EFFECTIVE PRACTICES FOR CONSIDERING HISTORIC PRESERVATION IN TRANSPORTATION PLANNING AND EARLY PROJECT DEVELOPMENT

NCHRP Project 25-25, Task 49

Requested by:

**American Association of State Highway
and Transportation Officials (AASHTO)
Standing Committee on the Environment**

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With

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DISCLAIMER

Table of Contents

List of Tables

Executive Summary

Since the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, there have been several reports, studies, and web sites that describe best practices associated with the consideration of environmental factors during planning and early project development. These environmental factors include, for example, air quality, natural resources, and social and economic issues. SAFETEA-LU also requires consultation with historic preservation agencies and organizations during planning and early project development, in addition to comparing transportation plans with cultural resource inventories, if available. Unfortunately, there have been few publications and studies describing best practices for integrating historic preservation factors with planning and early project development.

NCHRP Project 25-25, Task 49 is the first concerted effort to compile in one document descriptions of best practices for considering historic preservation factors during transportation systems planning and early project development. This project also examines how state departments of transportation (DOT) effectively engage historic preservation agencies and organizations, and Federally recognized tribes, during planning and the initial stages of project development.

The study was conducted in three stages: 1) a literature search; 2) a nationwide on-line survey of state DOTs and local planning organizations; and 3) follow-up interviews with those agencies and organizations that noted in their survey responses that they did consider historic preservation factors during either planning or early project development. Transportation planners from 28 states participated in the on-line survey, as did cultural resource staff from 38 states. Eighteen states participated in the follow-up interviews. Based on the literature search, on-line survey, and follow-up interviews, the project team, in consultation with the study's panel members, identified a sample of states and local planning organizations for additional in-depth interviews. The purpose of these more in-depth interviews was to document the specifics of how these agencies developed and maintain their best practices.

The best practices documented in this study, though developed to address specific conditions and problems within each state and agency, can be groups into five categories. One category involves the development of computerized cultural resource inventories, often within a geographic information system (GIS). These databases are used to identify cultural resource locations across the landscape, in addition to cultural resource "red flags." These "red flags" include cultural resources protected under Section 4(f) of the Department of Transportation Act, in addition to other resource categories that might have an impact on project design, costs, and scheduling. These databases also are used for "constraint mapping," identifying areas that should be avoided, if possible, when evaluating alternative locations and design options.

Archaeological predictive modeling is another best practice category used by some DOTs to characterize and analyze project alternatives, particularly those at the preliminary or conceptual stage. These models also can be used for "constraint mapping," identifying areas of high archaeological sensitivity within proposed alternatives.

A third category of best practices is developing formal, interagency procedures for considering historic preservation factors during planning or early project development. These procedures, often codified in manuals and guidelines, are generally part of a larger package involving the full

range of environmental issues that must be addressed during planning and project development. A few states implement these procedures through a GIS-based decision-making process.

Regularly scheduled consultation with State Historic Preservation Offices (SHPO), tribes, and other stakeholders is yet another category of best practice, often structured to complement the technological and procedural practices discussed above. This consultation can take place through face-to-face meetings or through web-based communication networks.

A final, particularly powerful practice is the use of Section 106 programmatic agreements to establish procedures and protocols for considering historic preservation factors during both planning and early project development. Once executed, these agreements can be used to fulfill FHWA's Section 106 responsibilities associated with particular types of transportation undertakings or categories of cultural resources.

The project team suggests various approaches to disseminating and advancing the results of this NCHRP study. One approach is to inform groups such as SHPOs, Tribal Historic Preservation Officers, and local transportation planning organizations about the release of the report. Another approach is to develop brief case studies of the most effective practices identified in this study and then posting these case studies on transportation and environmental web sites. The case studies also can be the focus of presentations at various venues across the country, in addition to a webinar on the consideration of historic preservation factors during planning and early project development. Finally, the case studies can be used as the foundation for regional and national workshops that serve as peer exchanges among practitioners. The goal of all of these efforts is to promote proactive and collaborative approaches to the consideration of historic preservation during the project delivery process, particularly during transportation systems planning.

1.0 Introduction

Consideration of environmental factors during transportation planning and early project development is an important component of the environmental sections of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), passed by Congress in August 2005 *(1)*. Section 6001 of the Act states that metropolitan and long-range transportation plans must be developed in consultation with resource agencies and tribes. This consultation is to include comparisons of transportation plans with state and tribal conservation plans, in addition to inventories of natural and historic resources, if available.

Section 6002 establishes a new environmental review process required for environmental impact statements (EIS), but optional for environmental assessments (EA) and categorical exclusions (CE). The Federal Highway Administration (FHWA) must now invite both Federal and non-Federal agencies that may have an interest in a project to be a participating agency in this review process. Tribes also are invited to participate. These participating agencies and tribes work with FHWA to define the project's purpose and need, identify the range of alternatives that can meet the purpose and need, and define the methodologies for analyzing these alternatives. These requirements in SAFETEA-LU are to ensure adequate consideration of important environmental issues early in the transportation planning process and to improve interagency coordination and consultation.

Since the passage of SAFETEA-LU, there have been several reports, studies, and web sites that describe best practices associated with the consideration of environmental factors during planning and early project development (see Section 2.0). These environmental factors include, for example, air quality, natural resources, and social and economic concerns. SAFETEA-LU also requires consideration of historic preservation issues, and consultation with historic preservation agencies and organizations during planning and early project development. Unfortunately, there have been few reports, studies, or web sites describing best practices for considering historic preservation issues.

NCHRP Project 25-25, Task 49 is the first concerted effort to compile in one document descriptions of best practices for considering historic preservation factors during transportation systems planning and early project development. This project also examines how state DOTs effectively engage historic preservation agencies and organizations, and Federally recognized tribes, during planning and the initial stages of project development. Cambridge Systematics, Inc. (CS) and the SRI Foundation conducted this study for NCHRP.

The first steps in identifying these best practices involved a literature search, followed by a national survey of state DOTs. The literature search examined practices employed by both state DOTs and local transportation planning organizations. After the completion of the literature search, the project team surveyed all of the state DOTs. One set of survey questions was sent to the state DOTs' planning staff, and a separate set was sent to the state DOTs' cultural resource management (CRM) staff. The questions sent to the planners asked if their agency considered historic preservation factors during transportation systems planning. The set sent to the CRM staff made similar inquiries, but in terms of both planning and early project development. The results of this initial survey are presented in Section 3.0. The tallies (e.g.,

percentages) discussed in these results reflect only the survey respondents, and not the total number of states and organizations invited to participate in the survey.

As will be discussed in more detail in Section 3.0, 28 state DOT planners responded to the survey. Thirty-eight state DOT CRM staff also responded. The responses to the survey were somewhat surprising. Ninety-six percent of the planners and 79 percent of the state DOT CRM staff said "yes" to the question "Do you consider historic preservation factors during transportation planning." In addition, 78 percent of the planners and 76 percent of the CRM staff said "yes" to the question "Do you involve the State Historic Preservation Office (SHPO) in statewide and regional planning." The project team did not anticipate such a high number of "yes" answers to these two questions. For the past four years, members of the project team have been instructors for the National Highway Institute's course 142049, "Beyond Compliance: Historic Preservation in Transportation Project Development." This course includes a lesson on considering historic preservation factors during planning. As part of this lesson, the instructors ask the participants, the majority of which are state DOT staff, if they have a formal process for considering historic resources during planning. After delivering this course to 20 state DOTs, the team members found that only one of these 20 state DOTs has a formal process for considering historic resources during planning, which does not match the survey results.

The project team, therefore, decided to conduct a follow-up with the states that responded "yes" to these two questions. A separate set of questions was developed for this purpose, and these questions were posed to these states during a telephone interview. It was important to conduct these follow-up interviews in order to understand the meaning of the initial survey responses, and to more fully identify the range of best practices used by the DOTs and their local planning partners. The results of these interviews, and the literature search, are presented in Section 4.0.

Based on the literature search and follow-up interviews, the project team, in consultation with the study's panel members, identified a sample of states and local planning organizations for additional in-depth interviews. The purpose of these more in-depth interviews was to document how these agencies developed and maintain their best practices, particularly in terms of funding and staffing. These agencies also were asked to describe any challenges and obstacles they encountered while developing and maintaining these practices. Finally, these agencies were asked to provide information on lessons learned and suggestions to other agencies considering developing a program similar to their program. The results of these more in-depth interviews are presented in Section 5.0.

Section 6.0 highlights the key themes and elements common among the best practices discussed in this report. These themes and elements serve as the foundation for a step-by-step guide to developing programs that effectively integrate historic preservation factors into transportation planning and early project development. Section 6.0 concludes by answering the question "What next?"

2.0 Background

Since the passage of SAFETEA-LU, FHWA and the American Association of State Highway and Transportation Officials (AASHTO) have been promoting the consideration of environmental factors during transportation planning and early project development. In 2008, for example, AASHTO published practitioners' handbooks on *Using the SAFETEA-LU Environmental Review Process (2),* and *Using the Transportation Planning Process to Support the NEPA Process (3).* FHWA also has developed a "Planning and Environmental Linkage" (PEL) program, highlighted on FHWA's environmental web site *(4).* AASHTO's Center for Environmental Excellence web site has a stand-alone section on "Environmental Considerations in Planning *(5).*"

Publications on how to consider environmental factors during both transportation planning and early project development include NCHRP Report 541, *Consideration of Environmental Factors in Transportation System Planning (6)*; and NCHRP Project 08-36, Task 48, *Improved Linkage Between Transportation Systems Planning and NEPA (7).* A detailed discussion of the current state of the practice on considering environmental issues during planning can be found in the NCHRP Project 25-25, Task 32 report, *Linking Environmental Resource and Transportation Planning (8).*

Most of these sources, however, do not provide much guidance on how to engage state and local historic preservation agencies and organizations, and Federally recognized tribes, in planning or early project development. They also do not provide much information on best practices for considering historic resource information during the planning process. One exception is FHWA's "State Environmental Streamlining and Stewardship Practices Database *(9).*" This database showcases several state DOT best practices, including those from Florida, Minnesota, New Mexico, North Dakota, and Ohio. The project team consulted this web site for information on several best practice discussed in Section 4.0 of this report. NCHRP Report 541 *(6),* and AASHTO's Center for Environmental Excellence web site *(5)* are two more sources for practices used by state DOTs and local planning organizations. Of particular relevance to the current study are discussions in these sources on Indiana DOT's historic bridge program *(10)* and programmatic agreement *(11),* Minnesota's archaeological predictive model *(12)*; and Pima County, Arizona's Sonoran Desert Conservation Plan *(13).* Finally, the 2008 *Transportation Research Record: Environment and Energy* provided an excellent example of a best practice used by a local planning organization. The latter was a case study on the efforts of the Texas Capital Area Metropolitan Planning Organization (CAMPO) *(14).* A discussion of CAMPO's program is presented in Section 4.0.

In terms of available guidance, the Advisory Council on Historic Preservation (ACHP) has developed a draft five-point plan for integrating historic preservation and transportation planning (personal communication, Carol Legard, ACHP, 2008). This draft plan is in response to the passage of SAFETEA-LU, specifically the requirements of Section 6001 of the Act. The ACHP proposes five broad principles for considering historic resources in planning.

1. **Find New Ways to Work with Preservation Partners** – State DOTs and FHWA should rethink how they interact with SHPOs, Tribal Historic Preservation Offices (THPO), and tribes. "Instead of expecting them to make your planning needs their top priority (and

being inevitably disappointed)" reach out to the SHPO and tribes "and offer to work with them to identify and safeguard endangered high-value properties."

2. **Develop a New Vocabulary** – The ACHP recommends not using Section 106 terminology (e.g., "National Register eligibility," "adverse effect," "area of potential effect") during planning given the legal meaning of these terms in the Section 106 context. Instead, transportation agencies should use more general concepts, such as "areas of cultural concern" which provides a broad definition to an area of historic sensitivity.

3. **Consider Historic Properties as Part of a Broader Environmental Ecology** – The goal here is to serve both natural and cultural resource values, especially where these values overlap on the landscape. The ACHP recommends collaborating with natural resource agencies, during planning, to develop programmatic approaches to mitigation that include historic resources, rather than using a separate and project-by-project approach during NEPA (National Environmental Policy Act) compliance.

4. **Identify How Transportation Improvements Might Enhance Historic Preservation Goals** – This suggestion involves the application of context sensitive concepts to planning, where transportation improvements serve, in part, to enhance the historic character of a place or landscape. These enhancements would become part of a project's purpose and need.

5. **Share Information** – The goal is to use available technology (e.g., GISs) to consider historic preservation issues using a systems approach, and to facilitate the sharing of historic resource information among all of the parties involved in the planning process (personal communication, Carol Legard, ACHP, 2008).

Many of the best practices discussed in Sections 4.0 and 5.0 mirror the principles proposed by the ACHP. In Section 6.0, the project team will return to some of these principles in the context of suggestions for future actions that will advance the consideration of historic preservation factors during transportation planning.

3.0 Survey Results

3.1 Introduction

As noted in Section 1.0, after the completion of the literature search, the project team surveyed all of the state DOTs. One set of survey questions was sent to the state DOTs' planning staff, and a separate set was sent to the state DOTs' cultural resource management staff. *Survey Monkey*, an on-line survey tool, was used to send the survey questionnaire to the state DOTs. A copy of the questionnaire is in Appendix A. The survey was conducted from August 12, 2008 to September 16, 2008. The results of this survey are presented below.

3.2 Responses from DOT Planners

Twenty-eight state/territory DOT planners responded to the survey, which represents a 54 percent response rate (see Table 3.1).

Table 3.1 Survey of State DOT Planners

Summary Counts		
Total Contacted		52
Total Responses		28
	Response Rate	**54%**

State/Territory DOT Planners Responding to Survey:

Alabama	Maine	New Jersey	South Dakota
Delaware	Missouri	New Mexico	Texas
Florida	Mississippi	New York	Virginia
Georgia	North Carolina	Ohio	Vermont
Hawaii	North Dakota	Oklahoma	Washington
Massachusetts	Nebraska	Oregon	Wisconsin
Maryland	New Hampshire	Puerto Rico	Wyoming

Survey Question No. 1 asked if planners consider historic preservation factors in their planning efforts. The responses to this question are presented in Table 3.2 below. More than 96 percent of the respondents indicated that historic preservation factors are included as part of the transportation systems planning process.

Table 3.2   Response of Planners to Question 1

Do you and/or the metropolitan planning organizations or other local planning organizations that you work with include historic preservation factors and concerns in statewide and regional transportation planning efforts and programs?

Yes	96.4%	27
No	3.6%	1
Answered Question:		28
Skipped Question:		0

The second survey question, presented in Table 3.3 below, asked if planners consult with or otherwise involve Section 106 consulting parties during the planning process. The majority of respondents (78.6 percent) indicated that the SHPO is involved, followed by other consulting parties such as local governments (64.3 percent) and tribes (60.7 percent). Only one respondent indicated that the parties are not involved in any capacity in the planning process

Table 3.3   Response of Planners to Question 2

Do you and/or the metropolitan planning organizations or other local planning organizations that you work with involve any of the following individuals or groups in statewide and regional transportation planning efforts and programs? Select one or more from the list below.

State Historic Preservation Officers	78.6%	22
Tribal Historic Preservation Officers	32.1%	9
Federally Recognized Tribes	60.7%	17
Other Section 106 Consulting Parties (Local Governments, Applicants for Federal Assistance, Local Historic Preservation Organizations, etc.)	64.3%	18
No, the above individuals or groups are not involved in statewide and regional transportation planning efforts and programs	3.6%	1
Answered Question:		28
Skipped Question:		0

3.3 Responses from DOT CRM Staff

DOT CRM staff from 38 states participated in the survey, resulting in a 76 percent response rate (see Table 3.4 below). All major regions of the country, with the exception of the U.S. territories, are represented in the list of survey respondents.

Effective Practices for Considering Historic Preservation
in Transportation Planning and Early Project Development
NCHRP 25-25, Task 49

Table 3.4   Survey of State DOT CRM Staff

Summary Counts		
Total Contacted		50
Total Responses		38
	Response Rate	76%

States DOT CRM Staff Responding to Survey:

Alabama	Indiana	Mississippi	Ohio
Alaska	Iowa	Missouri	Oregon
Arkansas	Kansas	Montana	Pennsylvania
California	Kentucky	Nebraska	Rhode Island
Colorado	Louisiana	Nevada	South Dakota
Florida	Maryland	New Hampshire	Tennessee
Georgia	Massachusetts	New Jersey	Texas
Illinois	Minnesota	New York	

As with the questionnaire sent to the state DOT planners, the first question asked if DOT CRM staff include historic preservation factors in statewide transportation and regional planning. The responses, presented below in Table 3.5, indicate that a high percentage of states do consider historic preservation factors in their planning efforts.

Table 3.5   Response of CRM Staff to Question 1

Do you and/or the metropolitan planning organizations or other local planning organizations that you work with include historic preservation factors and concerns in statewide and regional transportation planning efforts and programs?

Yes	78.9%	30
No	18.4%	7
	Answered Question:	37
	Skipped Question:	1

Table 3.6 below presents the responses to Question No. 2. The state DOT CRM staff do consult with the SHPOs during planning, along with other Section 106 parties and tribes. These responses are similar to those from the state DOT planners.

Table 3.6   Response of CRM Staff to Question 2

Do you and/or the metropolitan planning organizations or other local planning organizations that you work with involve any of the following individuals or groups in statewide and regional transportation planning efforts and programs? Select one or more from the list below.

State Historic Preservation Officers	76.3%	29
Tribal Historic Preservation Officers	31.5%	12
Federally Recognized Tribes	47.3%	18
Other Section 106 Consulting Parties (Local Governments, Applicants for Federal Assistance, Local Historic Preservation Organizations, etc.)	55.2%	21
No, the above individuals or groups are not involved in statewide and regional transportation planning efforts and programs	18.4%	7
Answered Question:		*37*
Skipped Question:		*1*

The state DOT CRM staff were asked two additional questions that dealt with the project development process (i.e., once the NEPA review process is initiated). Question No. 3 sought to identify how early Section 106 consulting parties participate in the project development process. As shown in Table 3.7, half of the respondents said that they involve the Section 106 parties during early corridor or feasibility studies. Another 15 percent engage in consultation at the stage in which the project Purpose and Need is defined. A similar number indicate that consultation occurs at the preliminary/conceptual alternative stage. Approximately 1 in 5 said that the Section 106 consulting parties were not consulted until alternatives had been identified for detailed study.

Table 3.7   Response of CRM Staff to Question 3

At what point do you FIRST involve SHPOs, THPOs, tribes, and other Section 106 consulting parties? Select ONLY ONE answer from the list below.

During preliminary corridor or feasibility studies	50.0%	19
When defining a project's purpose and need	15.7%	6
Identifying conceptual/preliminary alternatives	15.7%	6
Conducting analysis of the alternative(s) retained for detailed study (i.e., defining the project's affected environment)	18.4%	7
Answered Question:		*38*
Skipped Question:		*0*

The last question (Table 3.8, next page) asked when the CRM staff first consider cultural resources during project development. The responses to this last question indicate that many states considered cultural resources during preliminary corridor and feasibility studies.

Table 3.8   Response of CRM Staff to Question 4

At what point do you FIRST consider cultural resources (e.g., archaeological sites, historic buildings and structures, traditional cultural properties, etc.)? Select ONLY ONE answer from the list below.

During preliminary corridor or feasibility studies	52.6%	20
When defining a project's purpose and need	10.5%	4
Identifying conceptual/preliminary alternatives	18.4%	7
Conducting analysis of the alternative(s) retained for detailed study (i.e., defining the project's affected environment)	18.4%	7
Answered Question:		**38**
Skipped Question:		**0**

4.0 Best Practices – Who's Doing What?

4.1 Introduction

The project team contacted (via e-mail) all of the state DOTs that responded "yes" to the first two questions on the survey discussed in Section 3.0, and asked the states if they would participate in a follow-up telephone interview. The e-mails to the states included the follow-up survey questions (see Appendix B). The follow-up interviews were conducted from September 29, 2008 to October 20, 2008.

As noted in Section 1.0, the project team was surprised by the high number of "yes" answers to the two survey questions (Questions 1 and 2) dealing with consideration of historic preservation factors during planning. The results of the follow-up interviews suggested a reason for the unanticipated high number of "yes" answers. The project team found that several of the DOT CRM staff were confused about Questions 1 and 2. They had interpreted the term "planning" used in the first two questions as historic preservation reviews conducted under NEPA and Section 106. As a result, these individuals checked "yes" on the survey questionnaire even though they in fact do not consider historic preservation issues during transportation systems planning, but only took these factors into account during NEPA review and as part of Section 106 compliance.

A total of 18 states participated in the follow-up interviews. The project team has selected a representative sample of the range of best practices used by these 18 states. These best practices, which also are based in part on the literature search, are presented below. The first section below presents descriptions of best practices for considering historic preservation factors during transportation systems planning (i.e., pre-NEPA and Section 106). The second section focuses on best practices used during early project development.[1]

4.2 Best Practices – Consideration of Historic Preservation Factors during Planning

4.2.1 California DOT (Caltrans)

Individual Caltrans district offices obtained Transportation Enhancement grants (TE grants) to set up the cultural resource databases. These *Access* and GIS "T-Databases" consist of inventories of archaeological resources within the rights-of-way (ROW) of state rural highways. Excluded from these inventories were areas of previous cultural resource surveys and projects within, at the time of the grants, the State Transportation Improvement Plan (STIP) and the

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[1] California and Florida DOTs were not interviewed during the follow-up survey. These two states, however, participated in the more in-depth interviews discussed in Section 5.0. Descriptions of the best practices from these two states are included in Section 4.0.

State Highway Operation Protection Program (SHOPP). Though most of the databases are inventories of archaeological sites, some districts have data layers on the historic built environment, ethnographic information, and geomorphological data. Reports, archaeological site forms, and other management documentation also are stored in the databases in PDF form. In addition, some databases include digitized historic maps.

The first step in developing a district's database involved a records search at the local Information Center (independent offices that maintain the State's current cultural resource inventory data). Data from the centers were entered into the district's system. Next, the district conducted (usually through the use of consultants) a physical survey of the rural ROW covered by their TE grant, recording newly identified historic properties and updating existing records for known properties. All properties locations were recorded using GPS. These GPS data were then added to the district's database (personal communication, Anmarie Medin and Margaret Buss, California Department of Transportation, February 23, 2009).

Key Components

- The district databases include all available information and documentation on archaeological sites within Caltrans rural ROWs. Some databases include information on the historic built environment.

- Property locations are confirmed through field investigations and pin-pointed using GPS.

- Program includes identifying previously unrecorded properties within a district's rural ROW.

Benefits

- Provides an inventory of properties within the State's rural ROWs.

- Provides easy access to cultural resource information.

- Provides instant cultural resource information for emergency projects.

- Assists in advance planning for future projects.

- Serves as a tool for effective management and stewardship of cultural resources in Caltrans' ROW.

4.2.2 Colorado DOT

Colorado DOT (CDOT) currently is developing and testing a new "Planning and Environmental Linkages (PEL) Decision Tool." The internal test of this web-based program involves corridor studies. The purpose of the tool is to identify red flags, including problematic historic properties, during planning. This tool can be used by anyone within the DOT and by local planning organizations that are provided access to the PEL tool through CDOT. The tool is similar to Florida DOT's Efficient Transportation Decision-Making (ETDM) program in that it consists of a series of information and decision-making screens, including a screen on

"Archaeological/Historical/Paleontological" resources. The final output using this tool is an environmental planning report.

CDOT also is developing and testing an external program, "On-line Transportation Information Systems (OTIS)." This tool will include overlay maps of corridor study areas, using GIS. With this tool, resource agencies, such as the SHPO, will be able to comment on the environmental information on a specific corridor contained within the database, in addition to identifying resources that would be red flags (personal communication, Dan Jepson, Colorado Department of Transportation, October 14, 2008).

Key Components

- As with ETDM (see below), CDOT's PEL program will enable transportation planners to adjust project concepts to avoid or minimize impacts to "red flag" resources, consider mitigation alternatives during planning, and improve project cost estimates.

- Resource agencies will have access to the program's database, and will be able to actively participate in and comment on the planning environmental review process.

Benefits

- Streamlines both project planning and delivery, and establishes a proactive approach to addressing environmental issues

- The SHPO's involvement in the development of the program has contributed to building a better working relationship between the agencies.

- Demonstrates CDOT's commitment to identifying and considering historic preservation issues, and other environmental concerns, early in the planning process.

4.2.3 Florida DOT

Florida's Efficient Transportation Decision-Making (ETDM) process assesses the potential environmental impacts of proposed transportation projects. This assessment, which is web-based, includes the consideration of cultural resources. Florida DOT (FDOT) and resource agencies participating in the program, including the Florida SHPO, evaluate the potential impacts of a proposed project using an on-line "Environmental Screening Tool." All environmental evaluations and communications related to these evaluations are performed, shared, and stored within the database. The creation of ETDM required restructuring the State's entire transportation planning process, in addition to establishing new dedicated funding for the program and the creation of new positions within the DOT to maintain ETDM. The program also required a commitment to develop and maintain a web-based GIS planning format (*15*; personal communication, Buddy Cunill and Roy Jackson, Florida DOT, April 6, 2009).

Key Components

- Cultural resources are considered at each step in the ETDM process: planning, programming, and project development. Information on cultural resources within the ETDM database is kept up to date by the SHPO. As noted in the October 23, 2006 ETDM Progress Report, "[a]fter projects are loaded in the database, standard GIS analyses are

automatically performed to identify potential environmental effects. These analyses were prescribed by the resource agencies, and include concerns such as identifying National Register sites within a mile of proposed projects..."

- Resource and transportation agencies, including the SHPO and tribes, are involved in every step in the planning environmental review process. This involvement occurs at the district level, within district advisory teams.

- During planning, agencies use the database to assess the effects of potential projects on recorded cultural resources. This very early consultation enables transportation planners to adjust project concepts to avoid or minimize impacts to these resources, consider mitigation alternatives (if appropriate), and improve project cost estimates.

- At the programming stage, decisions are made about what specific studies will be needed to meet NEPA and Section 106 requirements during project development.

- To ensure that the ETDM process is conducted consistently among the agencies and governments participating in the program, there are several detailed handbooks describing the process step by step, including a Cultural Resource Management Handbook.

Benefits

- By front loading the historic preservation analysis (and other environmental analyses) into planning, project development moves more quickly, at less cost, and with fewer conflicts. FDOT has saved millions of dollars by not advancing projects that would have resulted in major conflicts with resource agencies and the public over environmental issues.

4.2.4 Illinois DOT

Illinois DOT uses a cultural resource GIS database to identify during planning, potential historic properties that would be protected under Section 4(f). In terms of archaeological resources, these include Native American burial mounds and historic period cemeteries. For large corridor studies, the DOT also may conduct historic architectural field investigations within the corridor in order to more fully identify potential Section 4(f) properties (personal communication, John Walthall, Illinois DOT, October 14, 2008).

Key Components

- Illinois DOT's contractors conduct historic architectural inventories during planning, photographing historic buildings within proposed corridors.

- Information from these field investigations are combined with data from the DOT's GIS.

- The DOT consults with the SHPO on the recorded and photographed properties, and discusses the potential National Register eligibility of the properties.

Benefits

- Identifies potential Section 4(f) red flags so future projects within the corridors can be developed to avoid these properties.

4.2.5 Indiana DOT Historic Bridge Program

Indiana DOT (INDOT) has developed a proactive program for managing all of the State's National Register eligible historic bridges. The structure of this program was stipulated in a Section 106 programmatic agreement executed in the fall of 2006.

After the completion of the statewide historic bridge inventory, INDOT, in consultation with their Section 106 consulting parties, stakeholders, and the public, developed a structured methodology for identifying National Register-eligible and listed historic bridges most suitable for preservation and that are excellent examples of a given historic bridge type. Bridges that met these criteria were identified as "select bridges." All other historic bridges were placed in a "nonselect" category. Following the stipulations of the programmatic agreement, the DOT cannot use Federal-aid monies to demolish a select bridge. The procedures for managing these bridges are detailed in the programmatic agreement. The agreement also stipulates the process for managing nonselect bridges. As of this NCHRP interim report, Indiana DOT has completed their in-house identification of select and nonselect bridges, but has yet to consult with their stakeholders and the public on the results of this identification effort. The locations of all of these bridges will be geo-referenced and included in the State's cultural resource GIS (personal communication, Christopher Koeppel, Indiana DOT, October 7, 2008).

Key Components

- Developing a programmatic agreement establishing the process for managing the State's historic bridges.

- Completing and updating the State's historic bridge inventory.

- Defining select versus nonselect bridges and adding information on these bridges to the State's GIS.

Benefits

- Once fully operational, this historic bridge management program will provide state and local transportation planners with the location and historic preservation requirements/process for any historic bridge that may fall within a planning area.

4.2.6 Kansas DOT

Kansas DOT employs a "Discovery Phase" during planning. During this phase, the DOT submits maps and/or aerial photos with a location of the study area to the State Historical Society (the location of the SHPO and the state archaeologist). The DOT also contacts tribes. These groups and organizations are asked to identify archaeological and historic resources within those areas where a project(s) may be planned. The State Historical Society archaeologists, working under contract with the DOT, identify high and medium archaeological sensitivity locations in the area of the planned project(s), using the State's GIS. Kansas DOT has on-line access to the state's cultural resource database and GIS, which include information on recorded and surveyed archaeological sites, historic trails, buildings, and bridges; location and information on surveyed areas; and General Land Office survey details. (personal communication, Marsha King, Kansas DOT, October 9, 2008).

Key Components

- Kansas DOT consults with all potential consulting parties during planning.

- The DOT compiles information obtained from the consulting parties and develops a preliminary cultural resource report, which goes to the planners/engineers directing the planning effort.

Benefits

- Brings consulting parties into the planning process.

- Process helps design projects that avoid historic properties.

4.2.7 New Mexico DOT

The New Mexico DOT (NMDOT) places a great deal of emphasis on early environmental, cultural, and tribal consultation during the development of the NMDOT Long-Range Transportation Plan (LRTP). Historic preservation factors considered during the development of the plan include tribal cultural resource concerns, historic buildings, known archaeological sites, historic irrigation systems, historic trails and roads, and historic bridges. NMDOT also consults with the SHPO and other state resource agencies and local governments during planning (personal communication, Janet Spivey, February 26, 2009).

Key Components

- Historic preservation issues are identified early within MPO and/or regional planning organizations (RPO) long-range transportation plans. Both the State and MPOs use the SHPO's New Mexico Cultural Resources Information System (NMCRIS) database during these planning efforts.

- New Mexico's tribal governments are members of MPOs adjacent to tribal lands, and are also members of RPOs within their regions. These member tribes participate in the planning process associated with NMDOT projects. This process includes the early consideration of historic preservation issues of importance to the tribes.

- NMDOT has a Tribal Liaison in the Planning Division who consults with tribes as part of the long-range transportation planning process, and attends all the MPO/RPO meetings that have tribal government members.

Benefits

- NMDOT's planning program facilitates the early identification of documented cultural resources and areas of cultural sensitivity, which streamlines the subsequent project development process.

- The NMDOT Planning Division provides technical assistance to local governments during project planning by conducting a preliminary environmental evaluation, which includes historic preservation factors. This early evaluation is used to assess the level of environmental review (i.e., CE, EA, or EIS) that will be needed for local projects.

4.2.8 North Dakota DOT

North Dakota DOT's (NDDOT) planning process takes into account the locations of known traditional cultural properties and archaeologically sensitive areas. In addition, during the development of the State Transportation Improvement Plan (STIP) and other planning documents, NDDOT meets with the State's resident tribes as well as resource agencies. NDDOT relies on these face-to-face consultations to identify and address cultural resource issues and concerns during planning, rather than relying only on paper maps and records *(16)*.

Key Components

- Consideration of documented traditional cultural properties during planning.

- Face-to-face meetings with tribes during the development of the STIP and other transportation planning documents.

Benefits

- Avoids areas of conflict which can delay subsequent projects.

- Results in the identification of more realistic project schedules and budgets.

4.2.9 Ohio DOT

The Ohio Department of Transportation (ODOT), in cooperation with the Ohio SHPO, developed a statewide cultural resources GIS database using Mapping and Preservation Information Technology (MAPIT). Information on archaeological sites, historic buildings and structures, as well as historic bridges is maintained in the database (FHWA Environmental Streamlining Toolkit, Streamlining, and Stewardship web site). The GIS is used during ODOT's Project Development Process (PDP), which categorizes transportation projects into three levels – major, minor, or minimal – depending on the anticipated degree of environmental impact, engineering, and right-of-way needs.

The operative principle behind the PDP is that all projects begin in planning and seamlessly move through environmental analysis, design, and construction. For Major and complex Minor projects, ODOT conducts various planning and technical studies, including the cultural resource "red-flag" summary, prior to preparation of a final Purpose and Need. ODOT uses the statewide GIS to identify places of concern (red flags), such as historic districts, historic buildings, archaeological sites, or locally designated landmarks. Red flags do not necessarily indicate locations that must be avoided, but rather, are locations that will entail additional study, coordination, creative design approaches, or increased ROW or construction costs during later project development. They also include locales that could affect overall project scheduling *(17)*.

Key Components

- ODOT has developed a statewide historic and archaeological resources GIS.

- ODOT uses the GIS database in its Project Development Process.

- All Major and complex Minor transportation projects are evaluated for "red flags" during planning.

- The PDP encourages communication among disciplines, in addition to a seamless process for decision-making.

Benefits

- The statewide GIS enables ODOT to anticipate potential impacts of transportation projects on a wide variety of cultural resources.

- The red flag analysis can identify "fatal flaws," but also areas where additional information is needed to identify, evaluate, or manage cultural resources. These analyses also identify opportunities for resource avoidance or impact minimization through creative management or project design during subsequent project development.

4.2.10 Oregon DOT

In 2001, Oregon DOT signed a charter with state and Federal transportation and environmental agencies, including the SHPO, establishing the "Collaborative Environmental and Transportation Agreement for Streamlining" (CETAS). Each participating agency contributes data to a natural and cultural resources GIS database that is available for use by all CETAS members. CETAS applies to projects that are or may be included in STIP.

Under CETAS, major projects are reviewed at the STIP level through a "Refinement Planning Stage." This Refinement Planning Stage involves more in-depth planning and environmental data needs identification. Broad level information on potential environmental impacts is carried forward into project development once funding is committed for a specific project. CETAS explicitly links transportation planning and project development through a process where preliminary environmental analyses are conducted in anticipation of subsequent NEPA requirements *(18)*.

Key Components

- CETAS establishes a framework for decision-making among multiple state and Federal transportation and environmental agencies.

- CETAS members contribute data on cultural and natural resources into a GIS database accessible to all participants.

- CETAS explicitly links transportation planning at the STIP level with project development through a transitional plan review process.

Benefits

- Identifies potential environmental impacts and resource management problems at the level of the STIP.

- Results of preliminary environmental analysis are carried forward into project development.

- Shifts consideration of historic preservation and other environmental factors into planning.

4.2.11 Pima County, Arizona

Between 1999 and 2002, Pima County, Arizona developed a regional growth management plan called the Sonoran Desert Conservation Plan (SDCP). One of six elements of the plan focused on managing archaeological and historical resources. As part of this planning effort, Pima County identified and located all known archaeological sites, all areas previously surveyed for archaeological sites, all National Register properties, including historic districts, and all historic buildings, structures and landscapes. These data were collected from throughout the county and all municipalities within the county. Data were converted into digital data layers and loaded into a GIS database. In addition, Pima County identified the most important archaeo-logical and historical resources and plotted these in relation to high-value natural resources such as riverine areas, open space, ranch lands, and areas of high biodiversity. These important sites and high-value natural resources are considered project "red flags." The resulting data-base, which is frequently updated, provides Pima County with a tool that is applied to multiple county planning activities, including transportation planning *(13)*.

Key Components

- Pima County developed a comprehensive countywide GIS database on archaeological and historical resources.

- The data include the location of all resources determined to be of exceptional importance to the county.

- The GIS data layers can be compared at the same scale to multiple data sets, including streets and highway ROWs, natural and topographic features, parcel boundaries, etc.

Benefits

- Using the database created for the SDCP, Pima County can forecast the nature and location of potential impacts to archaeological and historic resources as part of any county planning function, including roadway projects and maintenance.

- Allows the county to define the location and subsequent design of transportation projects that avoid or have minimal impact to historic properties.

4.2.12 Texas, Capital Area Metropolitan Planning Organization

The Capital Area Metropolitan Planning Organization (CAMPO) of central Texas improved its GIS database to guide an update of its long-range regional plan. The database improvement and plan update were in response to Sections 6001 and 6002 of SAFETEA-LU. CAMPO is composed of Hays, Travis and Williamson counties, centered on the City of Austin. To meet the needs of its growing population, CAMPO, in conjunction with Federal, state and local agencies, sponsored three workshops or "summits" to update the regional plan. The first summit included a presentation by the Texas Department of Transportation (TxDOT) on their GIS database – Geographic Information System Screening Tool (GISST). The purpose of GISST is to facilitate the transportation planning process. GISST defines and ranks areas of environ-

mental concern, producing a measure of environmental significance. TXDOT also uses GISST as a screening tool to help evaluate environmental impacts for Environmental Impact Statements (EIS). In subsequent summits, participants added additional data to GISST, including information on cultural resources, provided by the Texas SHPO, and CAMPO incorporated GISST into its own GIS database. CAMPO generated a "Sum of All Criteria" map showing the combined environmental data for the region *(14)*.

Key Components

- CAMPO brought together multiple Federal, state and local agencies that had a concern or role in regional planning.

- CAMPO used TxDOT's GISST screening tool to create environmental sensitivity overlays/ maps for the region.

- CAMPO maps are used as guides for meeting regional transportation planning needs.

Benefits

- CAMPO planning efforts provided a holistic, long-range regional planning guide for future transportation projects.

- This planning effort identified regional historic preservation constraints and opportunities that can be used to reduce future project costs and schedules, in addition to preserving places of historic and cultural value.

4.2.13 Virginia DOT

Virginia DOT (VDOT) recently implemented a process for integrating all environmental factors (including historic preservation) into planning. This process is documented in *Integrating Elements of NEPA into the Transportation Planning Process: Standard Operating Procedures* (October 1, 2007). This SOP establishes different levels of environmental (and historic preservation) information requirements for different planning products (e.g., Small Urban Area Transportation Studies, Rural Long-Range Plans for Transportation, Corridor Studies, State Highway Plan).

Cultural resource data are found within the State's Comprehensive Environmental Data and Reporting System (CEDAR), a GIS database. CEDAR organizes all environmental data (including specific project documents, forms, and images) into one system, accessible to VDOT staff (personal communication, Tony Opperman, October 9, 2008).

Key Components

- VDOT planners have access to the cultural resource data layers in CEDAR.

- Given this process is relatively new, it is unclear as to what extent planners are using the cultural resource component of CEDAR in planning decision-making.

Benefits

- It is too early to evaluate the benefits of VDOT's new planning process. The benefits of CEDAR are, however, clearly evident in terms of early project development. See discussion below.

4.3 Best Practices – Consideration of Historic Preservation Factors during Early Project Development

4.3.1 Arizona DOT

The Arizona DOT (ADOT) has developed a web-based GIS database on recorded archaeological sites, historic buildings and structures, and other cultural resources, within ADOT ROW, statewide. The database, referred to as the HPT Portal, portrays the boundaries of cultural resources relative to highway ROW. The portal is updated as new cultural resource inventories are conducted and additional resources are identified. All documentation associated with a resource, including inventory reports, site forms, and project correspondence, is scanned and included within the HPT Portal. The portal is used by DOT staff for project development, and also is accessible to approved contractors *(19)*.

Key Components

- A portal user can highlight a historic property within the GIS and access all documentation on the property.

- The portal is updated regularly as new information is obtained from ongoing projects.

- The portal is accessible for planning purposes by approved contractors.

Benefits

- ADOT staff can quickly assess the current state of knowledge about cultural resources in any highway ROW in the State.

- Information on consultations with the SHPO and other agencies regarding National Register eligibility and project effects is accessible through the portal.

- The HPT portal allows ADOT to determine if proposed projects or activities within existing ROWs will affect cultural resources.

4.3.2 Colorado DOT – I-70 Mountain Corridor-Tiered EIS

Colorado DOT (CDOT) is preparing a tiered EIS for proposed improvements to I-70 from Glenwood Springs to C-470, west of Denver. A programmatic agreement (PA) was executed during preparation of the Tier 1 EIS, stipulating the process for complying with Section 106 requirements for all Tier 2 undertakings (personal communication, Lynne Sebastian, SRI Foundation, November 21, 2008).

Key Components

- The PA anticipates direct, indirect, and cumulative effects to historic properties, including the Georgetown-Silver Plume National Historic Landmark, from Tier 2 projects, and establishes a process for addressing these effects in consultation with the consulting parties and project stakeholders.

- Pursuant to the PA, CDOT will prepare a historic context of the I-70 Mountain corridor as well as historic preservation-related design guidelines to be used in guiding Tier 2 undertakings.

- CDOT will assist local governments to preserve the historic character of their communities within the project corridor.

Benefits

- The PA establishes a decision-making process designed to facilitate Section 106 consultation for all subsequent Tier 2 undertakings.

- The PA serves as a tool guiding future decisions on National Register eligibility, effects, and resolution of adverse effects.

4.3.3 Georgia DOT

Georgia DOT (GDOT) currently is developing a GIS database on environmental and cultural resources – Natural, Archaeological, and Historic Resources GIS (NAHRGIS). The Georgia Historic Preservation Division (SHPO), the Georgia Department of Community Affairs, and the University of Georgia are partners in the creation of this GIS. The GIS will be used to identify and avoid potential cultural resource red flags, including Section 4(f) properties, early in project development. GDOT, in some cases, also conducts historic architectural surveys within preliminary corridor studies, in order to identify previously undocumented Section 4(f) properties (personal communication, Rowe Bowan, Georgia Department of Transportation, September 30, 2008).

Key Components

- NAHRGIS is an interactive web-based inventory that contains information about Georgia's archaeological sites, historic buildings, structures, landscapes, and districts.

- Data are drawn from the Georgia Archaeological Site File, and the SHPO's Historic Resources Survey and National Register inventory files.

- In 2010, NAHRGIS will include GDOT historic property survey data.

Benefits

- It is anticipated that the GIS will provide GDOT project designers and engineers with information on cultural resource red flags well in advance, resulting in time and cost savings, and a reduction in project development "red tape."

- The GIS will provide cultural resource managers with the most current data available. These data can be used to prepare efficient and effective scopes of work for conducting historic property inventories. The costs and time for conducting these inventories can be included in early definition of overall project costs and schedules.

4.3.4 Indiana DOT – I-69 Tiered EIS

Indiana DOT (INDOT) developed a Tier 1 EIS for the I-69 corridor from Evansville to Indianapolis. As part of the Tier 1 process, INDOT conducted various Section 106 activities that laid the ground work for all subsequent Section 106 compliance associated with future Tier 2 projects (personal communication, Christopher Koeppel, Indiana DOT, October 7, 2008).

Key Components

- INDOT identified historic properties within five, two-mile-wide corridors or "study bands," and conducted a preliminary assessment of effects on these properties. These corridors served as the project's initial area of potential effect.

- The DOT reviewed all existing records on historic structures and archaeological sites within the APE, developed a GIS predictive model for prehistoric archaeological sites, and prepared a Section 106 compliance plan defining how Section 106 requirements are to be met in the context of Tier 1 (the plan was included in the Tier 1 Draft EIS).

- INDOT consulted with the SHPO and the Advisory Council on Historic Preservation during these efforts, and then entered into an MOA setting up a process for Section 106 consultation during Tier 2 projects.

Benefits

- The results of the cultural resources analysis of the five corridors were used to evaluate all Tier 1 project alternatives. A preferred alternative was selected, which was subsequently modified to avoid impacting several historic properties identified during earlier corridor studies.

- Results of Tier 1 efforts established a process for avoiding, minimizing, and mitigating adverse effects to historic properties during Tier 2 projects.

4.3.5 Minnesota DOT

The Minnesota Department of Transportation (MnDOT) developed an archaeological site predictive model called "Mn/Model," beginning in 1995. The model, accessible to multiple state and Federal agencies, utilizes GIS technology and statistical analyses to indicate the likelihood of finding pre-1837 archaeological properties anywhere within the State. Mn/Model is used by DOT staff during early project development to assess potential impacts to archaeological resources, particularly in terms of proposed project corridors. Most recently, MnDOT has developed a model to map probable locations of historic and prehistoric water bodies based on soil properties (12).

Key Components

- Mn/Model stratifies the landscape into different levels of archaeological sensitivity.

- Continued refinement of the model since its development has resulted in increased reliability and confidence in the model's predictive power.

- The model is used by DOT for early project development.

- The model includes information on the potential for deeply buried archaeological sites within landforms in important depositional environments across the State.

Benefits

- Use of the model enables MnDOT to anticipate the effects of transportation projects to archaeological resources, and the potential costs of mitigation if avoidance of significant archaeological sites is not possible. These estimates can then be built into project funding.

- The model facilitates archaeological sensitivity and impact evaluations of multiple project alternatives.

- Mn/Model can be used to predetermine the level of effort required to identify archaeological sites within proposed project alternatives.

- After applying the model to projects statewide for two years, the resulting project cost savings allowed MnDOT to recover the costs of model development. In addition, project delivery time improved by 30 percent as a result of the model's effectiveness (MnDOT 2005).

4.3.6 North Carolina DOT

North Carolina DOT (NCDOT) has a GIS database that predicts and quantifies the potential for archaeological sites within proposed project areas. The GIS currently encompasses seven counties, but is anticipated to eventually cover the entire State. The State also hopes to add historic architectural properties to the database. Information on the latter would provide immediate access to information on potential Section 4(f) properties. The archaeological predictive model/GIS currently is used during project development, but a future goal is to have it become a transportation systems planning tool. NCDOT planners, however, do have access to the GIS either through the State Historic Preservation Office or through the DOT's CRM staff.

NCDOT consults with the North Carolina SHPO early in project development as a partner in the State's Section 404-NEPA merger process, which includes early consideration of cultural resources. The SHPO often attends early meetings at which time NCDOT, along with other state resource agencies, discuss the definition of project purpose and need, and review various environmental issues linked to the Section 404 permit and NEPA processes (personal communication, Matthew Wilkerson, North Carolina DOT, October 20, 2008).

Key Components

- The GIS integrates environmental and cultural variables in order to assign areas a high, medium, or low probability rank for containing archaeological sites.

- Historical archaeological site probability will be defined using existing site inventories and digitized historical map data.

- Creation of the GIS/predictive model for NCDOT began with the development of a Procedural Manual that included the specific protocols and methodologies used in developing and implementing the GIS/predictive model. This manual provides a record of the model's structure and functionality.

Benefits

- Provides constraint mapping and summary tables quantifying a project area's potential impacts to archaeological sites.

- Provides information on archaeological sensitivity without conducting archaeological field investigations. Streamlines assessment of potential archaeological impacts within proposed project areas and specific project alternatives.

- Provides a mechanism for defining the scope, cost, and scheduling of archaeological investigations within alternatives under consideration.

- Assists in avoiding high archaeological sensitivity areas.

- The State's 404 merger process provides a mechanism for SHPO participation in defining project purpose and need, and addressing other project issues early in the development process.

4.3.7 North Dakota DOT

In 2006, the North Dakota DOT, the FHWA, and nine tribes entered into a Section 106 programmatic agreement guiding tribal consultation for all Federally funded highway projects in the State. The PA was the product of discussions with tribes from North Dakota, South Dakota, Montana, and Minnesota over a three-year period. The PA was negotiated with all tribes collectively, as a consensus document *(16)*.

Key Components

- The PA was developed as a consensus document through negotiations among the North Dakota DOT, the FHWA and the tribes.

- The PA is based on ideals of trust, mutual respect, recognition of cultural identity, and values that the tribes identified as critical to the success of the agreement.

- The PA stipulates which projects require consultation with the tribes and which do not, and how consultation is to take place.

Benefits

- The PA was a vehicle for building and maintaining trust with the tribes.

- The PA has streamlined Section 106 compliance, and in turn, project delivery.

4.3.8 Oregon DOT

Through Oregon DOT's "Collaborative Environmental and Transportation Agreement for Streamlining" (CETAS) program, discussed earlier, state and Federal resource agencies (including the SHPO) fully participate in early project development. CETAS brings all parties together on a monthly basis to discuss issues and concerns about ongoing projects, providing a mechanism for early resource agency feedback. The CETAS program funds liaison positions member agencies to ensure their participation in the program *(18)*.

Key Components

- Early project review begins with a "Locational" EIS or EA (similar to a Tier 1 EIS). Resource impacts are identified within an initially defined project area, prior to the definition of specific project alternatives.

- The second step is a "Design" EIS or EA (similar to a Tier 2 EIS) where the location of alternatives is known and impact analyses are more specific and detailed.

Benefits

- Identifies and addresses environmental (and historic property) impacts as part of early project development.

- Provides mechanism for avoiding or minimizing impacts prior to defining specific project alternatives.

4.3.9 Pima County, Arizona

In 2003, Pima County revised its roadway design manual to incorporate new concepts and procedures that grew out of the Sonoran Desert Conservation Plan (SDCP), discussed above. One of these concepts is the "Environmentally Sensitive Roadway" (ESR). Such roadways fall within an "Environmentally Sensitive Landscape" as defined in the SDCP. These landscapes include moderate to high sensitive zones for archaeological sites, or locations of individually important cultural resources *(13)*.

Key Components

- Assessment as to whether or not a proposed roadway is an ESR is made during the conceptual design stage. With this information, the project design team knows that cultural and/or biological issues will need to be addressed as the project proceeds.

- Cultural and biological resources inventories, and additional studies, are conducted within the proposed ESR.

- All appropriate county departments participate in a design workshop or charrette, where roadway design options are considered in the context of the resource studies' results.

Benefits

- Pima County builds the consideration of cultural and biological resources into its early road-way design process

- This process allows the county to design roadways that avoid significant resources; and, if they cannot be avoided, minimizes impacts to the resources.

4.3.10 Texas DOT

The Texas Department of Transportation (TxDOT) has developed a GIS-based archaeological predictive model for the Houston area. The model, called "Potential Archeological Liability Map" (PALM), predicts areas where highway projects are likely to encounter buried prehistoric archeological sites with sufficient integrity that they would be eligible for listing in the National Register. Data on soils, landforms, and modern disturbances are used to stratify the landscape into areas of higher or lower sensitivity for intact archaeological deposits. The Texas Historical Commission (SHPO) was involved in developing Houston-PALM over a three-year period and supports its use. To compliment the PALM, TxDOT also developed the Houston Historic Overlay, a GIS data layer that shows the location of buildings and structures in areas that were not urbanized by 1936. The historic overlay, which was created by digitizing historic period maps, allows TxDOT to anticipate the likelihood of encountering historical archeological sites or structures in project areas *(20)*.

Key Components

- GIS-based landscape model predicts the likelihood of encountering buried prehistoric archaeological sites of sufficient integrity to be National Register eligible.

- The model stratifies the landscape into areas of archaeological sensitivity for intact archaeo-logical deposits. Locations of low sensitivity are excluded from further consideration.

- The Houston Historic Overlay provides historic archaeological and architectural data that are used in conjunction with Houston-PALM.

Benefits

- The model provides a means of evaluating project alternatives for impacts to prehistoric archaeological sites early in project development.

- Houston-PALM allows DOT project managers to anticipate the time and costs required to complete Section 106 compliance for a project.

- The historic overlay complements the PALM model, providing information on the potential locations for historic period properties.

4.3.11 Vermont Agency of Transportation

The Vermont Agency of Transportation (VAOT), in conjunction the Vermont Division of Historic Preservation, ESRI Business Partner, Earth Analytic, Inc., the University of Maine at Farmington Archaeology Research Center, and the University of Vermont Consulting

Archaeology Program, has developed a statewide GIS-based archaeological sensitivity model. The Vermont Archaeological Sensitivity Model (VTASM) is designed to estimate the relative potential for buried cultural deposits in different areas of the State. The model uses a suit of environmental variables relevant to prehistoric settlement, including landform, hydrology, elevation, etc. *(21)*.

Key Components

- VTASM is a statewide GIS-based archaeological sensitivity model that is used in early project development.

Benefits

- Model enables VAOT to avoid areas with high archaeological sensitivity.

- When avoidance is not possible, VAOT uses the model to develop appropriate and focused strategies for subsurface archaeological sampling, thereby minimizing the costs of subsequent archaeological investigations.

4.3.12 Virginia DOT

Virginia DOT's (VDOT) "Comprehensive Environmental Data and Reporting System" (CEDAR), discussed earlier, was developed primarily as a tool for improving early project development. VDOT also has a partnering process involving state and Federal agencies (including the Virginia SHPO) in early project development (i.e., during the definition of preliminary/conceptual alternatives). This process, used for all major projects, provides a formal opportunity for a dialogue among these parties (personal communication, Tony Opperman, October 9, 2008).

Key Components

- VDOT CRM staff can access cultural resource data layers in CEDAR.

- VDOT CRM staff provide data to project engineers/designers early in project development.

Benefits

- CEDAR provides VDOT designers data on cultural resources and other red flag environmental issues early in project development.

4.3.13 Washington State DOT

Washington DOT (WSDOT) shares a GIS database with the Department of Archaeology at the SHPO. The GIS contains several regional archaeological predictive models. The DOT also has in place an accord with multiple tribes residing within and outside of the State, guiding how the DOT consults with the tribes on a range of environmental issues, including Section 106 compliance. In addition, WSDOT funds two transportation-liaison positions within the SHPO (personal communication, Scott Williams, Washington DOT, September 29, 2008).

Key Components

- WSDOT uses the statewide GIS database on cultural resources to identify known cultural resources within proposed project areas.

- Regionally specific archaeological predictive models assist WSDOT in evaluating the potential for project alternatives to impact archaeological resources.

- The tribal consultation accord guides tribal consultation in transportation project development.

- The SHPO WSDOT liaison is dedicated to the review of WSDOT projects, and participates in early project development stages.

Benefits

- Early consultation with the SHPO, tribes, and local governments identifies potential cultural resource concerns during the identification of conceptual/preliminary alternatives. This process, in addition to the use of the cultural resource GIS and regional archaeological predictive models, also increases the predictability of historic preservation issues that will need to be addressed during the evaluation of specific project alternatives selected for detailed study.

5.0 Best Practices – How They Did It

5.1 Introduction

Based on the literature search, survey results, and follow-up interviews, the project team and the NCHRP project panel selected a number of state DOTs and local planning organizations for more in-depth interviews about their respective programs. The selected states and local planning organizations serve as a sample of the different types of practices used in different parts of the country. These interviews focused on the nuts and bolts of these programs, documenting how these agencies implement and maintain their best practices, particularly in terms of funding and staffing. They also were asked to describe how these best practices improve transportation project delivery, in addition to advancing the stewardship of historic properties; and, to describe any challenges and obstacles they encountered while developing and maintaining these practices.

The specific questions posed to this group of 11 state DOTs and one local planning organization were as follows:

- Why did you create the program?

- How did you set it up, especially in terms of funding and staffing?

- What obstacles or problems did you encounter?

- How do you maintain the program, especially in terms of funding and staffing?

- What obstacles or problems are you encountering?

- What did your agency do to convince the SHPO, tribes, other Section 106 parties to partici-pate in the program?

- What is the value of their participation from your agency's perspective? From the consulting parties' perspectives?

- What are the most critical factors to having a successful program?

- What would you do differently if you were starting the program today?

- What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

- What parts of your program did not work the way you expected them to work?

- What came out of the program that was unexpected, but still beneficial?

The results of these in-depth interviews are presented below. It should be noted that the agencies sometimes did not answer all of the interview questions.

5.2 Case Studies

5.2.1 California DOT (Caltrans) District Cultural Resource "T-Databases"

Why did you create the program?

Caltrans conducted cultural resource surveys of its rural ROWs only when there was a specific highway project within the ROW, so there was no cultural resource information for those areas that had not been involved in a project. As a result, highway maintenance activities within the State's ROW were inadvertently affecting archaeological sites, which raised concerns among the State's tribes. In addition, because of a lack of accessible data on cultural resources in the ROWs (site forms and maps only existed as paper records), Caltrans' cultural resource staff could not immediately respond to emergency projects within the ROW. The individual district "T-Databases" were developed to address these issues.

How did you set it up, especially in terms of funding and staffing?

In the late 1990s, Cultural Studies Office staff at Caltrans headquarters, together with staff in Districts 2, 5, and 9, successfully secured TE funds for each of these districts (there are 12 districts statewide). Funding was obtained under the TE program's "Archaeological Planning and Research" category. The first district to receive a TE grant collected cultural resource data on their rural ROW, and had a consultant develop the shell of a desk-top database for the district office. This shell was the foundation for the databases developed by subsequent district offices.

To date, Districts 2, 3, 4, 5, 6, 10, and 11 have operational databases. Each district contracts with a consultant to develop the databases. This work is overseen by a District Data Steward, who is a cultural resource management professional.

What obstacles or problems did you encounter?

In the early 1990s, the Department's GIS priorities focused on engineering. Including environmental issues within a GIS was not a high priority. There also was Departmental resistance to the use of TE funds for developing the district databases. Once the program was in place and running, however, Caltrans managers could clearly see the utility of the databases, and other districts wanted to participate in the program. The districts also had to expend more time than anticipated to deal with the unsorted paper records at the local Information Centers (independent offices that maintain the State's current cultural resource inventory data).

How do you maintain the program, especially in terms of funding and staffing?

The districts' consultants develop the databases using TE funding, and then designated Caltrans staff maintains the databases using project funds. The districts make sure that project budgets include funds to maintain and keep the databases up to date.

What obstacles or problems are you encountering?

Caltrans district information technology (IT) personnel are supposed to take care of the technical side of database maintenance. Unfortunately, this has not been the case. As a result, Caltrans headquarters is in the process of taking over the district databases and turning them into a statewide database.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

The database is an internal Caltrans program, with no input or consultation with the SHPO. The Caltrans districts do work with the cultural resource Information Centers, obtaining the data from the centers' files and putting these data into the district databases. Caltrans also provides funding to the Centers for accessing the data in the Centers' files.

What are the most critical factors to having a successful program?

A willingness to take risks along with the willingness of individuals to try to make something work that had not been tried before was very important. The districts now have accurate cultural resource property locations that can be accurately tied to Caltrans project data. Caltrans cultural resource management staff can provide more accurate and timely responses to cultural resource information requests from project engineers, which in turn assists in expediting project delivery.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

Be careful in developing a scope of work for building these types of databases. Caltrans found that cultural resource management professionals who developed the scopes of work for creating the databases often did not have a lot of IT expertise. This resulted in problematic scopes of work and work products. It is important to have IT professionals on the team creating these databases. It also is important to have the cultural resource staff outline their needs and these needs must be clearly understood by the IT members of the team.

What came out of the program that was unexpected, but still beneficial?

There has been informal consultation with some of the State's tribes to obtain ethnographic information for input into the districts' databases. The tribes were provided information on the security protocols for accessing this information once it was within the database. In addition, Caltrans was able to demonstrate how this ethnographic information could improve the effectiveness of tribal consultation. These efforts increased the tribes' trust with Caltrans and the Information Centers.

> Information provided by:
> Anmarie Medin, Senior Environmental Planner, Chief of the Archaeology Branch, Cultural Studies Office
> and Margaret Buss, Supervising Environmental Planner, Chief, Office of NEPA Delegation and Environmental Compliance, Caltrans Division of Local Assistance
> California Department of Transportation

5.2.2 Colorado DOT – Planning and Environmental Linkage (PEL) Decision-Making Tool

Why did you create the program?

Appendix A of 23 CFR 450, which resulted from the passage of SAFETEA-LU, encourages the integration of environmental analyses into the planning process. This guidance was used, in part, to justify the creation of CDOT's PEL program. In 2006, CDOT hired a coordinator to develop the PEL program. The program was initiated at a time when CDOT already was committed to similar "big picture" planning efforts, such as conservation banking.

How did you set it up, especially in terms of funding and staffing?

The PEL program was started by the CDOT's Division of Transportation Development managers, with support from the Planning Division and IT/GIS staff. A vacant full-time-employee (FTE) position in the Planning Division was available and was used to create the program coordinator's position. The position is paid for out of State Planning and Research (SPR) funds.

What obstacles or problems did you encounter?

The State's PEL program has just gotten underway. Initial problems included funding and difficulties in acquiring and housing critical environmental data. In terms of the latter, two critical issues were deciding who should house and maintain the PEL database, CDOT or resource agencies, such as the SHPO; and, who should have access to sensitive resource locational information stored within the database?

How do you maintain the program, especially in terms of funding and staffing?

The program coordinator, which is a full-time position, maintains the PEL program. While this position is funded with SPR monies, state funds are used to develop internal training programs and the PEL's GIS screening tools. The screening tool currently is used to identify "red flags," such as recorded cultural resources, within a corridor study area.

What obstacles or problems are you encountering?

Data management and data quality issues continue to be the primary problem. There also is no centralized database, or data sharing/data maintenance protocols in place.

Despite these problems, there is a real interest in the PEL program. CDOT staff recognize the value of merging planning and environmental analyses. Department staff understands that this program can save time and money.

Limitations on critical environmental data and the absence of mapping functions within the database restrict the use of PEL's screening tool. CDOT intends to enhance the tool's capabilities so that it can be used to analyze and eliminate alternatives during planning.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

CDOT has a good relationship with the SHPO and invites the SHPO to participate in planning activities. The SHPO understands and supports what CDOT is trying to do through the PEL

program; however, the SHPO currently does not have the staff or resources to actively participate in the PEL program.

In June 2009, CDOT executed the Planning and Environmental Linkages Partnering Agreement with the FHWA, the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency, the SHPO, MPOs, and other agencies to streamline project planning and delivery. CDOT also organized an environmental forum that brought together 15 planning regions within the State to discuss the PEL program. The SHPO attended this forum.

What is the value of their participation from your agency's perspective? From the consulting parties' perspectives?

From CDOT's perspective, the SHPO's involvement contributes to a better working relationship between their respective offices. From the SHPO's perspective, DOT is making a good faith effort through the PEL program to identify and consider historic preservation issues early in the planning process.

What are the most critical factors to having a successful program?

CDOT recognizes that working closely with the resource agencies is a critical factor in building a successful program. The program coordinator works with the Transportation Environmental Resource Council (TERC) and with CDOT's transportation partners to foster interagency communication and coordination. Maintaining a close relationship with the FHWA, which has supported a proactive approach to environmental planning, also is very important.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

First, identify the transportation needs and determine how a PEL program can address those needs. Second, develop a programming plan. Third, contact your partners and work to foster their support and participation.

> Information provided by:
> Sheble McConnellogue, Planning and Environmental Linkages Program Manager
> and Lisa Schoch, Senior Staff Historian, Environmental Programs Branch
> Colorado Department of Transportation

5.2.3 Florida DOT – Efficient Transportation Decision-Making (ETDM)

Why did you create the program?

Prior to implementing ETDM, problematic environmental issues were being identified late in project development, resulting in project delays, increased costs, and conflict among Florida DOT (FDOT), its transportation partners, and resource agencies. In order to avoid these late discoveries, FDOT needed a program where all of the parties worked together to solve environmental issues during planning, eliminating the need to address these issues during project development. In addition, if an issue could not be dealt with during planning, the new program would have a process for making decisions on how to deal with the issue during project development.

The goals of this new program were early engagement, early dispute resolution, early problem solving, and more targeted environmental studies during project development. In addition, the program would have the funding to accomplish all of these goals.

How did you set it up, especially in terms of funding and staffing?

Two individuals, one within the state DOT, the other within what was the FHWA regional office in Atlanta, served as the program's "champions." These two "champions" identified ways to merge agencies' processes and programs, implement concurrent reviews, obtain early participation in the planning arena, and put in place the technology to make this all happen. Developing ETDM was a joint effort among FDOT, FWHA, and other state and Federal agencies, and local governments.

There are two ETDM components: technology and agency operating-agreements. The latter includes funding agreements, if needed, whereby FDOT provides financial assistance to a resource agency so they can fully participate in the ETDM program. The resource agency uses these funds to hire staff (part- and full-time), or to hire a consultant to assist them in implementing ETDM. Each agreement was developed agency by agency, tailored to the agencies' processes. The agreements were signed by FHWA, FDOT, and the agencies.

During the first two years, FDOT, in cooperation with FHWA, initially used state money and Transportation Equity Act – Section 1309 funds to develop ETDM. FDOT put in place the agreements with the resource agencies and provided funding to these agencies as needed. Then, FDOT, again in cooperation with FHWA, used state funds and surface transportation program (STP) funds to implement ETDM. FDOT took the necessary funds for ETDM "off the top" of STP funding.

Initially, there was a big debate on how to implement ETDM. One option was as a pilot program or as a group of projects. The other option was to implement the program statewide. FDOT decided on the latter, holistic approach. When fully developed, FDOT would have in place a program that streamlines all of the DOT's projects. This would not have been possible if FDOT focused on a group of projects or ran ETDM as a pilot program. Based on the positive results of implementing ETDM statewide, a holistic approach was the correct choice.

What obstacles or problems did you encounter?

Trust among the participating agencies was the big initial issue. Developing a new process like ETDM was a learning experience for everyone.

Technology also was a challenge, since the tools needed to implement the program, such as the program and planning screens, did not exist. These tools had had to be created from scratch. There also were no models for the type of resource agency agreements required for implementing ETDM.

How do you maintain the program, especially in terms of funding and staffing?

ETDM is maintained using STP funding. FDOT's Environmental Management Office has three people dedicated to ETDM, in addition to one individual working full-time on the technological maintenance of the program.

What obstacles or problems are you encountering?

Since implementing ETDM, FDOT has learned that the technology for the program needed to be more flexible and adaptable. The state DOT also found that there needs to be a mechanism within the program for archiving information, since this information will be needed in the future.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

There was no difficulty in getting the SHPO to participate. The SHPO saw how the program could address their internal needs and facilitate their involvement in transportation planning and project development.

What are the most critical factors to having a successful program?

Having the correct technology was critical to creating and implementing a successful program. Important technological elements included the ability to archive information and decisions, and the program's environmental screening tools. Having usable and reliable cultural resource data sets is also critical.

Another critical factor is having a program based on comprehensive interagency coordination. As a result of interagency cooperation and coordination, participating agencies learn about each other's processes. This helps build trust and relationships among all of the parties involved. Additional critical factors were FDOT's and FHWA's willingness to provide funding for the program, and FHWA's active role in establishing and supporting the program.

What would you do differently if you were starting the program today?

The resource agencies involved in the creation and implementation of the program understood the necessity of having a dedicated person within their agency to move projects through securely and quickly. FDOT, however, did not consider the need for additional positions within their own environmental staff. As a result, implementation of ETDM increased FDOT's work load, at the same time that their staff was shrinking.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

First, a state DOT has to have a "champion" who sees that environmental streamlining is needed within the Department. This champion also is an individual who can get resource agencies to participate as team members to build the program, and can obtain support for the program from upper management. Once these elements are in place, the next steps involve budgetary and technology issues.

What came out of the program that was unexpected, but still beneficial?

On the technology side, there have had several spin-offs. For example, local planning agencies create and maintain their own GIS data layers in ETDM. Participation in ETDM requires these agencies to keep their own information up to date, which has been very beneficial for their local planning efforts. In turn, FDOT has immediate access to this local information through the ETDM program.

Information provided by:
Buddy Cunill, Environmental Program Development Administrator
and Roy Jackson, State Cultural Resource Coordinator
Florida Department of Transportation

5.2.4 Indiana DOT Historic Bridges Programmatic Agreement

Why did you create the program?

Indiana DOT (INDOT), FHWA, and the Indiana SHPO were having problems determining which historic bridges were eligible for listing in the National Register and which were not eligible. The State's metal truss bridges were the most problematic because the statewide inventory of metal truss bridges was out of date. In some cases, it took up to 10 years to complete the Section 106 process on Federal Aid Highway-funded projects involving a historic bridge. The Section 106 consulting parties, including the preservation advocates and the historic bridge owners, were often totally entrenched in their opposing positions.

INDOT and FHWA needed a process that identified which bridges were National Register eligible and which were the best candidates for preservation from a historical and engineering perspective. The two agencies also wanted a program where bridge owners would know instantly what compliance issues they had to deal with, and how to proceed on projects that involved a historic bridge.

So, after many years of conflict and disagreement, the parties came together to solve these problems and issues.

How did you set it up, especially in terms of funding and staffing?

Creating this program was a joint effort among the FHWA, INDOT, SHPO, representatives of local historic bridge interest groups, the ACHP, counties, and many other groups, even one of Indiana's U.S. Senators. This was truly a group effort, involving a task force that met several times during the development phase of the program. All of these parties participated in the development and execution of the programmatic agreement (PA) establishing the program.

Funding came from SPR monies. FHWA and INDOT came to an agreement that this historic bridge program was a critical transportation planning tool, so the use of SPR funds was considered appropriate. The INDOT used these funds to update and complete the statewide inventory of historic bridges on public roads and on public right-of-way. These funds also were used to hire a consultant to do most of the program's ground work. Given the cost, however, the program was developed incrementally.

The first step in developing the program involved creating a statewide historic context on historic bridges. This context was the foundation for determining which bridges were eligible for listing in the National Register. The FHWA and INDOT currently are working with the consulting parties and the public to identify the select and nonselect historic bridges (see Chapter 4 for more detailed discussion on the INDOT historic bridge program).

What obstacles or problems did you encounter?

During the development of the program, the preservation organizations and the bridge owners pressed their own respective agendas. This resulted in a conflict between meeting preservation goals and minimizing the expenditure of funds on the historic bridges. Another obstacle was how to deal with Section 4(f) in the context of identifying and treating select versus nonselect historic bridges. This issue was resolved in part by including a statement in the PA that FHWA will not consider demolition to be a "prudent" alternative for any Federal-aid project involving a select bridge.

How do you maintain the program, especially in terms of funding and staffing?

FHWA, INDOT, and the SHPO jointly maintain the program, using SPR funds. INDOT has around five individuals managing the program as part of their overall duties. The SHPO has assigned three to five individuals to participate in the program when needed. FHWA usually has three individuals participating in the program during various milestones and meetings.

What obstacles or problems are you encountering?

There was a recent letter from the local preservation groups to the ACHP questioning INDOT and FHWA's methods for determining select versus nonselect historic bridges. FHWA is going to have a meeting with all of the original parties in the task force that created the program, including the FHWA Federal Preservation Officer, to go over the preservation groups' issues. The groups' primary concern is that the full range of bridge types needs to be considered. The bridge owners are just as concerned; they are afraid that every bridge they own will become a select bridge that needs to be preserved.

What are the most critical factors to having a successful program?

One critical factor is keeping all parties involved all of the time, but also keeping in mind that the transportation agencies have to make a decision at some point. One cannot let things go on forever; there needs to be closure. Another critical factor is having total cooperation among the SHPO, state DOT, and the FHWA. The agencies need to be totally honest and frank with each other during program meetings and discussions. The agencies also must maintain a positive relationship with each other and a commitment to make the program work, balancing historic preservation issues with delivering a transportation project within a reasonable time.

What would you do differently if you were starting the program today?

INDOT and FHWA should have provided a little bit more money to enable the consultant to respond in more detail to all of the public and stakeholder comments. With the available funds, the consultant had to lump the response-to-comments into broad categories. The consultant did not have the luxury of addressing all of the comments individually.

In addition, developing and maintaining the program would have been easier if the ACHP was more involved in the day-to-day elements of the program, especially since this program had no precedence or model to rely on. The ACHP would often have only a general idea of what FHWA and INDOT were doing. If the ACHP was more closely involved, they would be in a better position to deal with issues as the came up, such as the recent concerns about the definition of select and nonselect bridges.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

A state DOT needs to be prepared to expend a lot of time on the program; this type of program is not something that happens overnight. The agency needs to have the bridge owners and preservation groups working continually with the state DOT; otherwise, the parties will end up with products no one wants to use or is happy with. The state DOT also needs to put a lot of effort into developing the scope of work for implementing the program. This is critical in terms of hiring a consultant that can really provide the required services. This is especially the case for this type of program, given the intensive nature of the work. Finally, a state DOT needs to keep in mind that this type of program is not a "one-time" effort. The Department will need to revisit past decisions and methods to make sure the program is functioning the way it was intended. The state DOT needs to make sure there is funding for these periodic program reviews. INDOT will be doing a program review every 10 years.

What parts of your program did not work the way you expected them to work?

Developing the methodology for select/nonselect historic bridges was difficult, especially for those bridges that fell in the middle (i.e., could not be easily categorized as eligible or not eligible). It was hard to develop a selection process that was replicable and fair, and focused on what really needed to be preserved.

What came out of the program that was unexpected, but still beneficial?

The collaboration among the FHWA, INDOT, and the SHPO required by the program fostered a good working relationship among these agencies.

> Information provided by:
> Janice Osadczuk, Planning and Environmental Specialist,
> Indiana Division, FHWA

5.2.5 Minnesota DOT – Mn/Model (Archaeological Predictive Model)

Why did you create the program?

Minnesota DOT's statewide archaeological predictive model, known as "Mn/Model," was started in 1995. Prior to developing the model, MnDOT did not have an archaeologist on staff and was dependent upon direction from the Minnesota SHPO on when and where cultural resources surveys were needed for DOT projects. Typically, SHPO required 100 percent survey coverage for every road project. Upon hiring their own archaeologist, MnDOT questioned this survey rationale and decided that it needed the capability to make objective decisions regarding cultural resources surveys. This was the impetus for developing Mn/Model.

How did you set it up, especially in terms of funding and staffing?

MnDOT applied for and received five million dollars from the TE program, and contracted with a private firm to develop the model. The state DOT also hired its own expert in archaeological modeling to act as a program adviser. The modeling team started with one region of the State and as problems were resolved, expanded the modeling effort region by region until the entire state was covered. This phase of the program took three years.

Since the modeling effort was to be awarded to a consultant, the proposed program had to first go through MnDOT's internal consultant review process. A program proposal was submitted to a committee of Division Directors for approval. The MnDOT archaeologist had to convince the committee that the modeling program would deliver tangible benefits, expediting transportation project delivery and reducing project costs. Once approved, the program began with construction of the model, followed by model testing and then refinement.

What obstacles or problems did you encounter?

The biggest initial challenge was acquiring the necessary data layers, and then correcting and refining the data. In 1995, there was not enough of digital data to build the model. The modeling team also detected a bias in archaeological survey data. Archaeologists tended to look in areas where they expected to find sites, skewing the survey results. There was money in the program budget to conduct field surveys to collect new archaeological data in order to correct these biases and to test the model's assumptions.

How do you maintain the program, especially in terms of funding and staffing?

Mn/Model is housed within the state DOT's own GIS database. MnDOT has one staff member dedicated to maintaining and updating the database. State funds are used to pay for this position and hire consultants (e.g., statistical experts) as needed. Currently, about 70 percent of this staff member's time is devoted to the model and database-related activities.

What obstacles or problems are you encountering?

The staff person maintaining the model is involved in other Department projects. As a result, she cannot spend as much time as she would like on maintaining and improving the model.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

The Minnesota SHPO supported the modeling effort and participated in a steering committee establishing the model. The SHPO also agreed to using the model to determine where and how archaeological surveys would be conducted. This survey protocol is codified in a PA. Other Federal agencies, such as the Natural Resources Conservation Service and the USACE, also use the model.

The SHPO and the Minnesota State Archaeologist do not have the computer capabilities to use the model within their offices. MnDOT has to provide printouts to the SHPO and State Archaeologist when using the model for Section 106 consultation on a specific project.

What are the most critical factors to having a successful program?

The single most important factor in building and using Mn/Model has been the continued support of MnDOT management.

What would you do differently if you were starting the program today?

Quality control issues associated with archaeological site data should have been addressed earlier in program development. In retrospect, MnDOT should have done more early on to resolve the site location data problems, determine which areas of the State had been surveyed,

and digitize survey records. The modeling effort also would have benefited from better data on prehistoric environments, in terms of hydrology and geomorphology. The modeling team also was surprised by the biases of previous archaeological surveys.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

Talk to other agencies that have developed an archaeological predictive model. Their experiences and the lessons learned are invaluable for guiding future modeling efforts.

> Information provided by:
> Elizabeth Hobbs, State Program Administrator Coordinator – Geographer
> Cultural Resources Unit, Office of Environmental Services
> Minnesota Department of Transportation

5.2.6 New Mexico DOT – Tribal Liaison Program

Why did you create the program?

Tribal consultation has been a part of long-range transportation planning in New Mexico since 1999; however, no individual staff member was responsible for these consultation efforts. A tribal liaison position was created in 2003 within the Department's Strategic Planning Bureau. The position was filled in 2005 in response to SAFETEA-LU's requirements for consultation with tribes during transportation planning, and Governor Bill Richardson's executive order encouraging state agencies to consult with Native American communities in the State.

Concurrent with the creation of the tribal liaison position, New Mexico DOT (NMDOT) added historic preservation issues into the State's Long-Range Transportation Planning (LRTP) process. At this time, the DOT also adopted measures with local planning organizations to ensure that tribal consultation was included in the planning process. Tribal representatives are members of MPOs and Regional Planning Organizations (RPO) whose jurisdiction lies immediately adjacent to tribal lands. As members of these local planning organizations, the State's resident tribes have an opportunity to raise concerns about the effects a project may have on historic resources, including traditional cultural properties.

How did you set it up, especially in terms of funding and staffing?

The New Mexico Cabinet Secretary of Transportation created the tribal liaison position as a full-time FTE using state and SPR funds. The first tribal liaison position was held by a non-Indian, who left the job after one year. In 2006, NMDOT hired a former tribal governor of Acoma Pueblo to fill the liaison position.

What obstacles or problems did you encounter?

The Cabinet Secretary of Transportation created the tribal liaison program, in part, in response to systemic concerns and needs within the Department regarding communication and coordination with the Native American community. Once a commitment to establish the position was made, the only issue to resolve was filling the position.

How do you maintain the program, especially in terms of funding and staffing?

The tribal liaison position is a full-time position, and continues to be funded through state and SPR monies. The liaison is responsible for maintaining the liaison program, and is a staff member of the Department's Planning Division, and has been appointed as a member of the Cabinet Secretary's executive staff.

What obstacles or problems are you encountering?

The tribal liaison's duties have expanded to the point where there is the need for an assistant liaison. There currently is no funding to create an assistant position.

What are most critical factors to having a successful program?

The current tribal liaison is a former tribal governor of Acoma Pueblo. As a former pueblo governor, the liaison believes that his native identity helps him understand tribal needs, which he can directly discuss with senior staff within NMDOT. He also is readily accepted by the State's tribal government entities given his background and expertise.

From NMDOT's perspective, the tribal liaison improved consultation and collaboration with the tribes on historic preservation issues, in addition to other environmental and transportation concerns. In turn, the tribes have a voice in the planning process and a partner within the Department's Planning Division.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

The most important factor in making the tribal liaison position a success was filling the position with a native person who can work with both the Department and the Native American communities. Enabling the tribes to become involved in the RPO and MPO planning process also is very important. Establishing this type of relationship with the MPOs and RPOs has greatly improved the interactions between tribes and these local planning organizations.

> Information provided by:
> Ron Shutiva, Tribal Liaison, Strategic Planning Bureau, Planning Division
> Janet Spivey, Transportation Planner, Planning Division
> New Mexico Department of Transportation

5.2.7 North Carolina DOT – Archaeological Predictive Model

Why did you create the program?

In the past, NCDOT was spending a lot of time and resources preparing archaeological background information on project alternatives for NEPA compliance. NCDOT needed a tool to more efficiently assess project alternatives. To address this problem, NCDOT, in 2000, started the archaeological modeling project as a seven-county pilot program.

How did you set it up, especially in terms of funding and staffing?

The problem, and potential archaeological modeling solution, was recognized by a NCDOT archaeologist who championed the modeling project. This individual prepared a scope of work

for the project, which then went through several internal reviews, including one by the State Transportation Board. The contract for developing the archaeological predictive model was awarded to a consortium of private consultants.

NCDOT's partners in conducting the pilot program included the FHWA, the State Division of Cultural Resources (i.e., the SHPO), the Office of the State Archaeologist (OSA), which is within the Division of Cultural Resources, and the project consultants. Other entities with experience in managing archaeological sites, such as Fort Bragg, also were involved in the program. NCDOT entered into a Memorandum of Agreement (MOA) with the SHPO and OSA to establish a collaborative relationship between the agencies for this project.

The project was divided into two tasks. Task 1 involved digitizing all existing archaeological site records for the seven-county study area. These records were housed at the OSA. These data were used to populate an archaeological site data layer within NCDOT's existing GIS database. NCDOT also collected additional data on environmental variables for use in developing the predictive model. The second task involved building the model, testing its statistical validity, and evaluating the model's use as a planning tool. Task 2 was completed by 2006.

Funding for the modeling project came from SPR monies. Total project costs were approximately $900,000, which was used to pay the contractors and to purchase some equipment. Salaries for DOT personnel involved in the modeling project also came out of the same funding source.

What obstacles or problems did you encounter?

NCDOT encountered technical problems in developing the model, and also had to educate some of its agency partners on the modeling process. There was no uniform learning curve among the DOT's partners, so bringing them up to speed on the modeling project's development process added time to creating the program.

How do you maintain the program, especially in terms of funding and staffing?

The model resides at NCDOT. NCDOT's GIS staff currently maintains the modeling data layers as part of the agency's larger GIS database. Under the MOA between NCDOT and the SHPO and OSA, the latter provided all site records for the modeling project and in return, NCDOT built the SHPO and OSA an *Access* database housing all archaeological data for the seven-county project area.

While SPR funds were used to develop model, NCDOT uses project funding to maintain the program, updating the database on a project-by-project basis.

Presently, one to two NCDOT employees work with the Department's GIS staff to maintain the database.

What obstacles or problems are you encountering?

The biggest problem has been funding and staffing, especially at the SHPO and OSA. They currently do not have the staff or resources for digitizing records for the remainder of the State. The model, therefore, has not been expanded beyond the initial seven-county area. NCDOT

has established an Internal Leadership Team composed of multiple agencies, including the SHPO, to discuss ways of expanding the database and model use.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

The SHPO and OSA recognized the advantages of the modeling project, and worked with NCDOT on the project since its initiation. The agencies negotiated an MOA, which established procedures for interagency coordination, sharing of data, equipment use, etc.

NCDOT made the database and modeling results available to local governments for their own local planning programs.

What is the value of their participation from your agency's perspective? From the consulting parties' perspectives?

From the state DOT's perspective, the SHPO and OSA's involvement was critical. They had the archaeological data needed for creating the model. From the perspective of the SHPO and OSA, they now have access to an archaeological predictive model and obtained a new archaeological database that can be expanded to the rest of the State.

What are the most critical factors to having a successful program?

The most important factor to the success of NCDOT's modeling project has been building a relationship of trust with its partners, especially the SHPO and OSA.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

An agency considering developing a predictive modeling program like NCDOT's needs to have dedicated staff and funds to maintain and update the model.

> Information provided by:
> Matt Wilkerson, Archaeology Supervisor, Human Environment Unit
> North Carolina Department of Transportation

5.2.8 North Dakota DOT – Tribal Consultation Programmatic Agreement

Why did you create the program?

The creation of North Dakota DOT's tribal consultation PA was motivated by changes to the National Historic Preservation Act in 1992 and to the Section 106 regulations in 1999, requiring greater tribal consultation for Federal undertakings. NDDOT saw the PA as an opportunity to address the heart of these changes rather than just meeting the minimal legal requirements, in the context of transportation project delivery.

How did you set it up, especially in terms of funding and staffing?

NDDOT contacted eight Federally recognized tribes with historic ties to territory within the State, and met with the tribes to discuss ways of improving the Department's tribal consulta-

tion efforts. NDDOT had to demonstrate to the tribes that the Department and FWHA were serious about establishing a formal relationship with the tribes, and not just going through the motions. This required multiple meetings and lots of discussions with tribal representatives. NDDOT continued to consult with the tribes on a project-by-project basis during this period.

After four years of working with tribes, NDDOT asked the tribes if they would be interested in entering into a PA to codify the protocols that had been developed over the years during project-by-project consultation. Individual PAs would be established with each tribe. All of the tribes, however, wanted a single consensus document that was negotiated concurrently with all parties. The development of this PA took one year.

The idea of developing a consensus PA received a high level of support from upper management within NDDOT. Upper management had heard negative reports about tribal consultation in other states, so they were open to the idea of building positive relationships with the tribes as a means of avoiding future problems.

One individual within NDDOT was designated the point person for developing the PA. State funds were used to prepare the PA, which included hiring a consultant to assist in the PA process, and to cover the tribal representatives' travel costs to attend meetings to work on the PA. NDDOT's point person currently fills the position of the Department's Tribal Consultation Specialist.

Under the PA, NDDOT has authority to speak with the tribes on behalf of the FHWA, although the FHWA is responsible for ensuring legal compliance. The DOT handles all day-to-day consultation.

The PA provides a single set of procedures for tribal consultation. The PA also created a process for discussing and resolving problems. From the tribes' perspective, their views are now being heard and respected by the agencies. As a result of the relationships that have been forged through the development of the PA, the tribes no longer feel the need to review all the past wrongs that have been afflicted upon them, but can address present and future needs in their discussions with NDDOT

What obstacles or problems did you encounter?

Finding the money in the state budget for the program was the biggest initial problem.

How do you maintain the program, especially in terms of funding and staffing?

The Tribal Consultation Specialist administers the tribal consultation program. As stipulated in the PA, there were initially four tribal meetings a year; now there are two. NDDOT hires a consultant to set up and facilitate these annual meetings. The Tribal Consultation Specialist devotes approximately half her time to tribal consultation. The balance is devoted to her duties as a member of the Department's Cultural Resources Section.

There is state funding for the Tribal Consultation Specialist position, and for covering the costs of tribal consultation, including setting up and conducting the tribal meetings.

What obstacles or problems are you encountering?

Funding is still a problem, though upper management of NDDOT fully supports the program, as does FHWA.

What are the most critical factors to having a successful program?

Relationship building is key to a successful tribal consultation program. The objective is to build partnerships with the tribes based on respect. This requires demonstrating a good faith effort, such as paying travel costs so tribes can attend consultation meetings.

What parts of your program did not work the way you expected them to work

The PA contains several provisions that have not really worked out as expected, such as the original deadlines set for consultation on projects. The agreement, however, was written so these types of issues can be easily changed without a formal amendment. All that is required is a simple consensus at a meeting. On the other hand, provisions for training included in the PA have worked out better than expected. Training is provided to the tribes on DOT procedures and the Section 106 process, in addition to other topics.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

NDDOT believes that what worked in North Dakota can work in other states. Specific suggestions to other state DOTs include:

- Get to know the tribes first, then begin discussions on a PA;

- Ask tribes "what do you need?" not, "here is our problem….";

- Find out what works for the tribes and how you can solve their problems;

- Meet the tribes on their own terms; and

- Be respectful.

> Information provided by:
> Jeani Bourchert, Cultural Resources Specialist, Cultural Resource Section
> North Dakota Department of Transportation

5.2.9 Ohio DOT – GIS Cultural Resources Database and Planning Development Process

Why did you create the program?

In 1998 ODOT started discussing how best to integrate environmental issues with project planning, engineering, and real estate issues, in response to huge growth within the State during the 1990s. As part of this program, ODOT wanted to improve its partnership with the Ohio SHPO and the FHWA in order to streamline environmental compliance. Development of a cultural resource GIS database was started in 1998, in part, to achieve this goal. ODOT entered into a formal agreement with SHPO to create the cultural resource GIS. At the same time, ODOT staff began initial discussions on how best to integrate environmental issues with

project planning, engineering, and real estate issues. With support from ODOT's Director, by 2002, the heads of the environmental, planning, design, and real estate offices proposed a new process for planning and project development. These efforts culminated in the Planning and Development Process (PDP), which was implemented in 2005.

How did you set it up, especially in terms of funding and staffing?

The GIS system was developed first and then rolled into the PDP as the new planning process was developed. The database was designed to be compatible with ODOT's existing GIS, thereby assuring that cultural resources data could be compared with other data layers. The impetus for developing the GIS database came from the SHPO. A SHPO staff member with a background in GIS worked with ODOT's GIS group to set up the system. The SHPO then hired temporary staff to start digitizing records for input to ODOT's GIS.

Both ODOT and the SHPO maintain their own respective databases. The SHPO enters new data into their GIS and then sends the data to ODOT to be uploaded into ODOT's GIS. In this way, the agencies have access to the same data.

ODOT staff had to get executive approval and upper management support to set up the cultural resource database. Funding for the GIS came from SPR and TE monies. The PDP, which uses the GIS database for planning and project development, was developed using state funds.

What obstacles or problems did you encounter?

The biggest problem in setting up the GIS database was the number of errors found in the SHPOs inventory records. These errors included incorrect property locations and descriptions.

How do you maintain the program, especially in terms of funding and staffing?

SPR funds are used to maintain the system. In addition, ODOT and the SHPO each have one GIS specialist maintaining the database.

What obstacles or problems are you encountering?

Funding is an issue. There are constraints on how much can be spent and how the funds can be used. Also, the Ohio SHPO recently developed an electronic cultural resource inventory form to streamline data entry, but this new inventory system has some technical problems that must be addressed before the new system can be put in place.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

The GIS database was created jointly by the SHPO and ODOT, so the SHPO supported the program from the beginning. Tribes, local governments, MPOs, and other agencies also support the use of the database and the PDP, and they have access to the data contained within the GIS.

What is the value of their participation from your agency's perspective? From the consulting parties' perspective?

From the perspective of the Section 106 parties, the GIS database and PDP place all parties at the same level of participation, providing equal access to information.

What are the most critical factors to having a successful program?

Cooperation among agencies is the key.

The GIS is an important tool in ODOT's PDP. Combining GIS technology with the organizational changes that ODOT adopted in 2005 allows the Department to achieve it internal environmental and project delivery streamlining goals.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

Any transportation agencies wishing to develop a GIS cultural resources database should start as soon as possible. Developing this tool, however, requires a long-term commitment, not only in terms of development but also maintenance. Patience with the individuals controlling funding sources also is necessary.

> Information provided by:
> Paul Graham, Assistant Environmental Administrator, Office of Environmental
> Services, Ohio Department of Transportation

5.2.10 Oregon DOT – Collaborative Environmental and Transportation Agreement for Streamlining (CETAS)

Why did you create the program?

The CETAS program was created by the Oregon DOT in 2000 and revised in 2001. The program grew out of a multi-agency group formed to streamline NEPA/404 consultation in Oregon. ODOT convinced its partners within this group to establish a collaborative framework that would bring the parties together at critical junctures in the project planning and development process. ODOT's suggestions were presented as a means to achieving greater efficiency and use of staff resources in the planning process, and to provide better resource management outcomes. TEA-21 also encouraged this type of collaboration, providing additional support to ODOT's efforts.

How did you set it up, especially in terms of funding and staffing?

ODOT's Environmental Manager originally came up with the idea of forging a multi-agency coordination framework. She had to sell the idea to her supervisors, who embraced the idea and took it to the Department's executive staff. Everyone was well aware of several previous project "train wrecks" that had resulted from a lack of interagency coordination. This awareness helped justify a new approach. The proposed program also was sold as a business solution for expediting and enhancing project delivery.

Executive-level support was critical to creating the program. The Transportation Director and the Deputy Director advanced the idea, with support from the FHWA. This level of support allowed ODOT to convince the resource agencies to participate in the initial program development meetings. After obtaining resource agency buy-in, ODOT, FHWA, and the resource agencies entered into formal agreements to implement the program. ODOT's Environmental Manager and staff, and the NEPA Section Manager and staff were responsible for establishing the CETAS program. State funds were used to develop the program.

What obstacles or problems did you encounter?

There were initial funding and staffing problems. Getting the resource agencies to participate also was difficult at first, as was changing the way ODOT staff prepared EAs and EISs. CETAS required changing the way people did their jobs. ODOT had to develop internal outreach and training on the new program.

How do you maintain the program, especially in terms of funding and staffing?

One staff person is in charge of maintaining the program, and is assisted by a consultant. The parties involved in CETAS meet monthly and coordinate project planning and review. Staffing support for these meetings is a challenge due to limited resources within ODOT.

Individual project funds are used to maintain the CETAS program. The CETAS manager, for example, charges his time to these project accounts. ODOT also covers the expenses of the other program participants from these funds

Maintenance requires approximately 10 percent of the CETAS' manager's time, 50-75 percent of a technical coordinator's and approximately 25 percent of an administrative assistant's. The monthly CETAS program meetings require a two-day-a-month commitment from the participating resource agencies.

What obstacles or problems are you encountering?

Consistent funding to maintain the program is problematic. Another problem is staff turnover, which results in a loss of continuity in the relationships between ODOT staff and the staff of the participating agencies. ODOT originally created CETAS to address these relational and coordination issues among the agencies. To deal with the continuity problem, ODOT is preparing a training program with these agencies, in addition to establishing an annual meeting with all of the program's participants. ODOT believes that these measures are needed to remind the agencies about the purpose of CETAS, and to reinforce commitments among the parties.

What did your agency do to convince the SHPO, tribes, other Section 106 parties to participate in the program?

The Oregon SHPO was not invited to participate in the program when originally conceived in 2000; however, with the 2001 program revision, the SHPO has joined CETAS. The SHPO, however, is the least engaged of all the participating agencies. Part of the problem is SHPO staffing. The Oregon SHPO, like most SHPOs across the country, is understaffed and does not have the resources to fulfill their National Historic Preservation Act responsibilities and fully participate in programs like CETAS. In addition, the Oregon SHPO and ODOT have a strong relationship of trust, especially in terms of archaeological and tribal issues. As a result, the SHPO feels it only needs to participate when they have a specific concern about a project. This level of trust and participation also exists between ODOT and tribes and local governments. Tribes and local governments can participate in the program at any time.

The SHPO, tribes, and local governments are typically invited to participate in critical project decision-making milestones, such as developing a project's purpose and need, scoping, screening preliminary alternatives, etc.

What is the value of their participation from your agency's perspective? From the consulting parties' perspectives?

Participating in CETAS provides the resource agencies an opportunity to identify potential resource conflicts early in project planning and development. From the perspective of ODOT's Section 106 partners, the CETAS process gives the SHPO, tribes, and local governments a seat at the table and an opportunity to voice their concerns.

What are most critical factors to having a successful program?

A few key individuals drove the process from concept to fruition; their vision was supported at the executive level, which was critical to the program's success. The commitment of the participating agencies to the CETAS process also was an important factor in the program's success.

What would you do differently if you were starting the program today?

ODOT should have been clearer on the roles and responsibilities of the participants, when initiating the program. The Department also should have developed a plan to deal with staff turnover and its affects on the program.

Initial members of CETAS were agency managers. Currently, lower-level staff are the primary CETAS participants. While this is not a problem, these staff members require some additional decision-making authority in order to make effective use of their time working on the program.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

To implement a CETAS-like program, executive-level support within the state DOT is critical. Everything else flows from this support.

> Information provided by:
> Bill Ryan, CETAS, Program Support Unit Manager
> Oregon Department of Transportation

5.2.11 Texas Capital Area Metropolitan Planning Organization (CAMPO) – Regional Planning

Why did you create the program?

The Texas CAMPO always included environmental analysis in its regional plans. After the passage of SAFETEA-LU in 2005, however, CAMPO decided to update their long-range regional plan in order to fulfill the requirements of the Act. CAMPO staff went to their regional planning partners, all of whom were aware of the changes in SAFETEA-LU, and discussed collecting more environmental data for CAMPO's existing GIS database, and improving the program's environmental analysis process.

How did you set it up, especially in terms of funding and staffing?

CAMPO established a working group composed of its regional planning partners, including the Texas Historical Commission (i.e., the SHPO), to provide input and guidance on updating the regional plan and improving the GIS database.

The Planning Director at CAMPO was the driving force behind the effort to update the regional plan and improve the database. Prior to implementing this initiative, CAMPO staff had to secure approval on the technical aspects of the plan update from CAMPO's Technical Advisory Board, and then had to convince the Transportation Policy Board on the value of the initiative.

Four staff members, including the Planning Director and CAMPO's GIS expert, worked on the initiative. The initiative was funded using CAMPO's regular planning monies, and covered salaries, supplies and meeting costs.

What obstacles or problems did you encounter?

CAMPO staff acquired a variety of data sets for updating their GIS database; however, the quality and outdated nature of some of the data presented problems. Cultural resources were not originally included in the database; however, CAMPO staff subsequently asked the SHPO for their cultural resource GIS data, which the SHPO provided.

How do you maintain the program, especially in terms of funding and staffing?

CAMPO maintains the environmental database out of its regular funding. Two staff positions devote part of their time to the maintenance of the database.

What obstacles or problems are you encountering?

Acquiring local environmental data in a compatible GIS format has, in some cases, been difficult.

What are the most critical factors to having a successful program?

The participation of all the resource agencies, including the SHPO, was critical to the initiative's success. CAMPO's partners provided important sources of GIS environmental data, such as the TxDOT's GISST database and screening tool.

CAMPO shares its environmental data with other agencies and organizations in the region. These parties are excited about the program because they can use the database and associated planning tools in their own planning efforts. From their perspective, this sharing of data and analytical tools is unprecedented.

What would you do differently if you were starting the program today?

More time should have been allocated to acquiring and developing local environmental data. Developing performance measures was not part of the initial program, and in retrospect, should have been included. CAMPO currently is working on adding these measures to the program.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

Any planning or transportation agency considering a similar program needs to focus on achieving the following goals early in the program's development:

- Identify all resource agencies and planning partners that should participate in the program; and

- Obtain their buy-in to the program, and encourage their full participation.

> Information provided by:
> Michelle Meaux, Senior Planner
> Capital Area Metropolitan Planning Organization

5.2.12 Virginia DOT's Comprehensive Environmental Data and Reporting System (CEDAR) Program

Why did you create the program?

In the early 2000s, Virginia DOT (VDOT) came under criticism during an audit of the Department's environmental commitments tracking system. VDOT realized they needed a database to control environmental information, so the Department decided to create a new program for tracking these commitments, in addition to all environmental information. At the time of the audit, VDOT was beginning to develop a GIS for tracking project-related environmental activity; so, the Department used the audit results as the impetus and leverage for getting SPR funds to develop a comprehensive environmental GIS.

How did you set it up, especially in terms of funding and staffing?

In-house IT experts and a few consultants to augment in-house staff developed the GIS. As a first step, VDOT spent six months conducting research and discussing the program with potential users within VDOT's environmental office. The goal was to fully document how VDOT staff would want to use the proposed GIS, once it was in place.

SPR funds were used for staff's time to develop the CEDAR program and database. Funds were not used for hardware. The State's IT agency reviewed the development of the GIS, as did an internal VDOT IT board. Since SPR funds were used, FHWA also had a review role.

Prior to initiating the environmental database, VDOT IT staff had just finished developing the SHPO's data-sharing system, a web, and GIS-enabled cultural resource database. VDOT had used SPR money to develop SHPO's database.

After one full year (2003) of internal interviews and requirement development, VDOT created a read-only release of the database. The Department had several already existing, but varied cultural resource databases created by individual VDOT staff. All of these legacy databases were converted into the new database. In 2004, the new system was in place.

What obstacles or problems did you encounter?

One obstacle was getting buy-in from the environmental staff and from staff unfamiliar with using computers to track environmental data. This new program placed all environmental data in one place, and forced everyone to work the same way, using predefined environmental screens. Implementing this program was the single largest change in the history of VDOT's environmental program.

Working with the environmental staff (i.e., the future users) in developing the program helped advance CEDAR. Users had input into the design of the program, so CEDAR was built from the bottom up, not the top down. This helped in obtaining buy-in from VDOT staff.

How do you maintain the program, especially in terms of funding and staffing?

VDOT uses in-house staff and resources to maintain the program, and most of these individuals were involved in the creation of the database. The Department's IT administrative funds are used to maintain the program. VDOT has two full-time employees and another half-time employee maintaining the program.

What are the most critical factors to having a successful program?

The most critical factor was having an in-house team to develop the program, and having this same team involved in maintaining the program.

What advice would you give a state DOT or local planning organization that wants to do what your agency has done?

In order to get things right the first time, a state DOT needs to carefully define the database's business requirements. In addition, agencies need to understand that it takes time to carefully define these business needs.

What came out of the program that was unexpected, but still beneficial?

CEDAR has raised VDOT staff's awareness of the different environmental components associated with transportation project delivery. The program shows the connectivity of different environmental modules within the project delivery system, and forces staff to take a systemwide approach. This all came about as a result of implementing an IT practice requiring a single approach to entering environmental data, and having a system that had to anticipate how data would be shared among users.

Information provided by:
Tony Opperman, Preservation Program Manager
and Angel Deem, CEDAR Administrator
Virginia Department of Transportation

6.0 Conclusions

6.1 Keys to Effective Practices

All of the best practices discussed in this report share several key elements that are critical to the success of state DOT and local planning organization programs. These elements include leadership, funding, technology, interagency cooperation and collaboration, and organizational change. These key elements are not unique to best practices for considering historic preservation issues during planning and early project development. They also are critical to the success of programs integrating natural resource issues into the planning process *(6, 7, and 8).*

6.1.1 Leadership

Generally, an individual or group of individuals within a transportation agency recognizes a problem and has an idea about how to solve the problem, and then "champions" the idea. At the Minnesota DOT, for example, the idea of building an archaeological predictive model was initiated by a single staff member, and this individual became the idea's champion, moving the idea through the Department's approval process. In other cases, an innovative idea or practice comes from the top. In New Mexico, for example, the Secretary of Transportation created the tribal liaison position in the Department's Planning Division on her own authority.

After the passage of ISTEA, TEA-21, and more recently SAFETEA-LU, both FHWA and AASHTO took a leadership role, providing guidance to state DOTs and local planning organizations on how to effectively implement the requirements of these laws and their associated regulations. Passage of these laws and subsequent actions by FHWA and AASHTO were often cited in the current study as the impetus for states' and local planning organizations' efforts to restructure and retool their planning and early project development processes and practices, particularly in terms of broadening the scope of consultation with resource agencies, such as SHPOs, local governments, tribes and others stakeholders.

6.1.2 Interagency Cooperation and Collaboration

Almost all of the planners and CRM staff interviewed during this study noted that their respective programs could not have been implemented without the cooperation and collaboration of their partners within resource agencies, tribes, and other organizations. This cooperative effort involved working as a team to develop and then implement the program, establishing the program's communication procedures and protocols, and meeting on a continual basis to evaluate the program's progress and effectiveness.

Interagency cooperation and collaboration also are essential to the preparation and implementation of Section 106 programmatic agreements, such as North Dakota DOT's tribal consultation PA, the Colorado DOT PA developed for the tiered I-70 EIS, and the Indiana DOT PA for the I-69 Evansville to Indianapolis project. A Section 106 PA is an excellent tool for establishing procedures and protocols for considering historic preservation factors during both planning

and early project development; and, as in the case Indiana's historic bridges PA, can serve as a mechanism for addressing statewide historic preservation and project delivery issues.

There are, however, serious impediments to interagency collaboration. As noted in the NCHRP 25-25, Task 32 report on considering environmental resources during planning, "[f]inancial and staff capacity constraints are often cited as a barrier to collaboration. Resource agencies often reported that they had insufficient staff to actively participate in interagency planning *(8,* page 5-3*).*" Not surprisingly, the current study shows that shrinking staff and resources have affected the ability of SHPOs to participate in the planning process.

6.1.3 Funding

States and local planning organizations rely on a wide variety of funding sources to pay for their respective programs and practices. In some cases, state DOTs and local planning organizations use state and local funds to create and maintain their programs (e.g., Oregon DOT's CETAS program and North Dakota DOT's tribal consultation programmatic agreement). In other cases, Federal financial support has been essential. The predictive archaeological model developed by the Minnesota DOT, for example, relied on TE funds. Colorado DOT is using SPR funds to develop its new PEL process. Some states use project-specific Federal funds to pay for program maintenance and staffing (e.g., North Carolina DOT's archaeological predictive model). The Florida DOT, in cooperation with the FHWA, takes a portion of the State's STP funds "off the top" to maintain their ETDM program.

The current study highlights many of the financial avenues available to state DOTs and local planning organizations. An individual or group of individuals within an agency, however, has to establish agency priorities and then find the funding to address these priorities. As demonstrated by the various case studies, this individual or group of individuals must, at times, be willing to think outside the standard "financial box." Another critical element is convincing those who hold the purse strings on the benefits of the proposed practice or program. As demonstrated by several of the practices discussed in Sections 4.0 and 5.0, these benefits include reducing project costs and schedules, reducing or eliminating conflicts between transportation and resource agencies, and enhancing historic preservation stewardship.

6.1.4 Technology

Many of the practices used by states and local planning organizations are only possible as a result of recent technological advances, especially GIS *(6 and 8)*. These databases range from a cultural resource GIS used to identify "red flags" as part of the planning process; to GIS-based portals, such as California and Arizona DOTs' cultural resource ROWs databases; to Florida's GIS, web-based ETDM program.

Another powerful tool is a GIS-based archaeological predictive model. These statistically verified models can be used to characterize and analyze project alternatives, develop "constraint mapping," and define the scope and cost of archaeological surveys within proposed project alternatives. The benefits of these archaeological models have been demonstrated by the effectiveness of Minnesota's Mn/Model, the Vermont Agency of Transportation statewide archaeological model, North Carolina's seven-county modeling pilot project, and Texas DOT's Houston area "Potential Archeological Liability Map."

6.1.5 Organizational Change

Several state DOTs changed their internal structure and processes in order to more effectively integrate environmental factors into the planning process (see Florida's ETDM process, Ohio's PDP program, and Virginia's CEDAR program). Changes also were made in the relationships and interactions among transportation and resource agencies (see Florida's ETDM process and Oregon's CETAS program). The consideration of historic preservation issues was not necessarily the impetus for these types of organizational and interagency changes, but as demonstrated by the practices discussed in this report, was definitely a beneficiary of these changes.

6.1.6 Spin-Offs

A final element common to several of the best practices is the unanticipated benefits, or "spin offs," from implementing these practices. North Carolina DOT, for example, developed its pilot archaeological predictive model as a tool for project development; but, the Department also is making the model available to local governments who now use the model for making local land use planning decisions that extend beyond transportation. In another example, California DOT provided information to tribes on the security protocols for accessing archaeological and ethnographic information within the districts' cultural resource databases. This helped build trust between Caltrans and the tribes, and subsequently improved the effectiveness of tribal consultation during project development.

6.2 A Toolkit for Building Effective Practices

The practices discussed in Sections 4.0 and 5.0 can be placed along a continuum of increasing complexity and cost. At one end are practices that identify cultural resource locations, including "red flags," using a computerized inventory. These "red flags" include cultural resources protected under Section 4(f) of the Department of Transportation Act, in addition to other resource categories that might have an impact on project design, costs, and scheduling. These databases also can be used for "constraint mapping," identifying areas that should be avoided, if possible, when defining alternative locations and design options.

To supplement existing cultural resource data, some states conduct historic architectural investigations within proposed project areas in order to identify cultural resources that may be potential Section 4(f) properties. The results of these field investigations are used to define specific project alignments that avoid these protected properties.

Further along the continuum is the use of archaeological predictive modeling. Some DOTs have developed statistically based predictive models for defining archaeological sensitivity areas. These sensitivity areas are used during early project development as a means to characterize and analyze project alternatives, particularly those at the preliminary or conceptual stage. Modeling also is used to define the scope and cost of archaeological surveys within proposed project alternatives.

At the opposing end of the continuum are state DOTs that have detailed, formal, interagency procedures for considering historic preservation factors during planning or early project development. These procedures are often codified in manuals and guidelines. A couple of states implement these procedures through a GIS-based decision-making process.

Regular consultation with SHPOs, tribes, and other stakeholders is another important tool for considering historic preservation issues during planning and early project development, complementing the technological and procedural practices summarized above. This consultation can take place through regular face-to-face meetings or through web-based communication networks.

Tables 6.1 and 6.2 graphically portray this continuum of best practices, and provide a summary of the range of tools and processes available to state DOTs and local planning organizations. Table 6.1 highlights the elements and outcomes of practices involving the use of cultural resource databases. The first element listed is a database containing information and documentation on where cultural resources are located across the landscape. The next element, a portal, moves up the ladder of complexity, and contains resource locational data in addition to all available information and documentation on the resources included in the database. This is followed by a screening tool that uses information contained within one or both of the two previous elements. Computerized screening tools are used to identify the location and nature of cultural resources within proposed project areas, corridors, alternative, etc.; and to assess potential impacts from a proposed transportation project or projects. The next element is a GIS-based archaeological predictive model. The final element involves interagency access to some or all of the data contained within the previous four elements. The "outcomes" shown in the table are the analyses that can be accomplished using each of the listed elements. The two right-hand columns provide case study examples from Sections 4.0 and 5.0 for each of the elements.

Table 6.2 lists the different decision-making tools and processes available to state DOTs and local planning organizations. These range from Section 106 programmatic agreements to web-based decision-making processes.

Some of these tools and processes highlighted in these two tables can be used in isolation. A tribal consultation protocol, for example, can be codified and fully implemented through the use of an interagency/intertribal programmatic agreement. Regular face-to-face meetings between a state DOT and the SHPO can serve as a simple, direct approach to information exchange and decision-making. The elements listed in both tables also can be used in combination and as building blocks. For example, one can begin with the development of a locational GIS database, then add a screening tool function to the database, and then use the database for interagency collaboration and decision-making, following standardized protocols and procedures.

Table 6.1   Cultural Resource Databases

Elements	Outcomes	Case Study Examples – Planning	Case Study Examples – Early Project Development
1. Locational Database			
• Inventoried areas • Archaeological sites, historic built environment, etc. • Historic maps, aerial photographs, etc.	• Identify resource locations • Conduct "red flag" analysis • Develop constraint mapping • Identify data and inventory gaps	• Illinois DOT • Indiana DOT • Ohio DOT • Virginia DOT	• Pima County, Arizona
2. Portals			
• Same as #1 • Section 106 consultation documentation (resource records and forms, CRM reports, correspondence, National Register determinations, etc.)	• Same as #1 • Document and track cultural resource management history of properties		• Arizona DOT • California DOT • Virginia DOT
3. Screening Tools			
• Same as #1 and #2 • Transportation planning elements (e.g., proposed project locations in STIP, TIP, etc.)	• Same as #1 and #2 • Assess potential cultural resources impacts and issues (e.g., Section 4(f), Section 106)	• Colorado DOT • Florida DOT • Texas CAMPO • Virginia DOT	
4. Predictive Modeling			
• Same as #1 • Modern land use data • Gemophological data • Statistical analyses	• Evaluate potential effects to cultural resources within project areas • Identify avoidance options • Identify locations requiring minimization or mitigation • Estimate scope, costs, and schedule for inventory and mitigation		• Indiana DOT • Kansas DOT • North Carolina DOT • Minnesota DOT • Texas DOT • Vermont AOT • Washington DOT
5. Interagency Data Sharing			
• Same as #1 #2, #3, and #4	• Establish equal access to cultural resource data for planning and project development • Use of shared data for individual agency needs	• Oregon DOT • Florida DOT	• Alabama DOT • Arizona DOT • California DOT • Georgia DOT • Ohio DOT • Oregon DOT • Virginia DOT • Washington DOT

Table 6.2   Cultural Resources Decision-Making Tools and Processes

Elements	Outcomes	Case Study Examples – Planning	Case Study Examples – Early Project Development
1. Agreements			
• Section 106 Programmatic Agreements	• Establish communication protocols among parties • Streamline compliance process • Replace case-by-case project or property review	• North Dakota DOT • Indiana DOT	• Colorado DOT • Indiana DOT
2. Staff Liaison			
• Funding • Staffing agreement establishing roles and responsibilities	• Streamlines planning and project administration • Establishes communication links between agencies	• New Mexico DOT • Ohio DOT	• New Mexico DOT • Ohio DOT • Washington DOT
3. Meetings			
• Regularly scheduled meetings among transportation agencies, SHPOs, tribes, and stakeholders	• Improve communication and collaboration • Enhance problem-solving	• Georgia DOT • South Dakota DOT	• Washington DOT
4. Interagency Decision-Making Process			
• Established decision-making procedures	• Streamlines and enhances planning and Section 106 and NEPA compliance decision-making	• Ohio DOT • Oregon DOT	• Ohio DOT • Oregon DOT
5. Web-Based GIS Decision-Making Process			
• Same as #4 but conducted and captured using interagency GIS	• Same as #2, #3, and #4	• Florida DOT • Colorado DOT (in process)	• Florida DOT

6.3 Some Final Observations

The initial on-line survey and follow-up interviews highlighted three factors that can impact the effectiveness of programs that consider historic preservation issues during planning and early project development. These include how a cultural resource database is constructed, decisions about a proposed program's scale and scope, and constraints on SHPO participation.

6.3.1 Building a Database

When developing a cultural resource database, or any type of environmental database, it is important to first determine how the database will be used. As demonstrated by Virginia

DOT's CEDAR program, creating a database should begin with research on potential systems and discussions with the ultimate users of the database, followed by the development of the business requirements that will guide the creation and implementation of the database. One should develop these computerized systems from the bottom up, not from the top down. If the latter approach is used, the resulting system may not be what the users want or can even effectively use.

6.3.2 Scale and Scope

Another important decision is determining the most effective scale and scope for the program. Do you "test" the proposed database or process through a pilot program or a group of projects; or do you implement the program statewide? Using a pilot program or group of projects is less costly and takes less time than applying a database or program statewide. If, however, resources are not available for subsequent statewide expansion of a successful pilot project, the ability of a state DOT to integrate historic preservation factors into the planning process and early project development will be limited. FDOT decided on a holistic approach for their ETDM program. When fully developed (the program was built incrementally), FDOT had in place a program that streamlines all of the Department's projects. This would not have been possible if FDOT focused on a group of projects or ran ETDM as a pilot program; and, based on the positive results of implementing ETDM statewide, a holistic approach was the correct choice.

6.3.3 SHPO Participation

SHPO participation is critical to advancing the consideration of historic preservation issues during both early project development and planning. The follow-up interviews, however, found that few states consult with their SHPOs during planning. Of the 18 DOTs participating in the follow-up interviews, two reported having face-to-face meetings with their SHPO during planning (i.e., Georgia and South Dakota). A third state, Florida, uses its web-based decision-making process to consult with their SHPO on a continual basis, capturing the results of this consultation electronically.

Several state DOTs noted that a lack of staffing and resources prevented their SHPO from participating in the planning process. As a result of limited staff and resources, most SHPOs focus on project development. Of the 18 DOTs interviewed for the current study, roughly half said their SHPOs did not respond to requests for consultation until the state DOT had identified a specific project and had began the NEPA review process.

One way to help SHPOs become active participants in the planning process is for FHWA and state DOTs to provide sufficient funding to the SHPOs so one of their staff can devote his or her time to participating in planning. Both Florida and Ohio DOTs, for example, fund positions within their respective SHPOs, so SHPO staff can actively participate in transportation planning activities such as screening proposed project areas and alternatives, attend planning meetings, and identify areas of cultural resource concern.

6.4 Suggestions for Advancing Results of Study

The following are some suggested mechanisms for disseminating and advancing the results of this study:

- State DOTs and FHWA division offices will be notified about the study's completion through NCHRP's web site and subsequent announcements by AASHTO's Center for Environmental Excellence and by the Transportation Research Board's (TRB) Historic and Archaeological Preservation Committee (ADC50). It is suggested that additional organizations be informed about the publication of this report. These organizations include the National Conference of State Historic Preservation Officers (NCSHPO), the National Association of Tribal Historic Preservation Officers (NATHPO), and national associations for local transportation planning agencies, such as MPOs. Information on the study can be posted on the web sites and listserves of these agencies and organizations.

- Develop a series of case studies representing the most effective practices identified in this NCHRP report. The case studies would be condensed versions of the write-ups included in this report. These case studies would be about one-page long and would follow a standardized format that could easily be posted on the web sites noted above, in addition to FHWA's environmental web sites.

- These case studies would serve as the basis for presentations at various TRB meetings, in addition to the annual meetings of NCSHPO, NATHPO, and the national associations of local transportation planning agencies. The case studies might also be used to develop a webinar on the consideration of historic preservation factors during planning. The goal of these efforts is to promote implementation of these best practices. The presentations and webinar might be developed and delivered by FHWA, representatives of the state DOTs and local planning organizations that participated in this NCHRP study, and/or the report's authors.

- The case studies can also be used as the foundation for regional and national workshops that serve as peer exchanges among practitioners. The goal of these workshops would be to promote proactive, collaborative approaches to the consideration of historic preservation during the project delivery process, particularly during systems planning. The workshops would also include discussions of the "integrating historic preservation and transportation planning" principles recommended by the ACHP. Workshop participants would include FHWA state division offices, state DOTs, local planning organizations, SHPOs, tribes, and other transportation and historic preservation stakeholders.

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Appendix A

Initial Survey Questionnaire

Initial Survey Questionnaire

1. Do you and/or the metropolitan planning organizations or other local planning organizations that you work with include historic preservation factors and concerns in statewide and regional transportation planning efforts and programs?

   ☐ Yes.

   ☐ No.

2. Do you and/or the metropolitan planning organizations or other local planning organizations that you work with involve any of the following individuals or groups in statewide and regional transportation planning efforts and programs? Select one or more from the list below.

   ☐ State Historic Preservation Officers (SHPO).

   ☐ Tribal Historic Preservation Officers (THPO).

   ☐ Federally recognized tribes.

   ☐ Other Section 106 consulting parties (local governments, applicants for Federal assistance, local historic preservation organizations, etc.).

   ☐ No, the above individuals or groups are not involved in statewide and regional transportation planning efforts and programs.

3. At what point do you FIRST involve SHPOs, THPOs, tribes, and other Section 106 consulting parties? Select ONLY ONE answer from the list below?

   ☐ During preliminary corridor or feasibility studies.

   ☐ When defining a project's purpose and need.

   ☐ Identifying conceptual/preliminary alternatives.

   ☐ Conducting analysis of the alternative(s) retained for detailed study (i.e., defining the project's affected environment)?

4. At what point do you FIRST consider cultural resources (e.g., archaeological sites, historic buildings and structures, traditional cultural properties, etc.)? Select ONLY ONE answer from the list below.

☐ **During preliminary corridor or feasibility studies.**

☐ **When defining a project's purpose and need.**

☐ **Identifying conceptual/preliminary alternatives.**

☐ **Conducting analysis of the alternative(s) retained for detailed study (i.e., defining the project's affected environment)?**

5. **Comments. Please feel free to provide any comments you may have in the space provided below:**

Appendix B

Follow-Up Survey Questionnaire

Follow-Up Survey Questionnaire

Follow-up Questions for NCHRP 25-25 Task 49 Survey.

1. Do you and/or the metropolitan planning organizations or other local planning organizations that you work with include historic preservation factors and concerns in statewide and regional transportation planning efforts and programs?

    To all those states that answered YES:

    *   Why do you include historic preservation factors/concerns in the statewide/regional transportation planning?

    *   What historic preservation factors/concerns are included in the planning process?

    *   How is information on these factors/concerns used in statewide/regional transportation planning?

    *   How does including these factors/concerns in statewide and regional planning benefit the DOT?

2. Do you and/or the metropolitan planning organizations or other local planning organizations that you work with involve any of the following individuals or groups in statewide and regional transportation planning efforts and programs? Select one or more from the list below.

    To all those states that answered YES:

    *   Why do you involve these groups or individuals in statewide and regional transportation planning?

    *   How are these individuals or groups involved in statewide and regional transportation planning and to what extent?

    *   What outcome results from involving these groups or individuals in statewide and regional transportation planning?

3. At what point do you FIRST involve SHPOs, THPOs, tribes, and other Section 106 consulting parties? Select ONLY ONE answer from the list below?

    To all those states that selected responses 1 to 3, but not 4:

    *   Why are the Section 106 parties involved at this point in the planning process?

    *   How are the Section 106 parties first involved? What kinds of information are collected during this first involvement?

4. At what point do you FIRST consider cultural resources (e.g., archaeological sites, historic buildings and structures, traditional cultural properties, etc.)? Select ONLY ONE answer from the list below.

    To all those states that selected responses 1 to 3, but not 4:

    -   Why do you first consider cultural resources when you do?

    -   What about cultural resources do you first consider?

    -   How is this information used in the planning process?