TRANSPORTATION RESEARCH
CIRCULAR
Number E-C067
July 2004

Context-Sensitive Design Around the Country

Some Examples

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

TRANSPORTATION
RESEARCH
E-CIRCULAR

Number E-C067, July 2004
ISSN 0097-8515

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Transportation Research Board
500 Fifth Street, NW
Washington, DC 20001

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Introduction

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The major focus of highway agencies throughout the country is to provide a safe and efficient transportation system. In the past, these agencies did not always seek input on projects from other affected parties. Moreover, efficiency, and thus mobility, has been defined as moving traffic at high speeds. In the last decades, communities have increased their sense of historical, cultural, and environmental values that play an important role in shaping a community identity. Highway projects that in the past emphasized mobility and cost-effectiveness may conflict with such community values. There have been several instances where highway projects have been delayed because their design conflicted with community desires and values.

Recently, designing roadways to consider the capacity and safety issues while addressing its physical and human environmental setting has been emphasized through Context-Sensitive Design (CSD) initiatives. CSD is defined as the project development process, including geometric design, that attempts to address safety and efficiency while being responsive to or consistent with, the road's natural and human environment. It addresses the need for a more systematic and all-encompassing approach in project development which recognizes the interdependency of all stages and views them along a continuum. To achieve such balance, trade-offs among several factors are needed and are routinely made in most projects. Considering flexibility as part of the geometric design of roadways is not a new concept, since it has been stated clearly in the foreword of the Green Book since its first edition. Moreover, there are several projects throughout the country that have encompassed CSD principles and have been designed and constructed to fit the specific context and needs of the project.

The projects included here are examples of CSD projects presented in January 2003 at the 82nd Annual Meeting of the Transportation Research Board. Each project is unique in the aspects that it addresses, but all have several common themes that guarantee their success and acceptance by the public. These aspects include

- Significant involvement of the public and continuous solicitation of input;
- Cooperation of highway agencies with a variety of resource and other public agencies throughout the development of the project;
- Willingness of the designers to accept and try alternative solutions as well as to deviate from "standard" designs;
- Inclusion of specialists other than highway designers in the design teams to provide different view points; and
- Use of a variety of tools for communicating project alternatives and designs.

In summary, these projects are designed to address the context of the roadway and to provide a transportation solution that satisfies the purpose and need of the project.

Euclid Avenue
Lexington, Kentucky

NIKIFOROS STAMATIADIS
University of Kentucky

PHIL LOGSDON
Kentucky Transportation Cabinet

PROJECT DESCRIPTION

Euclid Avenue is a minor urban arterial and is considered the north boundary of the University of Kentucky campus. Euclid Avenue serves as a connector between the University of Kentucky and several residential areas to the east and south. The project involved resurfacing and restripping of an existing four-lane road into a three-lane roadway with bike lanes over a distance of approximately 0.80 mi. The route serves local traffic and regional commuters, it has a mixed land use of retail and housing, it carries a significant traffic volume [20,000 average daily traffic (ADT)]; it carries significant pedestrian and bicycle volumes; and it is used as the connector between the university and residential areas to the south (Figure 1).

PURPOSE AND NEED

The purpose of this project was improvement of mobility needs of the area due to congestion at some intersections along the corridor. Efforts to improve mobility and safety of pedestrians were also incorporated later as a result of public involvement.

FIGURE 1 Euclid Avenue: existing conditions.

CONTEXT-SENSITIVE FACTORS

A number of issues dealing with public involvement and promotion of multimodalism were central to this process. CSD issues implemented as part of the Euclid Avenue project included the following:

- A public involvement meeting was set up to present the proposed alternative and solicit input on how the plan was viewed by the public. Neighborhood and special interests groups attended the meeting.
- The use of simulation techniques to evaluate possible alternative designs was employed. This approach documented the relative gains from each alternative over the existing conditions.
- Use of bike lanes along the entire corridor.
- Use of a single corridor for all modes of transportation, i.e., passenger cars, public transportation, bicyclists, and pedestrians (Figures 2 and 3).

FIGURE 2 Pedestrian safety concerns.

FIGURE 3 Current conditions: serving passenger cars, public transportation, bicyclists, and pedestrians.

AGENCY INVOLVEMENT

The Kentucky Transportation Cabinet (KyTC)was the funding agency for this project and had a significant involvement beginning with the initiation of the project. Their involvement continued throughout the project and was critical to the evolution of events. Their support to the plan proposed by the public was central to successfully completing the project.

The Lexington–Fayette Urban County Government (LFUCG) was a stakeholder involved in the decision process. The city council pioneered the idea of the bike lanes and strongly supported the conversion of the roadway after the presentation explaining the relative gains from each alternative.

COMMUNITY INVOLVEMENT

There was direct community involvement from the beginning of the project. There have been several approaches taken to solicit input from the community, including:

- A public involvement meeting was held with 30 participants where alternative ideas were presented. Solutions provided included a three-lane roadway with landscaped median, pedestrian crossings, and wide sidewalks, and a three-lane roadway with bike lanes and landscaped median.
- The presentation to the LFUCG was well attended by the public and comments were collected regarding the importance of the redesign of Euclid Avenue as a more pedestrian- and bicycle-friendly roadway.

SIGNIFICANT ISSUES

LFUCG's Involvement

The LFUCG's support of the concept was essential in the successful completion of the project. The improvement of the area and development of bike lanes was strongly supported by the neighborhood representatives. Most of the council members endorsed the idea of creating a safe pedestrian and bicyclist environment that would enhance the quality of life of the area surrounding the corridor. The solicitation of ideas and comments from the public was considered essential in the development of a design that would be accepted by the community.

Public Education

An educational campaign was undertaken to promote proper use of bike lanes and increase their use. Newspaper articles were prepared and a pamphlet was developed.

Public Involvement

The public involvement meeting was essential in developing alternative ideas. During the meeting plans were solicited and discussed that changed the focus of the project to addressing mobility needs for all users of the corridor and not only for the automobile drivers. The meeting also demonstrated the flexibility of the KyTC to accept alternative designs and consider other approaches to improve the corridor.

FIGURE 4 Current conditions: Euclid Avenue connects the University of Kentucky and residential areas.

LESSONS LEARNED

Key attributes of the Euclid Avenue project were summarized to provide insight into the performance results and how these results differ from other highway projects where the concepts of CSD were not implemented. Following is a listing of the most prominent attributes of the project and an assessment of the success achieved.

- The flexibility and open mindedness of the KyTC to consider alternative designs and implement concepts suggested by the public indicated to the public that their opinion is valued and is seriously considered. This level of trust between the highway agency and the public has contributed to more efficient completion and acceptance of other transportation related designs.
- A major emphasis of the project was public involvement and solicitation of comments from various groups of interest.
- The strong commitment by the LFUCG to develop a bicycle and pedestrian corridor played an important role in completing this project.
- The “road diet” concept (where a roadway with more lanes is converted to one with fewer lanes) has worked very well by reducing speeds without increasing congestion.

Smith Creek Parkway
Wilmington, North Carolina

DON HARTMAN
University of Kentucky

NYA K. BOAYUE
North Carolina Department of Transportation

PROJECT DESCRIPTION

The Smith Creek Parkway project of 7-plus miles has been a priority since 1972 with the original environmental impact study of alternatives being completed in the 1970s. The project was divided into four sections and the two eastern most sections (C and D) were designed, constructed, and opened to traffic. However, the two western most sections (A and B) required further alternative investigation in final design to minimize impacts (Figure 1). The two highway sections open to traffic are six lanes with median. The alignment and designs for the remaining sections were altered significantly to minimize environmental impacts. The alignment for the remaining sections had to take into consideration a myriad of issues and has resulted in a controlled-access four-lane divided facility which bridges a significant amount of wetland. Specific issues included noise impact at a film studio, hazardous materials at a waste site, vibration of instruments at a manufacturing facility, an existing and possible future spur railway corridor, significant wetland area, tying into the Northeast Cape Fear River Bridge adjacent to the proposed expansion of the downtown historic area (4th Street), and a 75-year-old magnolia tree. Numerous meetings and discussions were necessary to satisfactorily resolve the issues with city officials, special interest groups, businesses, residents, and the numerous resource agencies involved. And a high level of coordination was required within the North Carolina Department of Transportation (NCDOT) among those responsible for project planning, design, and construction.

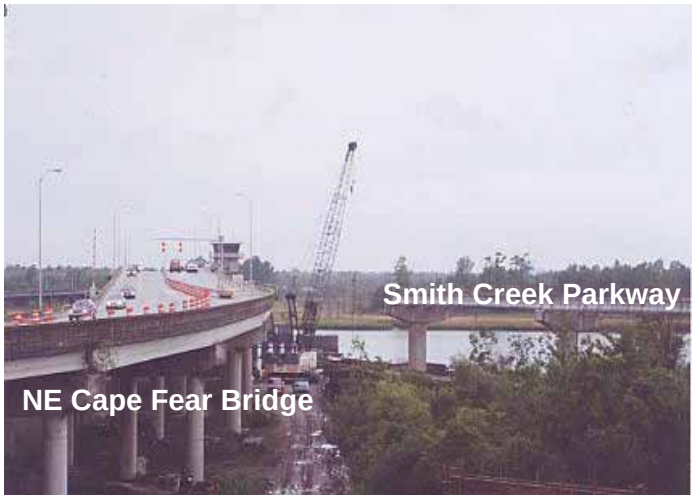

FIGURE 1 Section A under construction.

PURPOSE AND NEED SUMMARY

Abstracted from the project's Final Supplemental Environmental Impact Statement of 1998:

> *The primary purpose of the project is to relieve traffic congestion on Market Street (US 17) in Wilmington. The project will reduce traffic on Market Street by approximately 25 percent and will reduce traffic congestion and travel time delays at several key intersections. The project will also delay the year Market Street reaches traffic operations breakdown and reduce the accident rate related to congestion along Market Street. A secondary purpose is to provide a continuous east-west link between US 74 and downtown Wilmington.*

CONTEXT SENSITIVE FACTORS

- Wetlands avoidance/mitigation—impact was reduced from 14.4 acres to 5.35 acres by reducing the roadway section design from six to four lanes and increasing the amount of bridging (the goal is to accomplish compensatory mitigation by restoring the tidal swamp forest adjacent to Smith Creek) (Figure 2).
- Noise and vibration avoidance—while possible mitigation approaches were considered the final design alignment was adjusted to accommodate the existing location of Wilmington's premier film industry studios and a nearby industry's measuring equipment that was sensitive to vibration.
- Hazardous waste and hazardous materials storage/distribution avoidance—the alignment was readjusted to minimize use of landfill areas with a high probability of hazardous materials that could adversely impact the wetland and create a significant additional cost for the NCDOT.

FIGURE 2 Wetlands mitigation.

- Railway corridor accommodation—the existing active CSX corridor and the abandoned rail spur corridor being considered for possible future use has been accommodated with bridging structures and alignment.
- Historical area mitigation/enhancement—impact was mitigated for the future expansion of the historic district and enhancements include land for mini-parks and parking lots, lighting and landscaping coordinating with the North 4th Partnership, State Historical Preservation Office, and the Memorial Committee of the 1898 Centennial Foundation (Figure 3).
- Protect matriarchal magnolia tree (reported to be from 73 to 100 years old)—at this writing it is the expressed interest of the NCDOT that this tree be saved. However, a decision has not been made as to how that can best be accommodated. Discussion of alternatives with the local community is ongoing.

AGENCY INVOLVEMENT: PARTNERSHIPS

Development of the last segments of Smith Creek Parkway have involved a high degree of teamwork with the NCDOT and a close working relationship with numerous resource agencies, local government officials and agencies, and local special interest groups along with the area's businesses and citizens. Other agencies involved included the U.S. Army Corps of Engineers, U.S. Coast Guard, North Carolina Division of Coastal Management, North Carolina Department of Environmental Health and Natural Resources, NCDOT Rail Division, and FAA.

COMMUNITY INVOLVEMENT

- Wilmington mayor and city council,
- Metropolitan planning organization,
- City of Wilmington Planning Department,
- City of Wilmington Engineering Department,
- North Fourth Street Revitalization Group (now North 4th Partnership, Inc.), and
- Residents and business owners in the project vicinity.

SIGNIFICANT ISSUES

- The most significant natural environmental factor was the protection of the wetlands and the potential of contamination from hazardous waste at landfills on or near the alignment.
- There were two areas of significance in the human environment:

  1. Noise that could adversely impact film and TV studios and vibration that could impact sensitive measuring instruments at a manufacturing facility (Figure 4), and

  2. Impacts to the developing historic downtown area immediately adjacent to the project's western terminus. No residential relocations were required, but several businesses and two government facilities are to be relocated.

FIGURE 3 Historic concerns.

FIGURE 4 Noise walls in Section C.

- Numerous forms of communication were used including workshops, small group meetings, hearings, and newsletters along with various forms of visualization including maps, photographs, renderings, and computer animation.

LESSONS LEARNED

One WilmingtonStar.com news article quotes Wilmington city councilwoman and chairwoman of the local Transportation Advisory Committee Laura Padgett with saying: “This project has come up with every possible holdup…everything that could go wrong with a highway project did go wrong.”

The project’s development spanned some three decades that saw new environmental

concerns arise (wetlands protection, hazardous materials site mitigation, noise/vibration avoidance, and historic preservation). This resulted in the need to develop a new northern alignment and cross-section for the unfinished segments. In addition, new opportunities had to be accommodated including the future use of an abandoned railroad right-of-way and the proposed expansion of the downtown historic district. For the NCDOT the Smith Creek Parkway was a unique learning experience that required an extra measure of internal teamwork for planning, design and construction as well as significant outreach and cooperation with various stakeholder agencies, special interest groups, businesses, and citizens. Beyond the councilwoman's comments, the fact that the Smith Creek Parkway's remaining sections are finally under construction, though significantly modified from the original design, has to be considered a success for modern-day road building and the NCDOT.

U.S. Route 3
Port Ontario, New York

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University of Connecticut

PAUL KREKLER
New York Department of Transportation

PROJECT DESCRIPTION

U.S. Route 3 runs north–south between the shore of the east end of Lake Ontario and Interstate 81 in New York State (Figure 1). Route 3 is a two-lane rural highway, which passes through many old downtowns and small villages. The route is part of the Seaway Trail, a national scenic byway, and is also part of a state bicycle route. This particular project consisted of reconstruction and improvements along a 1.1-km section in the village of Port Ontario, town of Richland, Oswego County. Port Ontario has a population of only several hundred but increases in the summer with seasonal residents. Neighboring Pulaski has a permanent population of only 2,400.

The project included the replacement of two bridges over the mouth of the Salmon River, intersection improvements, accommodation of bicycles and pedestrians and general improvements in geometric standards. The location where Route 3 crosses the Salmon River in Port Ontario is approximately 1 mile upstream of Lake Ontario and is approximately 1,500 ft.

PURPOSE AND NEED

The purpose of the project was to improve safety and accessibility by replacing two bridges over the mouth of the Salmon River along with intersection improvements, accommodation of pedestrian and bicyclists, and general improvements to geometric standards (Figure 2).

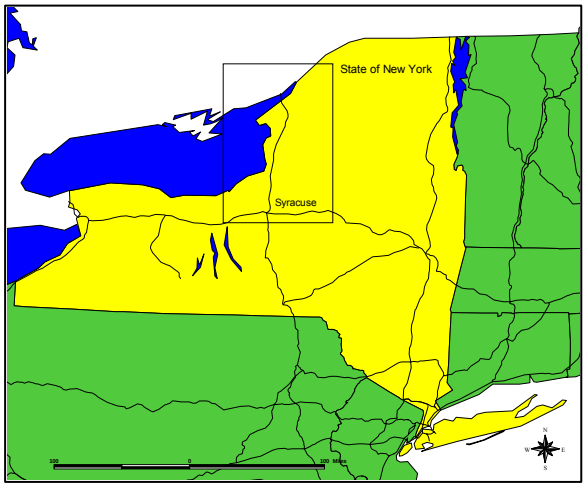

FIGURE 1 Project location.

FIGURE 2 The wide mouth of the Salmon River at Port Ontario.

CONTEXT-SENSITIVE FACTORS

A wide range of sensitive issues were addressed as part of the design of this project. It is particularly interesting to note that the prime issues of concern to the community were different from the prime issues for different resource agencies. Furthermore, the business owners had unique issues from other residents. This points to the need to contact all stakeholders in order to address all concerns (many of which cannot be foreseen). The business owners in the community were concerned most with the construction phase of the project and ensuring continued ease of traffic flow particularly during the tourist season. They were concerned that timely access to their business driveways be maintained during construction. Both business and citizen community members wanted the old bridge to stay in place until the new bridge was ready. The community also raised a traffic safety issue regarding intersection sight distance that was not known to the Department of Transportation at the start of the project. This resulted in the scope of the project being extended to include the intersection south of the bridge and its eventual signalization. Landowners who were going to have land purchased were particularly concerned about how much land they would lose and their compensation. One such owner lost the gas pumps on his business property. Those interviewed suggested that although the whole process went relatively well, the process of compensation for acquired land could be further improved. The main environmental concerns were raised by the agencies involved, not the public, and many of these concerns related to the fish habitat.

- Scenery and aesthetics were of interest to all stakeholders.
- A cultural resource study was prepared in 1997.
- Environmental concerns were related to fish habitats wetlands.
- Sidewalks and shoulder bikeways were a result of pedestrian and bicycle demand.
- Parking and accessible fishing areas were important to the community.
- Extensive public involvement was desired and sought from the beginning.
- Specialists provided direct information to residents.

FIGURE 3 Salmon River Bridge (looking south).

FIGURE 4 Completed Salmon River Bridges.

AGENCY INVOLVEMENT

The New York Department of Transportation (NTDOT) started using a CSD approach to this project from the beginning. They shared leadership on the project planning and design with other agencies. Several people interviewed for this case study noted that part of the success of the project was due to the personal attention of the NYDOT design project manager Mary Jane Meier. This points to the importance of personal connection when undertaking projects within communities.

Several resource agencies were involved in the project from the beginning stages including the following: U.S. Army Corps of Engineers; New York State (NYS) Department of Environmental Conservation; U.S. Environmental Protection Agency; U.S. Fish and Wildlife Service; NYS Department of State; Oswego County Planning Department; Eastern Shore Salmon River Corridor Fisheries Committee; Cornell Cooperative Extension; town of Richland; and Oswego County's Promotion and Tourism, Highway Department.

COMMUNITY INVOLVEMENT

There was direct community involvement in the early stages of the project, but especially from business owners on both sides of the river in Port Ontario. Beyond private citizens and land owners the following community groups were represented, including the Seaway Trail Inc., Advocacy Resources Information Services Education Toothpick (Bethel) Community Center, Brennan's Beach (1,450 trailer sites; 1,100 permanent year round), restaurants, and tackle shops. Many meetings were held in one of the local restaurants and this community setting may have represented "common turf" which aided in discussions. The proximity of the meetings to landowners and residents eased the burden of attending.

PROJECT OUTCOME AND ACCOMPLISHMENTS

Both the community and the project team are very satisfied with the project outcome. The product of this design process is very different from the draft options originally proposed. The NYDOT was willing to compromise and take new input from the beginning of the project design. In this case, instead of a two-lane bridge, a three-lane bridge was built (for the south bridge); a traffic signal was added to the project; and sidewalks were provided on both sides of the bridge as well as into the community (Figures 3 and 4). An important turning point for the community was the elimination of the design alternative that would have replaced the bridges on the existing alignment using temporary structures and interfering with traffic and therefore the community economy. The physical facility itself is far superior to the old substandard river crossing and all community members interviewed were extremely pleased with the functioning transportation facility. This project has restored confidence of the region's people in the DOT after the less successful bridge replacement in 1994 south of Port Ontario. This level of confidence was achieved by diligent attention to early and frequent communication. The circumstances of this project illustrate that it is not possible for design professionals to anticipate all needs and priorities for a community. Focus on traffic management during construction and the provision of a handicap accessible fishing area are not large issues that would have necessarily been anticipated; but they were important community issues that made this project successful.

Rhode Island Avenue
Mount Rainier, Maryland

SALLY G. OLDHAM
Oldham Historic Properties, Inc.

JAN VAUGHAN
Virginia Department of Transportation

PROJECT DESCRIPTION

U.S. Route 1 (Rhode Island Avenue) split the commercial town center of Mount Rainier with a six-legged intersection and four lanes of traffic with an ADT of 21,000 (Figure 1). This division created numerous transportation and urban design problems that hindered commercial revitalization in the heart of the community. The basic issues were pedestrian safety, environmental enhancement, the Washington Metro Area Transit Authority (WMATA) bus turn-around area (with 8 routes and 1,352 passengers daily), storm drainage inadequacy, the lack of a clean, safe, and welcoming mixed-use town center, and vehicular and bicycle safety.

This project replaced a six-legged intersection and four lanes of cars rushing through two blocks of liquor stores and abandoned buildings with a simple traffic roundabout, landscaped plazas, pedestrian lighting, easy pedestrian crossings, bus shelters built on early 20th-century designs, new business, and with public art including two blue-glass sculptures that will be lighted at night at opposite ends of the roundabout and bas relief sculptures of some of the diverse faces that make up the community of Mount Rainier.

FIGURE 1 Rhode Island Avenue: existing conditions.

PURPOSE AND NEED STATEMENT

There was no official purpose and need statement. At Maryland State Highway Administration (MSHA) the Neighborhood Conservation Program (NCP) falls under a categorical exclusion as defined by Section 106 so the agency does not prepare a purpose and need statement. MSHA developed the process in their Main Street Handbook (www.marylandroads.com) to create a community-based planning project development process. The goals and elements of this process are somewhat like the project's purpose and need.

CONTEXT-SENSITIVE FACTORS

A wide range of context-sensitive issues was addressed in the design and development of this project including addressing scenic values, aesthetics, historic issues, environmental concerns, and multimodal needs (Figure 2).

- Scenic and aesthetic values were seen as of tremendous importance as the city struggled to renew itself and create a positive sense of identity and community pride.
- Bringing artists onto the project team was a very important addition, adding understanding and skills to better meet goals of the project.
- An important goal of the city was to reclaim greenspace in order to reduce the effects of broad expanses of asphalt contributing to heat island effects.
- Environmental concerns were also important. Reduction of storm water run off and allowance for natural filtration of rainwater and storm water before it enters the Chesapeake Bay watershed were issues raised. By reducing the number of traffic lights at this intersection, air quality should improve, since emissions are lower for continuously moving vehicles than those with engines idling at traffic lights.
- The city also had important goals for the lighting in the project. City officials wanted lighting to focus on pedestrian needs, wanted the quality of light to be adequate and not overly bright, and wanted white light not the yellow light of high-pressure sodium fixtures
- Historic issues were important for this National Register Historic District. The artists'

FIGURE 2 Pedestrian safety, aesthetics and multimodal needs were among project considerations.

research of the trolley system yielded several benefits. They designed the bus shelters modeled after the designs of historic trolley stations. Echoes of the trolley tracks and turn around were included in the paving pattern designed for this project.

AGENCY INVOLVEMENT

This proposal was given to the newly created NCP, a part of the MSHA and Maryland Transit Administration charged with improving existing roads and transit facilities to spur investment in older communities. The design work for the project was carried out primarily by MSHA but the collaborative nature of the project process was very beneficial. In the course of the design WMATA requested that the roundabout be designed in an oval shape to ease the passage of its buses. This oval design proved to be a better geometric design on several levels. WMATA was also helpful in planning the one traffic signal that allows their buses to turn out of the bus holding bays.

Other agencies involved included the Maryland Transit Authority, Department of Housing and Community Development, Maryland National Capital Park and Planning Commission–Prince George's County, and Prince George's County Department of Public Works.

COMMUNITY INVOLVEMENT

MSHA asked the city to create a task force to work on the roundabout project. The close and direct working partnership of MSHA with the community in Mount Rainier gave an unprecedented opportunity to identify transportation-related issues; establish project limits; assist in the collection of data; assist in the organization, publication, and management of field walks, workshops, open houses, and public meetings; review materials intended for distribution to the community; review and revise all proposed plans; and endorse the agreed upon final concepts for approval by the local elected officials. Literally every aspect of the project from color selection to lighting to lane width to cost was subject to analysis by the community and the designers together. Members of the city council, business owners, and diverse residential representatives were encouraged to keep their constituents up to date.

Many community involvement techniques were used, including design charrettes where the public was invited to brainstorm with the project team about specific aspects of the design. Drawings were available in the City Hall. The city's newsletter included project updates frequently.

SIGNIFICANT ISSUES

Natural Environment

As discussed above, the roundabout has decreased starting and stopping by through traffic and has reduced emissions from this source. The overall project significantly reduced impervious surfaces and replaced them with landscaping (Figures 3 and 4). Finally, the project area has been selected as a pilot site for an urban bioretention facility to be constructed by MSHA.

FIGURE 3 Current conditions: improved landscaping.

FIGURE 4 Current conditions: improved pedestrian crossing.

Human Environment

Mount Rainier is a racially diverse area with its average income of about $30,000 a year, considerably below the county's average income of $48,000. The population is 60% to 70% African American, 10% Hispanic, and the rest from a variety of other ethnic groups.

In addition to struggling with revitalization, Mount Rainier has had a continuing struggle with crime. It was designated a Hot Spot community in 1997 and eligible for special grant assistance to fight crime. Local officials blamed much of this problem on lack of pedestrians on the street, failing businesses, and abandoned buildings. Without an improvement of the physical environment, they saw little chance of creating a viable housing market or adding needed community facilities.

PROJECT OUTCOME AND LESSONS LEARNED

There is a great deal of pride in this project by those involved in it from the project team as well as the community and public agencies. The parties interviewed for this case study all considered this to be a major learning experience with frustrations in the process but with a very worthwhile result. MSHA has acknowledged that the experience here has contributed greatly to the evolution of their project efforts using context design principles.

The Mount Rainier project was importantly an effort of urban design. MSHA found that its project team members were not skilled at urban design. In this case the artists' skills added greatly to the team's ability to address urban design issues. It is important in the future for projects of this type that an urban designer be on the team. In many cases this skill may be provided by a landscape architect skilled in urban design.

The project would have benefited from the knowledge that MSHA now has in designing its project process for NCP projects. If overall project goals had been identified up front with all stakeholders and if a team with all the skills needed had been assembled early, the project would have proceeded more smoothly. The decision making process for including public art in the project was a learning experience. The task force needed to have faith in the skills of the artists; the artists needed to listen to the aspirations of the community and be responsive to these varied interests.

U.S. Route 50
Loudoun–Fauquier Counties, Virginia

SALLY G. OLDHAM
Oldham Historic Properties, Inc.

JAN VAUGHAN
Virginia Department of Transportation

PROJECT DESCRIPTION

This project is a national demonstration project, funded under Transportation Equity Act for the 21st Century and Virginia Department of Transportation's (VDOT's) Virginia Transportation Development Plan (Figure 1). The project is described as "Traffic Calming Measures for Route 50 in Loudoun and Fauquier Counties." The portion of U.S. Route 50 affected by this project (called the Route 50 Corridor in this case study) is 24 mi long and located approximately 45 mi west of Washington, D.C., in the VDOT Northern Virginia District. Route 50 is a rural highway, serving as a through route as well as the main street for several small towns. The area economy is based on tourism and agriculture, so the road serves farm vehicles, bicyclists, and tourists as well as local businesses, schools, churches, residents, and commuters. Route 50 is functionally classified as a minor arterial. Current funding for the project totals $16.25 million. The corridor of Route 50 under study begins in the village of Paris and continues through Upperville, Middleburg, Aldie, and ends at Lenah.

PURPOSE AND NEED

The intent of the project is to employ traffic calming measures that will require drivers to comply with posted speed limits within the towns and along the intervening roadway segments (Figure 2). The purpose is to reduce speeding and aggressive driving, enhance safety, and promote local business, scenic beauty, and the historic nature of the area. The study of the project and the process, before, during, and after implementation is to be shared with interested communities throughout the country.

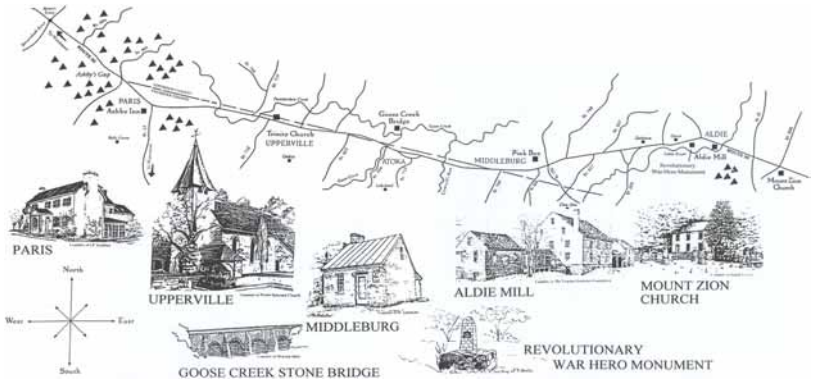

FIGURE 1 Route 50 corridor.

FIGURE 2 Typical community section of Route 50.

CONTEXT-SENSITIVE DESIGN FEATURES

- Part of the economic vitality of each of the respective communities is tourism. Maintaining the setting for scenic, historic, and economic preservation were all raised by members of the communities and incorporated into their vision statement (Figure 3).
- Traffic calming elements were selected to address significant safety problems but also to avoid adverse impacts on both historic and scenic resources.
- No historic structures will need to be relocated throughout the 24-mi route.
- Minimal right-of-way (ROW) acquisition is required. If the alternative for a triad of roundabouts is selected for Gilbert's Corners, ROW will be needed to construct the roadway connecting the roundabouts on Route 50 east and south of Gilberts' Corners. Otherwise, ROW requirements are just slivers of land.
- Shoulders along the project length will be stabilized turf shoulders. A VDOT maintenance staff person is working with personnel at the Virginia Transportation Research Council on a number of test areas this season to test the result of different plant material and gravel mixes.
- The project includes the use of
  - A roundabout at a high accident intersection (Route 50 and Watson Road) as opposed to a traffic signal;
  - Rural splitter islands that announce an intersection location and provide space for one car either making a left turn from Route 50 or attempting to cross Route 50 from a side road; and
  - The overall integration of landscape materials throughout the concept development phase.
- Design exceptions for lane widths are being used in the project. However, the goal of the design team was to use a design guideline that was either provided by AASHTO or by another state that has incorporated similar measures. The travel lanes will be 10-ft wide within the village areas, with an additional 1 ft of the adjacent valley gutter drainage system available if needed.

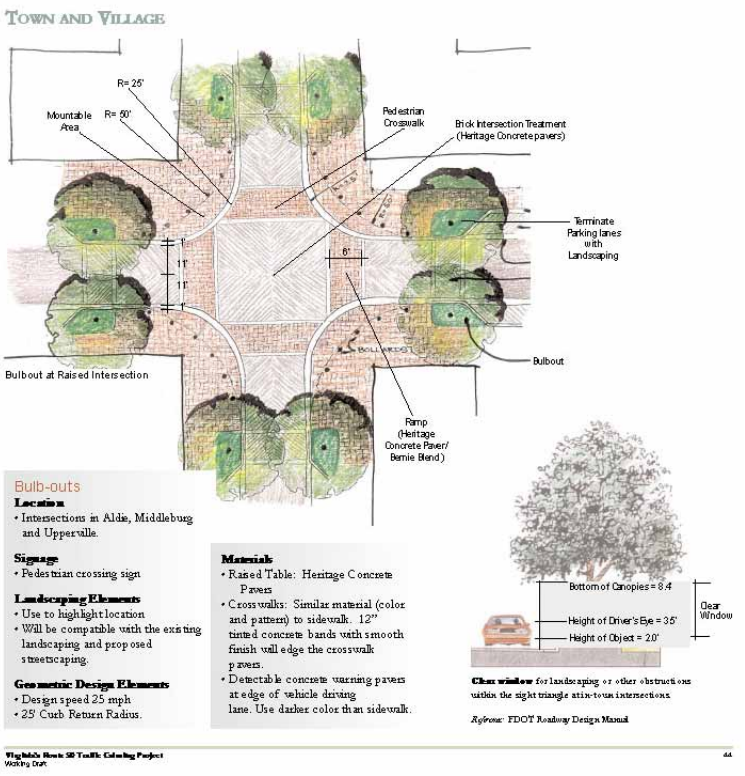

FIGURE 3 Sample of memorandum details.

AGENCY INVOLVEMENT

Under pressure to accommodate increased motor vehicle travel between expanding suburbs and the nation's capital, the VDOT developed a preliminary design to widen Route 50 to four lanes, with bypasses around Aldie and Middleburg (Figure 4). Once the Congress had approved the "Traffic Calming Measures for Route 50 in Loudoun and Fauquier Counties" as a demonstration project, VDOT established a close working relationship with the community appointed task force to convert the community goals into design plans.

Because a National Environmental Policy Act of 1969 (NEPA) document is required for the project, other interested state and federal agencies were contacted through VDOT's document scoping process. Additionally, agencies with jurisdiction and review authority were contacted, specifically the Virginia Department of Historic Resources and the Virginia Outdoor Foundation, for 106 Coordination and Preservation Easement information. The SHPO issued a finding of no adverse effect for the project.

COMMUNITY INVOLVEMENT

Before a consultant team was hired for the project, a task force of interested citizens, local elected officials, a member of the Commonwealth Transportation Board and VDOT had been formed. The task force is scheduled to meet every month and is open to the public

Near the beginning of the schedule, project kick-off meetings were held at the each of the three communities. During the day informal meetings were held to introduce the consultants, the

FIGURE 4 Concept plan for Middleburg.

project concepts, and listen to those that choose to be heard. During the evenings, seminars discussing the goals of traffic calming were discussed followed by a question-and-answer period concerning the potential uses of traffic calming along the corridor. Through the 3-day period a list of potential stakeholders was developed. Members of the design team were available to meet with interested parties throughout the concept development portion of the project.

A design charrette was held with members of the design team and VDOT. The issues noted during the initial stakeholder interviews were addressed as best as possible one by one. An overall concept for the corridor was developed and presented to the task force. Additional meetings were held with the stakeholders to refine the concepts. A public meeting was then held to present the overall and specific concepts. Meeting notes from this public presentation were again reviewed by the design team and refinements made.

SIGNIFICANT ENVIRONMENTAL ISSUES

Natural Environment

Among the design goals for the project team was to preserve and enhance views from the roadway that provide residents and travelers a connection to and an appreciation of the vast farmlands and preserved environmental lands along the Route 50 corridor. It was agreed that the rural rolling terrain would be maintained to preserve the natural topography of the land.

Human Environment

Two additional feet of sidewalk resulting from a potential reduction in the current curb-face to curb-face width, may allow room for two people to walk abreast and other streetscape amenities.

Public Involvement

The community's input through out this project has been a determining factor, from selection of the consulting team, participation on the community task force that directs the project team's work, participation in small group meetings, and participation in larger public meetings.

PROJECT OUTCOME TO DATE AND LESSONS LEARNED

- The six-member selection team was equally divided between VDOT staff and community representatives. The team's collaborative effort to conduct a fair and impartial review of consultants resulted in a unanimous choice. This activity was a turning point in the relationship between VDOT and the Route 50 Corridor Coalition, and allowed a relationship of trust to begin.
- An important element of the CSD approach with this project was the willingness of the engineers to get away from a template mentality where often a typical section is designed and then uniformly applied to large areas of the corridor. Instead the designers and engineers all agreed about the overall design goals and principles and then adapted the agreed upon principles to the very unique conditions of each of the three towns. The result is that each town will continue to retain its own unique character.
- The design team has been particularly sensitive to the need to look at design elements in the context of the existing resources so they enhance these resources—not overwhelm or detract from them. For example, there has been debate on entrance features—size, scale, materials, etc.—that are appropriate in this "quiet" environment.
- One of the keys to the success of the project has been the availability of members of the design team and task force to address issues and concerns raised by interested citizens. This responsiveness has been through individual and small group meetings such that individual voices can be heard in an informal setting.
- Having a design team that brings a full appreciation for the flexibility in the design guidelines has been very important along with the ability to research and bring for consideration successful design concepts from other states and countries.

Bridgeport Way
University Place, Washington

NIKIFOROS STAMATIADIS
University of Kentucky

STEVE SUGG
City of University Place Government

PROJECT DESCRIPTION

Bridgeport Way is a major urban arterial and it could be considered as a "Main Street" of University Place. The project involved reconstruction of an existing five-lane road into a four-lane divided roadway over a distance of approximately 1.5 mi (Figures 1 and 2). The route serves local traffic and regional commuters, it is the highest transit volume corridor for Pierce County, and it is often used as a bypass of the Interstate 5 freeway when congestion is heavy.

PURPOSE AND NEED

The purpose of this project was to address the safety concerns due to the high number of crashes over the past years. At the same time it was viewed essential to the vision statement of the City Council that aimed in improving the quality of life in the community by creating a town center. The goal of the project is to develop Bridgeport Way as a corridor that will improve traffic safety, increase the mobility and cohesiveness of the community, enhance the appearance of the corridor, and control traffic growth.

FIGURE 1 Bridgeport Way before.

FIGURE 2 Bridgeport Way before.

CONTEXT-SENSITIVE DESIGN FEATURES

CSD issues implemented as part of the Bridgeport Way project included the following:

- An extensive public involvement process was initiated to solicit input on how the street should be redesigned. The process utilized design charrettes, public meetings, open houses, meetings with neighborhood groups, and one-to-one meetings.
- A design charrette was completed with citizen participation to develop potential design alternatives for Bridgeport Way. There were two sessions, one for adults and a second for high school students.
- The use of flared intersections to accommodate U-turns for long vehicles at signalized intersections due to the use of the divided median to improve access management and reduce traffic crashes.
- Landscaped median with specially designed streetlights. Planter strips along the entire corridor with streetlights matching the median lights. Bike lanes along the entire corridor.
- Mid-block pedestrian crossings with in-pavement flashing lights at two mid-block crosswalks along Phase 1A. Because of reduced driver compliance over time and five vehicle–pedestrian collisions, the in-pavement lights are being replaced in Summer 2002 with pedestrian traffic signals. The signals will be interconnected with other signals along the corridor to optimize traffic progression and minimize vehicle–pedestrian conflicts.
- Undergrounding utility wires to enhance aesthetic appearance of the roadway.
- Use of a single corridor for all modes of transportation, i.e., passenger cars, public transportation, bicyclists, and pedestrians.

AGENCY INVOLVEMENT

The Washington State Transportation Improvement Board (TIB) was the funding agency for this project and had a significant involvement beginning with the initial application, which had as its objective to improve safety. Their involvement continued throughout the project and was critical to the evolution of events. In Phase 2, additional transportation, planning, and funding agencies were involved including the Washington DOT, FHWA, Puget Sound Regional Council, and Washington State Public Works Board.

The Chamber of Commerce was a stakeholder involved in the entire process. Tacoma Power, the local electric utility company, was also involved and participated in the project by funding 50% of the cost of undergrounding power lines.

COMMUNITY INVOLVEMENT

There was a direct and continuous community involvement from the beginning of the project. There have been several approaches taken to solicit input from the community, including:

- A design charrette (November 8–9, 1996) was held with 100 adult participants where focus group, brain storming, design sessions were completed. Solutions provided included a four-lane roadway with signals and median and a two-lane road with median and roundabouts.
- A design charrette (November 12, 1996) at Curtis Junior High School was also held where the students came up with similar designs but they added several youth-oriented facilities (skate parks, sports center, and bike trails).
- A charrette public forum was held on November 12 in a joint meeting of the City Council and Planning Commission to discuss the designs and get public input.
- A presentation to the TIB was the next step (January 1997) due to significant negative public campaign in the press and by a citizen's group (Citizens Against Repetitious Roundabouts). The TIB was favorable of the project and requested additional public input.
- Four neighborhood meetings were held over a 2-week period where the two alternatives were presented and comments were solicited. Frequently asked questions and their answers were provided after the first two meetings. A special town hall meeting was held following these meetings (February 26, 1997) to consolidate the public input.
- A public hearing was held on March 4, 1997, to present the four-lane alternative, since the roundabout option was deemed very controversial. It should be noted though that the council approved the installation of a roundabout as a demonstration project in another location.

SIGNIFICANT ISSUES

City Council's Involvement

The City Council's vision statement was central to the design of Bridgeport Way (Figure 3). The development of a town center and a main street that would promote a walkable community was the main objective of the council. Most of the council members were behind the idea of redeveloping Bridgeport Way in such a manner that would enhance the quality of life of the community. The continuous solicitation of ideas and comments from the public was considered

FIGURE 3 Bridgeport Way after, north view.

essential in the development of a design that would be accepted by the community. The City Council was committed to involve the public and the business community throughout the process and they spent several nights and meetings discussing the various alternatives. To proceed with the design and to dispel any reservations regarding the roundabout issues, the council supported a demonstration project in an alternative location (Grandview) and installed a roundabout. This demonstration test project was so successful that several roundabouts were installed along the same street with the demonstration project.

Public Education

A pamphlet describing proper driving at roundabouts has been developed by the City Council and a video has been developed as well. Additional education efforts regarding nomenclature and terminology were developed during the public involvement phase.

Public Involvement

Extensive public involvement was utilized to seek input and guide the project from the conception of the project development. To notify the public regarding the meetings, newspaper notices were printed, fliers to all property owners in University Place were delivered, and posters were placed in City Hall, supermarkets, banks, library, fast food locations, and other places. Overhang signs were placed along Bridgeport Way as additional means of increasing public awareness. A representative of the city government visited each property owner along Bridgeport Way.

Economic Development

Initial concerns of the business community were voiced regarding the loss of revenue from the proposed access management due to the presence of the median (Figure 4). A recently completed before and after study indicates that there has been an increase in business revenues due to the

FIGURE 4 Bridgeport Way left-turn lane.

project. Significant activity in redevelopment due to the Bridgeport Way project has also been observed with new businesses recently relocating to the area and others are applying for redevelopment and relocation.

PROJECT OUTCOME AND LESSONS LEARNED

- A major emphasis of the project was public involvement and solicitation of comments from all stakeholders throughout the entire process
- The strong commitment by the City Council to develop a town center and sense of community played an important role in completing this project.
- The flexibility and open mindedness of the council to develop a demonstration project for roundabouts indicated to the public and the stakeholders that their opinion is valued and is seriously considered. This level of trust between the government and the public has helped the more efficient completion and acceptance of other transportation related projects.
- The involvement of the area business owners from the outset of the project has been beneficial.
- The "road diet" concept (where a roadway with more lanes is converted to one with fewer lanes) has worked very well by reducing crashes up to 60% for some areas and speeds by about 6%.
- New techniques used for public involvement such as the roundtable format.
- Incorporation of innovative designs for pedestrian crossings.
- A systematic approach to educate public about design options and the purpose of the road using visual aids. A post-construction education was also undertaken to ensure proper driving.

Route 215
Ozark National Forest, Arkansas

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University of Kentucky

STEPHEN R. MITCHELL
Arkansas State Highway and Transportation Department

PROJECT DESCRIPTION

Route 215 is an improved two-lane facility of approximately 15 mi in length following along the Mulberry River (providing a scenic overlook, Figure 1) with its steep slopes and providing access to the Redding and Wolfpen Campgrounds in the White Rock Wildlife Management Area of the Ozark National Forest.

PURPOSE AND NEED

The previously existing route was not adequate for the current or anticipated future traffic. The travel lane was too narrow, the surface rough (gravel), and an unnecessary amount of dust and siltation were being produced, all of which detracted from the personal experience and water quality of the streams and river in the area. The road provides access to the Mulberry River Valley for local residents, recreationists, and other forest users. The road provides access to campgrounds, hiking trails, and scenic views of the Mulberry River. The Mulberry River is very popular among canoeists and it is highly regarded as a smallmouth bass river. Hunters also heavily use the national forest during hunting season. The reconstructed roadway is meant to reduce dust and siltation thereby enhancing the personal experience and improving the water quality of the area.

FIGURE 1 Scenic overlook of Mulberry River.

CONTEXT-SENSITIVE DESIGN FEATURES

Several principles were established for erosion and sediment control during and after construction. The visual environment of the forest, the viewscape from the Mulberry River, and the vistas overlooking the river were deemed extremely important to maintain and enhance. Improvement measures include revegetation of cut and fill slopes, location of borrow and waste areas so as to not be visible from the river, and use of native stone to the largest extent possible for retaining walls, gabion walls, riprap, and ditch lining. Because of the potential instability of the mountain, cuts were kept to a minimum. An additional requirement was to leave in place stone retaining walls at culverts and even a rock box culvert with large stone slabs (it has been covered over by the new roadway and its sides have been extended with pipe). The roadway alignment closely tracks the existing land contours to minimize both cuts and fills.

AGENCY INVOLVEMENT

- Arkansas State Highway and Transportation Department,
- FHWA (specifically the Eastern Federal Lands Highway Division),
- U.S. Forest Service,
- National Park Service,
- U.S. Army Corps of Engineers,
- Arkansas Natural Heritage Commission,
- Arkansas Department. of Environmental Quality, and
- Arkansas Natural and Scenic River Commission.

SIGNIFICANT ISSUES

Natural Environment

The major issues include the fact that the road is in a national forest and follows a river. Concerns were for preserving and enhancing scenic quality as well as water quality. Design principles included following the terrain and creating as little disturbance as possible with the alignment and using natural materials to the largest extent possible (Figure 2). The roadway provides improved access to forest uses and an improved view from the roadway, while also protecting the viewshed of the Mulberry River below.

Design Issues and Special Features

Design speed of 20 mph was chosen to allow use of much of the existing gravel road alignment. Retaining structures were used adjacent to cuts and fills in lieu of slope flattening. Native stone was used extensively for veneer on crash worthy walls, riprap/gabion retaining walls and ditch lining (Figure 3). Controlling erosion and sediment during and after construction has been a major concern. The design maintains the visual quality of the viewscape from the Mulberry River and provides for scenic overlooks of the forest and river for the roadway traveler. Various combinations of components were used including barrier walls, curbs and gutters, and guardrails.

FIGURE 2 Extensive use of native rock and stone.

FIGURE 3 Curb/gutter and culvert with adjacent stone retaining wall.

PROJECT OUTCOME AND LESSONS LEARNED

The Arkansas State Highway and Transportation Department is knowledgeable of CSD practices. However, this project extended the parameters of past initiatives/experience especially for the design of a secondary road. The client certainly "did not want a flat straight road." The preliminary design for the first segment underwent significant revision as the designers began to appreciate the full extent of the client's requirements. In order to preserve and protect the natural environment and create a built roadway environment that was to be esthetically pleasing, design speed, roadway geometric features, and natural materials were brought together. Some of the built features that look simple are made possible by using geotechnical design methods and special materials that cannot be seen.

Converting Highways into Streets and Avenues
Case Studies from Connecticut and Georgia

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JIANHONG WANG
PETER MINIUTTI
MATTHEW BISHOP
University of Connecticut

BACKGROUND

Increasingly, localities around the country are beginning to realize the importance of converting urban highways into streets, avenues, and boulevards. The initial focus has been on restoring downtown main streets. States leading this trend include New Jersey, Maryland, and California. Our case studies, from Connecticut and Georgia, exemplify a second wave in this movement: the conversion of neighborhood highways into urban avenues. Details of our case studies from West Hartford, Connecticut, and Savannah, Georgia, are discussed.

WEST HARTFORD, CONNECTICUT

West Hartford is a prosperous, inner-ring suburban town adjacent to Hartford, Connecticut. Over the last decade it has had great success recreating itself in the new urbanist model as a walkable, pedestrian-friendly town of neighborhoods. The work on Asylum Avenue is part of this effort to make the whole town more livable. Asylum Avenue was once a four-lane arterial with two lanes in each direction. With the median construction, Asylum Avenue was narrowed to two lanes plus on-street parking (see Figure 1).

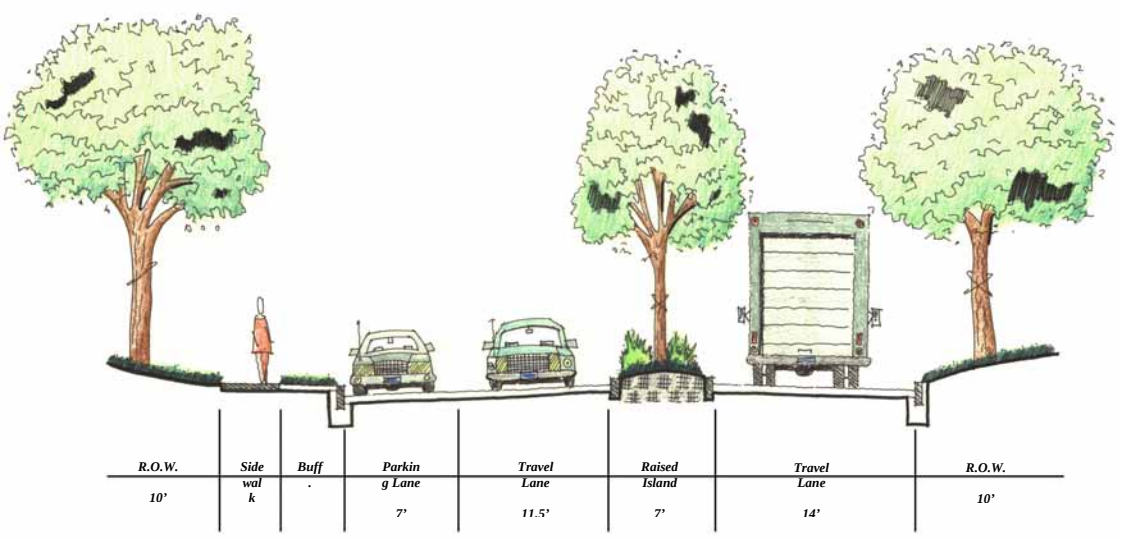

FIGURE 1 Cross section of raised median on Asylum Avenue (West Hartford, Connecticut).

According to ConnDOT's functional classification Asylum Avenue is a minor urban arterial. However, the context-sensitive classification of Asylum Avenue should be neighborhood (residential) avenue. The reconstruction effectively converted Asylum Avenue from a minor urban arterial highway into a neighborhood avenue.

This project has transformed the character and appearance of Asylum Avenue, converting a highway into an avenue that is more appropriate for the context of a highly urbanized residential neighborhood (see Figure 2). The median and plantings has reduced noise and nuisance and improved livability for residents and also visitors to nearby Elizabeth Park. The attractive planting, the wide median, and the high quality material used for curbing and paving have significantly enhanced the appearance of the roadway (see Figure 3). However, from a speed calming perspective this reconstruction is not as successful as it should be due to the use of relatively wide lane widths of 11 to 14 ft.

FIGURE 2 Asylum Avenue median (West Hartford).

FIGURE 3 Asylum Avenue cross section (West Hartford).

The real importance of this project is that it is the first of its kind in the region in years and it serves as a model for other towns that want to convert misplaced highways into context sensitive avenues.

SAVANNAH, GEORGIA

Savannah is renowned for its historical city center that was laid out around 21 small parks that make the city graceful and beautiful with its antebellum homes and its shaded streets (see Figure 4). These parks also break up the streets, slow traffic, and offer a stunning environment to complement some of America's best-preserved period architecture. The city of Savannah is deploying a comprehensive program of streetscape revitalization from River Street to 52nd Street: the median improvement along Martin Luther King Jr. Boulevard is a component of this revitalization program. Martin Luther King Jr. Boulevard is the western gateway into Savannah, thus the city targeted this area for redevelopment (see Figure 5). The median construction on Martin Luther King Jr. Boulevard aims to calm traffic, provide safer pedestrian crossing, and build a streetscape more unified with downtown Savannah (see Figure 6).

Currently, more than 1.3 million visitors annually visit the Savannah Visitor Center located on the segment of Martin Luther King Jr. Boulevard between Liberty Street and Oglethorpe Street, and more than 1,500 Savannah College of Art and Design students live and work in the area. Thus improvements to street features such as medians and pedestrian crosswalks are necessary to make the area more attractive to pedestrians.

FIGURE 4 Traditional streetscape in the historical center of Savannah, Georgia.

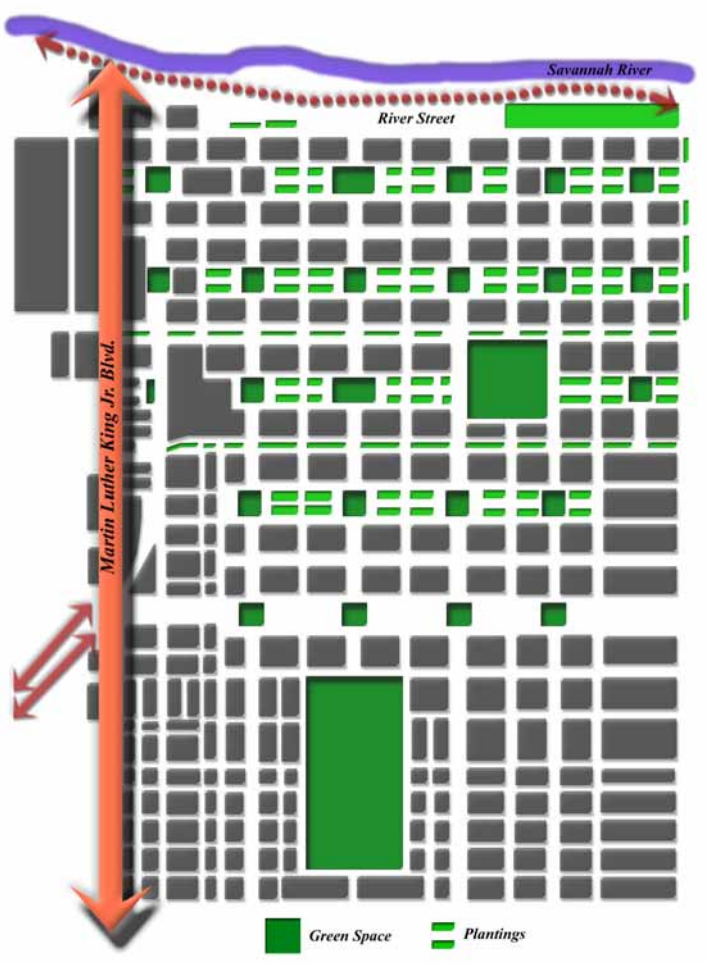

FIGURE 5 Map of downtown Savannah showing location of Martin Luther King Boulevard.

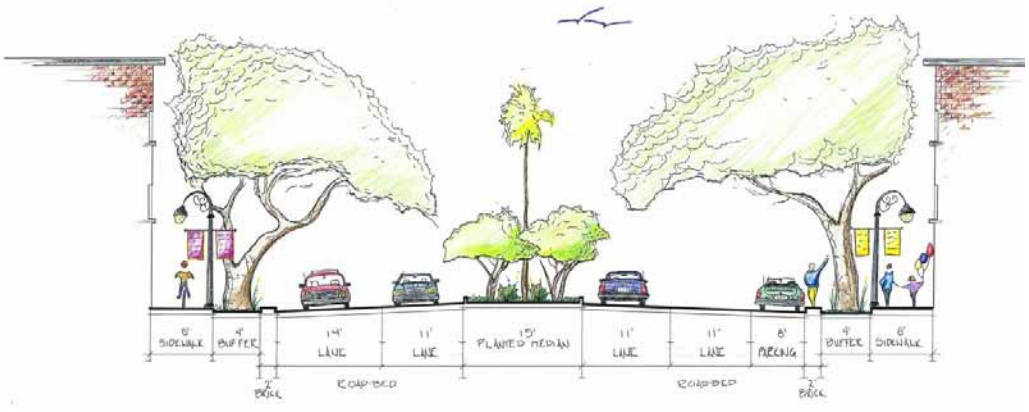

FIGURE 6 Cross-section design of Martin Luther King Boulevard.

FIGURE 7 Martin Luther King Boulevard median construction.

Martin Luther King Jr. Boulevard was once a four-lane urban arterial with on street parking on each side of the road. The newly designed alignment is four lanes, with two travel lanes provided on each side of a raised, landscaped median (see Figure 7). According to AASHTO's functional classification Martin Luther King Jr. Boulevard is major urban arterial. However, from the point of view of CSD the classification of Martin Luther King Jr. Boulevard should be neighborhood (mixed-use) avenue. The median improvement essentially converted Martin Luther King Jr. Boulevard from a major urban arterial into a neighborhood avenue.

The importance of this project in Savannah lies in the fact that it abuts one of the most celebrated historical districts in the country. This project is one of the many steps being taken to reverse some of the damage that was done to the district and to surrounding areas in order to facilitate vehicular traffic. For example, in the 1950s, one of the original landscaped squares in the historical district was converted to a parking garage. Plans are under way to convert it back to its historic use as a square. This project could actually, for the first time, extend the character of the historical district into a new area. Success here will depend on how well the designers integrate the details that are necessary to replicate the charm of the historical district, while accommodating a large volume of traffic.

Mannsdale Road, Mississippi Route 463
Jackson, Mississippi

JAKE A. KELLER
JOCELYN P. PRITCHETT
Parsons Brinckerhoff Quade & Douglas, Inc.

PROJECT DESCRIPTION

Mannsdale Road is located west of the city of Madison northwest of Jackson, Mississippi. The road is about 8 mi long and is currently two lanes wide. Land use varies significantly along the short project length. Light commercial is prevalent at the beginning near the Interstate and shifts to existing and developing suburban areas along the middle of the corridor. The end of the project is primarily rural with very low density residential and agricultural uses (Figure 1). Most of the project area is rich in history with two early town areas, a former plantation (Figure 2), and two 150-year-old church congregations.

To date, the local residents have been successful in influencing the character of the growth in the culturally rich area. Realizing the cultural significance of the area, the Mississippi Department of Transportation (MDOT) and the FHWA determined that the project should be developed following the principles of CSD. MDOT has chosen to implement and develop context sensitive solutions by utilizing the NEPA process. A multidisciplined project team was assembled to see the project from initial concept through the NEPA phase. Currently, the design team and the public have reached general consensus and are advancing two build alternatives through the NEPA process.

Early in the project a Citizen's Advisory Team (CAT) was assembled to represent the citizens in the corridor and work with the project development team to see that the project addressed citizens' concerns. The team interacts with the community and the project

FIGURE 1 Mannsdale Road.

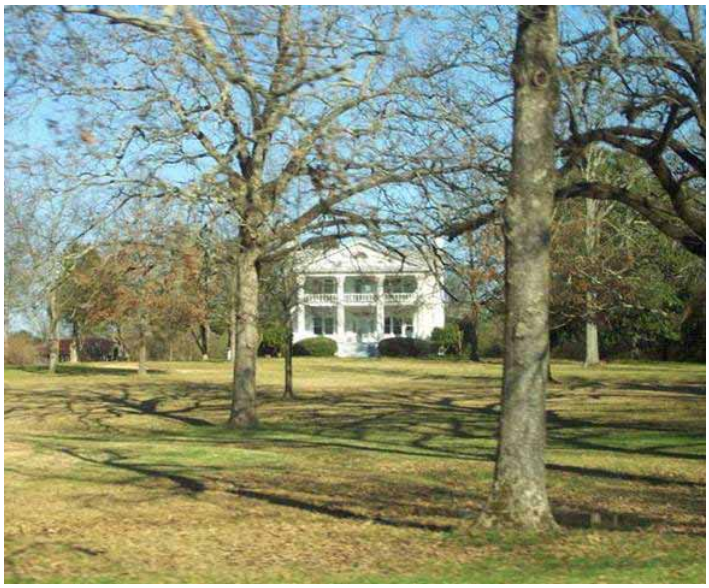

FIGURE 2 Former plantation.

development team to bring community issues to light, assist in the development and selection of alternatives, and inform other citizens' groups about the project. CAT members include leaders in the business and religious communities as well as homeowners, a local developer, the principal of St. Joseph's Catholic School, and the president of the Mannsdale Heritage Foundation. The CAT will remain with the project development team throughout the project design and construction stages to keep the design and planning features proposed during this planning stage included in the project.

PURPOSE AND NEED

Much of the property adjacent to the roadway is historic but undergoing extreme pressure to develop. The current traffic volumes range from 1,900 to 19,900 ADT. Future (2025) traffic volumes are projected to range from 9,600 to 33,300 ADT. To maintain an effective level of service the roadway will have to be widened to four lanes along part or the entire 8-mi corridor.

The purpose of the proposed project is to address the following identified needs:

- To increase the efficiency of traffic movements on the current route between Route 22 and Interstate 55.
- To serve the travel needs of developing land uses as well as future developments in this quickly growing area.
- To improve the safety of the community and the traveling public.
- To provide a transportation corridor that meets the needs of the community as well as the needs of the thru-traffic.

FIGURE 3 CAT meeting presentation.

FIGURE 4 CAT meeting interaction and discussions.

SIGNIFICANT ISSUES

The project team and the CAT had to address the basic task of how to provide additional capacity on this roadway while maintaining the character of the community. The initial proposal was to construct an additional two lanes along the existing alignment, the full length of the corridor. In accordance with current MDOT design standards, design speed would be 55 mph and the opposing lanes would need to be separated by a 90-ft-wide depressed median. Such a footprint would require relocating many homes, severely impact historic properties, and divide the community—both physically and culturally.

CONTEXT-SENSITIVE DESIGN FEATURES

In its efforts to encourage environmental stewardship, the MDOT determined that the improvement required for Mannsdale Road would be a good candidate for a project developed under the principles of CSD and context-sensitive solutions (CSS)—the broader view of CSD.

The first feature of this approach is the multidisciplined team developed to see the project through from concept to completion of construction. The project team membership, representing FHWA and MDOT, includes an advisor on CSD/CSS, transportation planners, traffic engineers, landscape architect, historic and cultural resource advisors, public involvement advisors, highway design engineers, and highway maintenance engineers. Once formed, this project team assembled a group of people from the community who were willing to serve on the CAT. These teams meet to address all issues associated with the project including such basic planning and design elements as functional class, design speed, and level of service.

As a result of this team structure and willingness to collaborate, the stakeholders were able to move from impasse to the selection of two alternatives (in addition to the no-build alternative) that will be carried through the NEPA process. Specific features that required extensive attention are described below.

Impacts of Implementing Initial Design Criteria

The impact of the initial design criteria would have been destructive to the corridor. The CAT brought to light and described impacts that allowed the project team to see the need to re-examine its initial approach. Consequently, the design criteria were lowered to allow for a median, but one that was much narrower, and the design speed may be reduced in some segments of the corridor that pass through an historic area.

FIGURE 5 Scenic area along corridor.

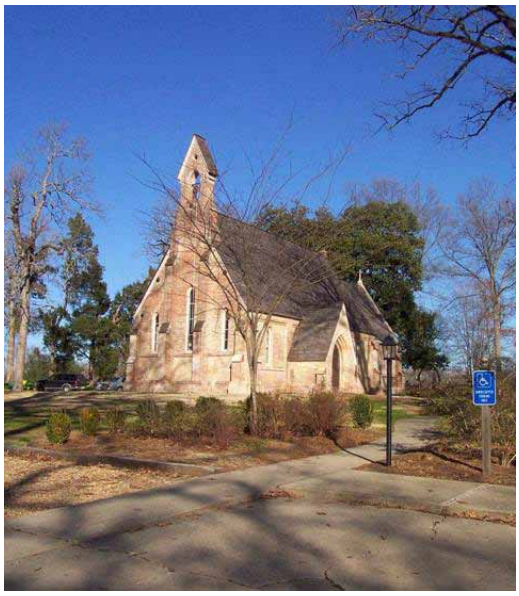

FIGURE 6 View of historic church was preserved.

Impacts of Requiring Four Lanes

While a majority of the stakeholders recognize the need to add another lane in each direction, the resulting roadway path has physical, visual impacts in sensitive areas. After proposing several alternative solutions to the CAT, including re-routing the roadway around the two most sensitive areas, the team accepted alternatives that, in one case reduced the width by using curb and gutter (the CAT found curb and gutter generally undesirable, but an acceptable compromise in this case) and in the other instance the alternative lowered the two new lanes in such a way as to virtually hide them and preserve the views of an historic church (Figure 6).

AGENCY INVOLVEMENT

Most of the agency involvement with the project has centered on FHWA and the Department of Archives and History. FHWA took an active role in the project by participating on the project development team and being an active contributor at all the public and CAT meetings. FHWA has worked closely with MDOT to develop CSS for the community and the corridor utilizing the NEPA process and has been instrumental in adapting the process to include the public involvement and design elements necessary to reach consensus. Meetings with the Department of Archives and History commenced early in the project to determine the National Register eligibility of certain properties along the corridor. Even though some of the historic properties have been deemed ineligible for the National Register, their historic importance to the community elevated them to an almost equivalent status in the project development. CSS are being developed in coordination with the SHPO for areas near historic churches (Figure 7).

FIGURE 7 Consideration was given to properties important to the community, like this church.

FIGURE 8 Mannsdale Road.

LESSONS LEARNED

Many things on this project have been done following CSD principles and the results have proven that this was the correct approach. The principles critical to the early success of this project were having the support of the highest management levels of the DOT and assembling a diverse team. Often, project opponents see a citizens' advisory team as the opportunity to defeat the project. The membership of the CAT team must be selected to represent all of the stakeholders.

The project team considers the DOT as stakeholders and had to convince some DOT staff of the value of this approach. The turning point came when the project team assured the DOT design engineers that the team was respectful of the responsibility that they bear as professional

engineers and assured them that the project would be developed without requiring design exceptions.

As with many projects in their formative stages, the project opponents were quick the challenge the traffic projections. The project team must be certain that the traffic projections are beyond reproach and that, if more than one entity is projecting traffic in the project corridor, the numbers must be made to be consistent.

Lastly, following the principle of always maintaining an open-minded approach and adopting suggestions from the stakeholders wherever possible, builds the trust and credibility that will be needed to finally open the new project to traffic.

Bridge 9 on Smiths Bridge Road
Wilmington, Delaware

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Oldham Historic Properties, Inc.

CALVIN WEBER
Delaware Department of Transportation

PROJECT DESCRIPTION

Bridge 9 (Smiths Bridge) is a one-lane wide, three-span steel beam bridge with timber deck and railing with a superstructure dating from 1962 when it was rebuilt following a fire (Figure 1). The original superstructure was a single-span timber covered bridge constructed in 1839. The substructure consists of stone abutments dating back to the original 1839 bridge and stone faced concrete piers that were constructed in the1950s when steel beams were added for support. The substructure is considered to be a contributing element to the historic district in which the bridge lies. The latest condition evaluation reports that the bridge deck is in poor condition, with the superstructure and substructure in fair condition. Based on the condition of the bridge, the scope of work was determined to include replacement of the superstructure and rehabilitation of the substructure.

PURPOSE AND NEED STATEMENT

There was no official purpose and need statement for the project. Projects come up on Delaware Department of Transportation's (DelDOT's) bridge schedule due to their deficiency rating and at that time the department determines the project scope. The original project scope here was to replace the deck and rehabilitate the substructure. It was following the first public workshop at which DelDOT staff took input from the public that DelDOT decided to alter the initial scope of the project.

CONTEXT-SENSITIVE DESIGN FEATURES

- Context-sensitive factors raised include: Aesthetics, historic issues, environmental concerns, noise concerns, multimodalism (pedestrian–cyclists), traffic calming (speed, traffic volumes, trucks), safety, vandalism, and flooding.
- As-built drawings were available from 1956 when the bridge was rehabilitated adding stone-faced concrete piers when steel beams were added for support. These documents gave design engineers good information to develop a replacement for the superstructure of the bridge that is not a literal recreation of the historic structure, but is based on its design qualities.
- The decision to build a one-lane covered bridge required a design exception to AASHTO design guidelines. DelDOT engineers determined that a 20-mph speed limit would be appropriate. DelDOT's engineers determined their principal concern with the poor sight

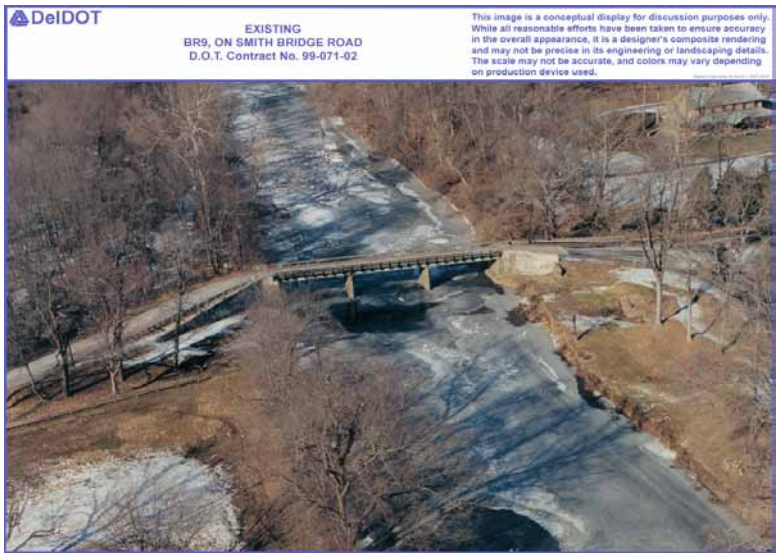

FIGURE 1 Existing bridge structure.

distances on the approaches to the bridge could be met by a limited realignment on the north side of the bridge to provide better sight distances.

- Improved sight line distances will be achieved by realigning and raising the approach from the west side of the bridge and by lowering the bridge deck by 1 ft (Figure 2). The reduced section height of the superstructure will allow this while maintaining the current soffit elevation of the bridge.

AGENCY INVOLVEMENT

Bridge 9 had a history of maintenance problems relating to its wooden plank surface and frequent need for repair to the timber bridge rail. When the bridge came up for deck replacement and rehabilitation work, DelDOT's North District decided the project was more than they could handle and turned to the Office of Preconstruction in Dover that provides designs for all districts in the state. DelDOT's engineers thought that the ADT of 3,600 vehicles warranted building a two-lane facility. The accident history for the bridge was not severe: 18 accidents over 10 years (including one fatality and three injuries). Most accidents were caused by the poor sight distance at the approaches to the bridge.

Other agencies involved include the Delaware Historic Preservation Office, the New Castle County Historic Review Board, the U.S. Army Corps of Engineers, and the Department of Natural Resources and Environmental Control.

COMMUNITY INVOLVEMENT

Prior to the first Public Workshop, initial contact was made with the adjacent property owners by letter and follow up interview. At the request of a community group that was working with DelDOT on a nearby project, the department agreed to hold a public meeting with a "blank sheet of paper". One hundred people attended this first meeting held in April 2000. Sixty-eight of the

FIGURE 2 Existing west side of bridge.

attendees returned a questionnaire that asked them to identify their concerns with the bridge's operation and their proposed solutions. The questionnaire also asked people to identify community groups to which they belonged. Many respondents were concerned that if a two-lane bridge was built, it would encourage more traffic through the area. Also there was strong opposition to installing a traffic signal to control traffic flow as being incompatible with the character of this rural setting.

A second workshop was held 2 months later. DelDOT staff organized the responses to the April questionnaire into four options, one lane open, one lane covered, one lane covered with bike–pedestrian lane, and two lanes open. At the second public workshop DelDOT distributed a questionnaire and asked the workshop attendees to rank the options. One hundred questionnaires were returned.

DelDOT then organized a 15-member working group to help them to refine the project concepts. A letter was sent to the various civic groups, organizations, property owners, and legislators asking if they would like to participate in the working group.

The responses from the second set of questionnaires gave nearly equal votes to the one lane covered option and to the one lane covered with bike-pedestrian lane option. Support for a two-lane option was negligible. The working group strongly supported the one lane covered option, possibly because the width of the one lane covered with bike-pedestrian lane option (which included an intermediate member separating the lanes) was 20 ft or essentially wide enough for two lanes at a point in the future. The working group agreed upon the one lane covered option with a 15-ft width, allowing enough width to accommodate bikes and pedestrians (Figure 3).

FIGURE 3 Visualization of proposed bridge.

SIGNIFICANT ISSUES

Natural Environment

The principal environmental impact is a small reduction of wetlands due to the road realignment on the west side of the bridge. The amount of wetland fill was minimized and kept below the level, which would require mitigation, by the use of a concrete retaining wall along much of the realignment. A New Castle County Floodplain Permit is required due to the abutment work. Hydrological calculations to prove that the improvements will not decrease the storage capacity of the floodplain and not increase the floodplain elevation were provided to the county in the floodplain permit application and the county issued a permit.

Human Environment

As noted in the section under Resource Agencies Involvement, Smiths Bridge is located in and its historic substructure contributes to the Smith's Mill–Granogue Historic District, a rural historic landscape. The special character of this area is widely recognized by those who live near and use this road. Respect for preserving the historic and scenic qualities of the area and developing a bridge design that would fit well with these qualities was a goal of all participants in this project.

PROJECT OUTCOME TO DATE AND LESSONS LEARNED

- DelDOT staff's request that the department provide a facilitator for the working group meetings was denied since the department would not usually use such services on a bridge project. Consequently, the project engineers found it very difficult to manage the working group

meetings, because they needed to serve both as facilitators and also to represent their own positions regarding design guidelines and safety issues.

- DelDOT's current procedure for bridge projects does not include a concept development phase. Including a concept development phase for future bridge projects would lend itself to supporting CSD principles.
- Bringing the public in early on a project of this nature worked very well. They had a say in what the problem was as well as having a say it the proposed fix. This format allowed DelDOT to achieve community buy-in.
- An important accomplishment was the willingness of the department to approach this project differently by allowing public input into the "scope" of the project. This community input and support allowed Del DOT to propose a one-lane structure.
- DelDOT has gained respect and good will from the participants in the public involvement process for this project. DelDOT's engineers are proud of their design and pleased they had the opportunity to work on a project that will add lasting value to the community.

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. On the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce M. Alberts is president of the National Academy of Sciences.

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