and environmental integrity of Glenwood Canyon were the Design Team’s top priority. By the time



construction began, most of the opponents became supporters of the project.



Construction employed innovative techniques as well. Long sections of the roadway were elevated above the delicate environment. Historically, heavy machinery would

have cut a wide swath on either side of the planned roadway for construction equipment. In Glenwood Canyon, a gantry was used to assemble elevated roadways. This technology allowed all bridge piers to be built from above, permitting plant life right next to the roadway to remain undisturbed.

Designers specified that the route follow the natural contours of the land. During construction, this was enhanced by "rock sculpting" all cuts so that they blended into the contours around them. The contractor stained the freshly cut rock so that it was the same color as the adjacent untouched formations. And always, plant and wildlife were protected. The contract included a fine for damaged trees and shrubs.

This final link on I-70 represents the best of both the process and technology of environmental mitigation. Not only did the road make the least possible intrusion into Glenwood Canyon, it also provided many amenities. A bike trail parallels the entire roadway. Picnic and rest areas allow travelers to pull off and enjoy the scenery. Launch ramps give kayakers and rafters access to the Colorado River. The highway was routed completely around one of the scenic gems, Hanging Lake. Hikers can climb here without hearing any of the highway traffic noise.

For all involved, Glenwood Canyon is a monument to both mobility and sensitivity to

the environment. In the end, the former opponents praised the project.

Public Art in Phoenix, Arizona

From the massive scale of Glenwood Canyon, consider a series of modest public art projects in Phoenix. The city discovered that art can be effective and inexpensive mitigation. It can mitigate the presence of an intrusive structure, give the public a sense of ownership in the new projects, involve the neighborhood, and also project a sense of local history and lifestyle.

In Phoenix, public art is now an essential element in designing and budgeting new roadway construction. An artist is hired at the same time as designers and engineers, works with the design team and supervises the construction of art works and their installation. Routinely, Phoenix reserves one percent of construction funds for art, and sometimes more.

One example among many is the Thomas Road Overpass on the Squaw Peak Parkway—a central Phoenix traffic artery. Planners realized that the roadway would cut through several neighborhoods. At Thomas Road, the neighborhood was well established, and it opposed the project.

To keep the bridge from being strictly utilitarian, Phoenix hired an artist to be on the design team. She was an equal with design engineers from the very beginning. The artist helped make the overpass an integral part of the neighborhood. Because columns made it possible to bring an artistic presence to eye level, the design team changed

the plan from a clear span with no piers to one having several. Each pier would be a work of art. (Interestingly, moving from clear



span to columns saved about \$700,000 on the final price. The art more than paid for itself.)

An artist and structural engineer worked closely in the design. Traditionally, plain geometric columns of concrete support a bridge. For this overpass, piers replaced columns and were decorated with art forms from the Hohokam tribe whose ancient burial ground was near the overpass. These adobe sculptures happily married form and function.

The artist did not stop at the Hohokam design, however. She set aside certain places on the large adobe panels for the neighbors to create their own images. Some placed pictures in the wet clay, while others put tools or other objects that identified them personally. Many just wrote a thought about the neighborhood or the overpass. When finished, the project contained personal statements from dozens of people who lived by the bridge.

What began as a neighborhood cut in two by the Parkway ended in a spirited sense of



ownership of the project. It became a part of the neighborhood as well as the neighborhood becoming part of the project. Neighbors take their

friends by to show off personal contributions to the overpass.

The Squaw Peak Parkway overpass is just one example of many public art projects chosen to mitigate the presence of roads, bridges, sound barriers and other infrastructure of this mobile society. Artworks extend to areas around the highway. Sign posts, street lights, and tree protectors all project the identity of Phoenix through the eyes of artists sensitive to the region's art. Now, Phoenix routinely considers including art during the design of highway structures. These structures could be nowhere else in the world but Phoenix.

A nationwide survey of environmental mitigation projects identified many highway departments and communities that had found truly creative solutions to the intrusion of highway construction. A documentary videotape, featuring three of these communities, shows the cooperative negotiations and technical solutions that brought competing interests together.

This brochure is a companion piece to the videotape of the same title.

THE FEDERAL HIGHWAY ADMINISTRATION

Washington, D.C.