

GAO

Report to the Ranking Minority Member,
Committee on Environment and Public
Works, U.S. Senate

April 2003

HIGHWAY INFRASTRUCTURE

Perceptions of Stakeholders on Approaches to Reduce Highway Project Completion Time



G A O

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Highlights of [GAO-03-398](#), a report to the Senate Committee on Environment and Public Works

Why GAO Did This Study

Constructing, improving, and repairing roads is fundamental to meeting the nation's mobility needs. The Federal Highway Administration (FHWA) supplies most of the money (about \$20 billion in fiscal year 2003), and state departments of transportation are primarily responsible for completing projects. Many federal and state agencies (called resource agencies) help ensure that environmental and other concerns are considered. These and other organizations have recognized that the time it takes to complete complex federally funded highway projects is too long—in some cases nearly 20 years.

GAO was asked to report the views of knowledgeable officials on the most promising approaches for reducing completion time for federally funded highway projects. GAO obtained the views of 33 officials from federal, state, and private organizations with interests in federally funded roads.

What GAO Recommends

GAO recommends that FHWA consider the benefits of the 13 most promising approaches and take actions needed to foster more widespread adoption of those that appear to be the most cost effective. While not commenting on the recommendation, the Department of Transportation generally agreed that these approaches represent opportunities to reduce project completion time.

www.gao.gov/cgi-bin/getrpt?GAO-03-398.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Katherine Siggerud at (202) 512-2834 or siggerudk@gao.gov.

HIGHWAY INFRASTRUCTURE

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What GAO Found

Respondents from 33 organizations identified 13 approaches as most promising for reducing the time it takes to plan, design, gain approval for, and build a federally funded highway project. These approaches fell into three areas:

- Improving project management.** Most approaches (8 of 13) focused on state-level activities that could be conducted earlier than customary, with 90 percent of respondents indicating that establishing early partnerships and early coordination among all project stakeholders is highly important to reducing project completion time. Other approaches included added flexibility for states in determining impacts on historic properties and imposing time limits on environmental reviews.
- Delegating environmental review and permitting authority.** Between half and two-thirds of the respondents indicated that utilizing programmatic agreements between transportation and resource agencies to address commonly occurring issues, unifying overall environmental assessments with reviews of project impacts on wetlands, and creating large banks of wetlands to replace those lost at highway project sites offered significant promise for reducing project completion time.
- Improving agency staffing and skills.** Nearly 60 percent of the respondents indicated that using interagency funding agreements in which state departments of transportation can ensure timely attention to environmental reviews of their projects by funding staff at federal or state resource agencies offered significant promise to reduce project completion time. About half of the respondents told us that adequate training of transportation staff on the requirements of all steps in completing a highway project was also a promising approach.

For the most part, the respondents were not able to estimate how much time adopting one or more of these approaches might save. Respondents' views varied both within similar types of organizations (such as state departments of transportation) and across lines of responsibility or interest. Generally, agencies and other organizations with primary responsibilities for or interests in building and funding highways ranked certain approaches higher than did agencies and associations with a primary focus on resource issues, and vice versa. Nonetheless, most of the 13 most promising approaches had widespread support across organizations.

Although some of these approaches are in use across the country, respondents acknowledged that the usefulness of these approaches could vary by the type of project or community values. For example, projects that are not complex or contentious would not necessarily achieve the time savings that these approaches afford for projects with complex characteristics or disagreement among stakeholders.

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Abbreviations

FHWA Federal Highway Administration
NEPA National Environmental Policy Act

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United States General Accounting Office
Washington, D.C. 20548

April 9, 2003

The Honorable James M. Jeffords
Ranking Minority Member
Committee on Environment and Public Works
United States Senate

Dear Senator Jeffords:

Constructing, improving, and repairing roads and bridges are fundamental to meeting the nation's mobility needs to facilitate commerce, national defense, and pleasure use and to promote economic growth. Therefore, the Congress has an interest in seeing that federally funded highway projects are completed in a timely manner. Many of the organizations with a role in highway project completion have recognized that completing major highway construction projects takes too long—in some cases about 20 years. As a result, these organizations—including the Federal Highway Administration (FHWA), state departments of transportation, and other stakeholders—have acted to reduce project completion time by developing initiatives in several areas and by publicizing what they believe are successful strategies. The Transportation Equity Act for the 21st Century, enacted in 1998, contained provisions designed to streamline environmental reviews, a component of projects often cited as offering the greatest opportunity for reducing the completion time of federally funded highway projects. As the reauthorization of this act approaches, the Congress may again consider approaches for reducing the time it takes to complete a federally funded highway project so that transportation benefits are realized sooner.

You requested that we report on knowledgeable officials' views on the most promising approaches to reduce project completion time for federally funded highway projects. To carry out this work, we asked officials from various federal and state agencies with responsibilities relating to the construction of federally funded roads, transportation engineering organizations, transportation professional associations, historic preservation organizations, environmental organizations, and tribal organizations to identify the most promising approaches for reducing project completion time by a substantial amount for federally funded highway projects of all types and complexities. We asked these officials to identify other stakeholders with expertise and asked those individuals also to identify promising approaches. Overall, 42 stakeholders identified 49 approaches. We then asked these officials to rate each approach on its

potential for reducing project completion time. Thirty-three officials representing different interests provided these ratings. The approach we used makes two contributions. First, it captures the views of a wide range of stakeholders that are identified by their peers as knowledgeable. Second, it provides a systematic assessment of the perceived value of all approaches involving all aspects of completing federally funded highway projects that were identified by knowledgeable stakeholders. We did not attempt to corroborate the need to implement these approaches or the reasons why respondents rated individual approaches as they did. In addition, we did not attempt to determine how effective the promising approaches, where already implemented, were in reducing highway project completion time. (See app. I for additional details on our scope and methodology.)

Results in Brief

Respondents from 33 organizations representing a wide range of federal, state, tribal, and advocacy interests generally rated 13 approaches of the 49 that they identified as most promising for reducing the time it takes to plan, gain approval for, design, and build a federally funded highway project. (See table 1.) These approaches fell into three key areas: (1) improving project management, (2) delegating environmental review and permitting authority, and (3) improving agency staffing and skills. One of these approaches, establishing early partnerships and coordination among stakeholders so that technical, environmental, policy, and other issues can be resolved in a timely and predictable manner, was strongly supported by 28 of 31 (90 percent) respondents.¹ Other approaches, although viewed as promising by respondents overall, received less widespread support across different groups of stakeholders that we contacted. Some state departments of transportation are employing some of these approaches. For example, according to FHWA, 34 states have agreements in which state departments of transportation provide funding for personnel at state and federal environmental agencies for expediting reviews. For the most part, respondents were not able to estimate how much time adopting one or more of these approaches might save. The respondents also acknowledged that the usefulness of these approaches could vary by the type of project or community values. For example, for projects that are not complex or contentious, these approaches would not necessarily save the same amount of time that they would for projects with complex characteristics

¹Two of the 33 respondents did not provide a rating for this approach.

or disagreement among stakeholders. We are making a recommendation to the Department of Transportation to foster more widespread use of the 13 most promising approaches, where appropriate. While it did not directly comment on our proposed recommendation, the department generally agreed that the 13 most promising approaches discussed in our draft report represent opportunities to reduce project completion time.

Table 1: Most Promising Approaches for Reducing Highway Project Completion Time, as Identified by Stakeholders

Key area	Approach
Improving project management	Establish early partnerships and coordination - Involve stakeholders early so that technical, environmental, policy, and other issues can be resolved in a timely and predictable manner.
	Revise section 4(f) of the Department of Transportation Act - For projects on public lands, use the protections found in section 106 of the National Historic Preservation Act of 1966 for consideration of historic properties and other historic resources.
	Use geographic information systems - Use the data collected by federal and state resource agencies on the location of historic properties and environmental resources in the state to identify environmental and historic issues early during environmental review.
	Establish time frames for resource agency review - Provide specific time frames for resource agencies to respond to environmental documents and produce any needed analyses. Reduce the 6-year time frame for lawsuits filed under the National Environmental Policy Act.
	Prepare preliminary environmental assessment reports - Provide information on any conditions and constraints prior to programming project cost and project schedule.
	Establish project milestones and performance monitoring systems - Specify key dates, such as when final design must be completed, and manage the project to meet the dates.
	Employ context sensitive design - Design projects that consider the community's environmental and social context so that projects are consistent with the values of the community.
Delegating review and permitting authority	Hold public information meetings early - Hold public meetings early and more often to provide information on projects that are planned or underway.
	Use programmatic agreements – Use agreements between transportation and resource agencies at the federal and/or state level to address commonly occurring issues.
	Unify Clean Water Act section 404 and National Environmental Policy Act reviews - Unify reviews so that section 404 wetlands reviews are addressed concurrently with other environmental issues.
Improving agency staffing and skills	Employ wetlands banking - Use agreements between state departments of transportation and wetlands permitting agencies to create large areas of wetlands in designated areas rather than addressing effects on small wetlands at each construction site.
	Use interagency funding agreements - State departments of transportation provide funding for staff at federal or state resource agencies to ensure timely attention to environmental issues.
	Provide training - Determine the skills available at state transportation departments in relation to federal and state requirements to complete each phase of highway projects and establish training programs for shortfalls.

Source: GAO.

Background

Officials in federal transportation and environmental agencies, state transportation agencies, and other stakeholder organizations (such as environmental organizations) generally agree that constructing a new federally funded highway is complicated and time consuming.² According to FHWA, constructing a new, major federally funded highway project that has significant environmental impacts typically takes from 9 to 19 years to plan, design, gain approval for, and complete construction. Projects take this long to complete because there can be as many as 200 major steps requiring actions, approvals or input from a number of federal, state, and other stakeholders. Projects with significant environmental impacts also face high levels of controversy that often results in a lack of sustained support from stakeholders. Federally funded highway projects are typically completed in four phases:

- **Planning:** State and local planning organizations and state departments of transportation assess a project's purpose and need and consider its need in relation to other potential highway projects.
- **Preliminary design and environmental review:** State departments of transportation identify project cost, level of service, and construction location; identify the effect, if any, of the proposed project and alternatives on the environment; and select the preferred alternative.
- **Final design and right-of-way acquisition:** State departments of transportation finalize design plans, acquire property, and relocate utilities.
- **Construction:** State departments of transportation award construction contracts, oversee construction, and accept the completed project.

The time required varies with the size of the project, its complexity, and the public interest in the project, but officials in federal and state agencies and other stakeholder organizations agree that delivering larger, more complex projects may take longer than is typical for most highway projects. In addition to needing more time because of their size and complexity, these

²U.S. General Accounting Office, *Highway Infrastructure: Preliminary Information on the Timely Completion of Highway Construction Projects*, [GAO-02-1067T](#) (Washington, D.C.: Sept. 19, 2002).

projects often take longer to complete because they must comply with more federal and state requirements and because of the public concern over environmental impacts they may generate.

FHWA provides financial assistance to states to build and improve highways and roads; establishes requirements related to planning, design, environmental review, and construction; and provides transportation engineering services (such as planning and design) for federally owned highways and bridges. For fiscal year 2003, FHWA expects to fund about \$20 billion in highway infrastructure improvements and congestion mitigations. The responsibility for designing, planning, and awarding contracts for federally funded highway projects generally rests with state departments of transportation and local planning organizations.

Before a federally funded highway project can be built, it must comply with the requirements of the National Environmental Policy Act of 1969 (NEPA), among other things. Under the act, the consequences, if any, of proposed transportation projects and alternative choices (such as alternative routings) on the natural and human (e.g., health) environment and on historic properties must be identified and assessed. For a federally funded highway project that will have a significant impact on the environment, the state department of transportation prepares an environmental impact statement, which FHWA must approve before the project can be built. The environmental impact statement must describe the project, characterize the surrounding environment, analyze the environmental effects of a range of reasonable project alternatives, and indicate plans for complying with environmental laws and mitigating environmental damage, if any. Other federal agencies (called resource agencies), such as the Army Corps of Engineers, Fish and Wildlife Service, Environmental Protection Agency, and Advisory Council on Historic Preservation, participate in the preparation and review of the environmental impact statements for highway projects because of their responsibilities under federal laws. These laws include section 404 of the Clean Water Act, section 4(f) of the Department of Transportation Act, and section 106 of the National Historic

Preservation Act.³ According to FHWA, only about 3 percent of all highway projects (accounting for about 9 percent of the funds) that received federal funding in 2001 had a significant enough impact on the environment to require preparation of an environmental impact statement.

Factors throughout the duration of a highway project can extend completion time; however, much attention has been given to the environmental requirements and their effect on timely completion. Concerned about how long highway projects take, the Congress included provisions in the Transportation Equity Act for the 21st Century to streamline environmental reviews. These provisions require FHWA to identify and work with federal agencies that have environmental and historic preservation jurisdiction over highway projects to cooperatively establish realistic project development time frames among the agencies and to work with the agencies to adhere to those time frames. Because transportation projects are also affected by state and local environmental requirements, the act allows individual states to participate in these streamlining approaches, as long as all affected states' agencies participate. Finally, the act also allows FHWA to approve state requests to use their federal-aid highway funds to provide additional environmental personnel dedicated to conducting environmental reviews of transportation projects in order to meet time limits established by the act.

³Any transportation project that involves discharge of dredged or fill material to navigable waters, including certain wetlands, requires a permit from the Army Corps of Engineers under section 404 of the Clean Water Act. The permit review may require mitigation of project impacts through specific measures to minimize or avoid damage to wetlands and compensate for unavoidable impacts.

Section 4(f) of the Department of Transportation Act applies to project use of publicly owned land of a public park, recreation areas or wildlife and waterfowl refuge, or public or private land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, recreation areas refuge, or site). Property for which section 4(f) is applicable can be approved for use of a transportation program or project only if there is no prudent and feasible alternative to using that land, and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register.

Most Promising Approaches Identified by Stakeholders Focus on Improving Project Management

Knowledgeable officials from 33 organizations representing a wide range of interests and responsibilities for the planning, design, environmental review, and construction of federally funded highways generally identified 13 approaches from the 49 promising approaches they identified as most promising for reducing the time it takes to complete a federally funded highway project. (See table 2 for how respondents rated the 13 most promising approaches. A more detailed discussion of the 13 approaches follows table 2. Table 6 in app. II describes the 49 approaches identified and the degree to which respondents told us each had potential for reducing highway project completion time.) One of the 13 approaches, establishing early partnerships and coordination among stakeholders so that technical, environmental, policy, and other issues can be resolved in a timely and predictable manner, was strongly supported by nearly all respondents. Other approaches, although viewed as promising by respondents overall, had less widespread support across different groups of stakeholders. Some state departments of transportation are already employing some of the 13 approaches, such as funding specialized staff, including biologists and historic preservation specialists, at federal and state resource agencies to assist with environmental reviews. For the most part, respondents were not able to estimate how much time adopting one or more of these 13 approaches might save.

Table 2: Percent of Respondents Rating the 13 Most Promising Approaches Highly, Including Average Rating

Nature of approach	Approach	Percent of respondents rating approach highly ^a	Average rating ^b
Improving project management	Establish early partnerships and coordination	90	4.5
	Revise section 4(f)	70	4.0
	Use geographic information systems	63	3.5
	Establish time frames for environmental reviews	60	3.6
	Prepare preliminary environmental assessment reports	53	3.6
	Establish project milestones and performance monitoring systems	52	3.6
	Employ context sensitive design	50	3.5
	Hold public information meetings early	50	3.5
Delegating review and permitting authority	Use programmatic agreements	68	4.0
	Unify Clean Water Act section 404 and NEPA reviews	58	3.7
	Employ wetlands banking	46	3.5
Improving agency staffing and skills	Use interagency funding agreements	59	3.6
	Provide training	53	3.7

Source: GAO.

^aPercent of all respondents ranking the approach as either having great or very great potential to reduce highway project completion time. Not all respondents rated each approach. Thirty or more of the 33 respondents (at least 91 percent) rated 11 of 13 approaches; 26 respondents (79 percent) rated the remaining 2 approaches. (See app. II.)

^bThe 13 most promising approaches were those with a rating of 3.5 or more on a 5-point scale, where a rating of 3 represented a moderate potential for reducing completion times and ratings of 4 and 5 represented great and very great potential for reducing project completion time, respectively. (See app. I.)

Most of the approaches (8 of 13) rated by our respondents as most promising fell into the category of strategies to improve project management, focusing primarily on state-level activities. Respondents also supported delegation of review and permitting authority (3 of 13 approaches, including the second and fourth highest rated approaches in terms of average rating); and identifying improvements in agency staffing and skills (2 of 13 approaches). None of the approaches in other broad areas identified by respondents as promising—alternatives to current construction contracting practices and improvements in disseminating information—were among the top 13. Furthermore, our results indicated that 9 of the 13 promising approaches (about 70 percent) were related solely to the planning and environmental review phases of a highway

project; the remaining 4 approaches offered opportunities for improved performance throughout the entire life of a project.

As can be expected, the level of support for each of these approaches varied within similar organizations, such as state departments of transportation. (See table 7 in app. II.) However, at least half of those charged primarily with funding and constructing highways (federal and state departments of transportation and organizations representing highway interests) as well as those organizations whose primary responsibilities or interests focus on resource issues (e.g., federal resource agencies and associations representing environmental interests) rated 6 of the 13 approaches (46 percent) as most promising.

While our results also showed a pattern that agencies and other organizations with primary responsibilities for or interests in building and funding highways ranked certain approaches higher than did agencies and associations with a primary focus on resource issues, and vice versa, most of the 13 most promising approaches had widespread support across organizations. (See table 3.) Regarding differences in rating, four approaches—metropolitan capacity building, acculturation, travel model improvement, and state funding of historic preservation activities—were rated highly by respondents with primary responsibilities for or interests involving resources and were rated significantly lower by respondents with primary responsibilities for or interests in funding or constructing a highway project.⁴ This can be explained, in part, by the fact that organizations we contacted identified roughly twice as many knowledgeable persons at organizations with primary responsibilities or interests in funding or constructing a highway project as they did for organizations with primary responsibilities for or interests involving resources, and the former group's views outweighed the latter group's views. Despite these differences, 8 of the 13 most promising approaches overall were in each group's "top 13" approaches.

⁴Acculturation, in part, is working to achieve recognition by transportation staff of the inherent benefits of environmentally sound projects and vice versa. See table 6 in app. II for a description of these approaches.

Table 3: Comparison of Rankings of 34 Approaches to Reduce Highway Project Completion Time by Transportation and Resource Respondents

Approach	Ranking among agencies or associations primarily affiliated with funding, managing, or constructing highway projects	Ranking among agencies or associations primarily affiliated with natural or historic environmental issues	Number of respondents primarily affiliated with funding, managing, or constructing highway projects	Number of respondents primarily affiliated with natural or historic environmental issues
Early partnership and coordination	1	1	20	11
Revise section 4(f)	2	16	20	10
Establish time frames for NEPA process	3	28	20	10
Programmatic agreements	4	9	20	11
Establish project milestones and performance monitoring systems	5	20	20	11
Unify Clean Water Act section 404 and NEPA processes	6	25	20	6
Formal elevation process	7	23	20	12
Wetlands banking	8	29	20	6
Training	9	8	20	12
Geographic information systems	10	3	20	12
Preliminary environmental assessment reports	11	6	20	12
Interagency funding agreements	12	4	20	12
Allow early right-of-way acquisition	13	31	19	10
Public information meetings	14	7	20	12
Partner with groups	15	14	19	12
Biennial reviews	16	27	18	11
Context sensitive design	17	2	20	12
Hire consultants or contractors	18	34	19	8
Internet	19	11	20	12
National conferences	20	21	20	11
Single agency point of contact	21	33	20	10
Acculturation	22	5	19	12
Environmental compliance mitigation systems	23	15	20	12
Metropolitan capacity building	24	13	18	8
Environmental information center	25	18	20	11
Aerial surveying and imaging technology	26	19	18	10
Videotaped guidance on promising approaches	27	22	20	11

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Approach	Ranking among agencies or associations primarily affiliated with funding, managing, or constructing highway projects	Ranking among agencies or associations primarily affiliated with natural or historic environmental issues	Number of respondents primarily affiliated with funding, managing, or constructing highway projects	Number of respondents primarily affiliated with natural or historic environmental issues
State funding of historic preservation activities	28	10	19	11
Professional organization membership	29	30	19	10
Regular publications	30	17	20	12
Awards program to recognize agency achievements	31	26	19	11
Infer the presence of endangered species	32	24	20	9
Peer reviews	33	32	20	10
Travel model improvement	34	12	19	9

Source: GAO.

Notes: In all, respondents identified 49 promising approaches. This table includes the 34 approaches where 75 percent or more of the respondents rated an approach. See app. I for a discussion of our methodology and table 6 in app. II for a description of the remaining 15 approaches.

Approaches in bold are the 13 approaches that respondents rated most highly overall.

The table is ordered from most popular to least popular among respondents with primary responsibilities for or interests in funding or constructing a highway project, to better show similarities and differences in rating.

The respondents acknowledged that these approaches might not work for every project or in every state because projects and communities vary widely. For example, projects that are not complex or contentious would not necessarily achieve the time savings that these approaches afford for projects with complex characteristics or disagreement among stakeholders.

Strategies to Improve Project Management

Among the 13 most promising approaches, 8 focused on improving project management at the state level. About half of these approaches were directed at undertaking activities earlier than usual. One promising approach—establishing early partnerships and coordination—stood out.

Establishing early partnerships and coordination. Ninety percent of the respondents rated establishing early partnerships and early coordination as highly important to reducing the time needed to complete a highway project. This approach addressed the commonly voiced concern that projects are halted late during environmental review because

previously unrecognized environmental impacts are brought to light. Respondents overwhelmingly told us that early identification of these issues and concerted efforts to address them sooner rather than later was the most promising approach for reducing the time it takes to complete a federally funded highway project. Support for this approach was generally unified across respondent affiliations, with 85 percent of those with primary responsibilities for or interests in funding or constructing a highway project and all of those with primary responsibilities for or interests involving resources rating it highly.

Adding flexibility to historic property reviews by revising section 4(f). About 70 percent of the respondents told us that adding flexibility to reviews of the potential impacts of proposed highway projects on historic properties and sites would either greatly or very greatly improve states' abilities to manage their highway projects. Historic properties are protected under two laws that are often viewed by stakeholders as duplicative and adding time to project completion: section 4(f) of the Department of Transportation Act and section 106 of the National Historic Preservation Act of 1966. Section 4(f) legislation prohibits the Department of Transportation from approving any highway project that uses, among other things, land of an historic site of national, state, or local significance unless it finds that (1) there is no prudent and feasible alternative that avoids such resources or causes less harm to them and (2) the project includes all possible planning to minimize harm to those resources. Section 106 of the National Historic Preservation Act of 1966 requires that projects that include federal participation consider the effects on any properties included in, or eligible for inclusion in, the National Register of Historic Places. Section 106 establishes a flexible consultative process that brings all parties into discussion, and was cited by some respondents as allowing for more productive outcomes that preserve the goals of the transportation project while creating meaningful protections of historic properties. Those advocating change wanted section 4(f) requirements to offer the flexibility of section 106 requirements. There was less agreement on the efficacy of this approach between those with a primary responsibility for or interest in funding or constructing highways (80 percent viewed this approach highly) and those whose primary responsibilities or interests rest with resources (50 percent viewed this approach highly). In some part, this lack of consensus reflected the differing views of whether legislative changes are needed to implement this approach or whether it could be accomplished administratively. For example, the American Association of State Highway and Transportation Officials has established a historic preservation work group to discuss and possibly seek solutions for section 4(f)

implementation, such as whether the requirements of section 4(f) could be considered as met if all parties sign a memorandum of agreement under section 106.

Use of geographic information systems data. Overall, 63 percent of the knowledgeable officials indicated that the use of geographic information systems data on the locations of historic property and environmental resources in the state had great or very great potential to reduce highway project completion time. Project duration can be extended when states are unable to accurately identify environmental resources or historic properties at the outset of environmental review when alternative road alignments are initially developed. Without this information, a preferred alternative may be selected, only to discover later that environmental resources or historic properties lie within the project alignment, delaying the project as impacts on the newly discovered resource are assessed. To address this dilemma, state transportation agencies and resource agencies increasingly use geographic information systems databases. According to respondents, by consulting these databases early during environmental review, transportation agencies can determine which project alignments would likely minimize any adverse impacts to natural or historic environmental areas. In addition, respondents indicated that using these databases would support integrated interagency reviews of a project's impact on the environment. Half of those with primary responsibilities for or interests in funding or constructing a highway project and 83 percent of those with primary responsibilities for or interests involving resources rated this approach highly.

Establishing deadlines for resource agency reviews. The majority of respondents also told us that projects could be managed better if more predictability existed in how long reviews to determine the level of impacts that proposed highway projects have on environmental and historic properties could be expected to take. In this vein, about 60 percent of the respondents highly supported establishing by law specific deadlines for resource agencies to provide their assessments of how a proposed highway project affects the environment or historic places. Some commented that resource agencies have no requirement for providing timely comments and feedback during creation of draft or final environmental impact statements, without which FHWA cannot allow a project to proceed. In addition, lawsuits challenging these FHWA decisions under NEPA can be filed for up to 6 years after FHWA has approved funding for the project after environmental review. Officials told us that lawsuits to challenge projects that are filed after the project has been put out to bid resulted in substantial

lost time and increased costs for state departments of transportation. According to these officials, establishing a shorter statute of limitations than the current 6 years for lawsuits to be filed would fully preserve citizens' rights to bring legal challenge while also achieving closure more quickly on any disputed issues. However, there was little consensus on this approach: 80 percent of those with primary responsibilities for or interests in funding or constructing a highway project rated this approach highly, but only 20 percent of those with primary responsibilities for or interests involving resources did so.

Preparing preliminary environmental assessment reports. About half of all respondents rated the idea of preparing preliminary environmental assessment reports highly. As discussed previously, state highway departments must assess the proposed project's impacts on the environment, if any. Respondents told us that obtaining information about a project's potential environmental impacts early, such as during the planning phase, could help transportation officials identify issues sooner and help move toward resolution earlier, thus saving time. Similar to establishing and utilizing geographic information systems databases, respondents explained that conducting field visits to the planned project sites, conducting literature searches, and documenting a proposed project site through photographs could help identify any environmental issues early. Slightly less than half of those with primary responsibilities or interests in funding or constructing a highway project (45 percent) and about two-thirds of those with primary responsibilities or interests involving resources (67 percent) rated this approach highly.

Establishing project milestones and performance monitoring systems. About half of the knowledgeable officials rated highly the concept of establishing project milestones and performance monitoring systems to help state transportation officials manage projects. Project milestones establish goals and expectations for as many as 200 major steps needed to plan, design, gain approval for, and construct a federally funded highway project. Performance monitoring allows state departments of transportation to determine whether goals are being achieved and take corrective action, if needed. Respondents indicated that off-the-shelf project scheduling software could meet this need. Finally, state transportation agencies do not typically capture information centrally on time spent on various aspects of their highway projects. Such information could be useful in managing the agencies' overall performance and help to identify opportunities for improvement.⁵ This approach was rated highly more often by those with primary responsibilities for or interest in funding or constructing a highway project (60 percent) than those with primary responsibilities or interests involving resources (36 percent).

Use of context sensitive design. Fifty percent of the respondents indicated that the use of context sensitive design has great or very great potential to reduce highway project completion time. In context sensitive design, engineering is driven by the needs of the community and the environment as well as by technical considerations. Context sensitive design goes beyond the early partnership and coordination approach discussed above to plan a project that not only meets transportation needs but also meets the underlying values of the community, such as strong attachment to certain historic or environmental resources. This requires an approach that involves all stakeholders, seeks to develop a highway project that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources while maintaining safety and mobility. About one-third (30 percent) of those with primary responsibilities for or interests in funding or constructing a highway project rated this approach highly. In contrast, 83 percent of those with primary responsibilities for or interests involving resources rated this approach highly.

⁵GAO-02-1067T.

Holding earlier, more frequent public meetings. About half of the respondents viewed earlier and/or more frequent public meetings as highly useful in reducing the time to complete highway projects. Respondents explained that public comments were sometimes not solicited until the state department of transportation had already identified a preferred alternative, rather than allowing for meaningful public input to address community concerns at the outset of developing suitable alternatives.⁶ Public information meetings allow transportation agencies to present information to the public on projects that are planned or underway and to obtain informal comments from community residents. Such meetings can help project sponsors understand the views of the community while communicating the project's purpose and possible impacts. At the same time, early opportunities for and incorporation of comments provides the community buy-in as the department of transportation addresses their concerns. About 40 percent of those with primary responsibilities for or interests in funding or constructing a highway project rated this approach highly, while two-thirds of those with primary responsibilities for or interests involving resources rated this approach highly.

Delegation of Review and Permitting Authority

A second set of promising approaches generally involved routinizing decisions on commonly occurring issues. According to FHWA, over 90 percent of highway projects are routine activities that do not impose extensive environmental impacts nor require substantial review. However, these routine activities may undergo lengthy or duplicative reviews that respondents noted as potentially slowing project completion.

Using programmatic agreements. Using programmatic agreements between federal and/or state transportation and resource agencies to address commonly occurring issues received the second highest rating from respondents on average of the 13 most promising approaches. Sixty-eight percent of the respondents indicated that programmatic agreements to handle routine projects or commonly occurring resource effects (e.g., endangered species) or to delegate review authority from resource agencies to transportation agencies have great or very great potential to reduce project completion time. This approach was rated highly by 70 percent of those respondents with primary responsibilities for or interests

⁶FHWA requires that, during statewide transportation planning, state officials proactively provide the public with complete information, timely public notice, full public access to decisions, and opportunities for early and continuing involvement.

in funding or constructing a highway project. Moreover, nearly two-thirds of the respondents with primary responsibilities for or interests involving resources rated the approach highly.

Unifying section 404 and other environmental requirements. Fifty-eight percent of the respondents rated highly the idea of unifying the requirements of section 404 of the Clean Water Act with other environmental review requirements. Traditionally, FHWA and the states completed environmental reviews of the proposed highway project before approaching the Army Corps of Engineers for a permit involving a wetland under section 404 of the Clean Water Act. Yet, even after FHWA had issued its record of decision on environmental issues allowing the project to move forward, a project might fail to obtain the needed permits from the Corps and therefore be halted despite having cleared an extensive environmental review. Officials told us that by effectively integrating the two processes, approval of the section 404 permit could be concurrent with FHWA's final action, resulting in reduced project completion time, more environmentally sound projects, and increased relationship building. Knowledgeable officials suggested that this approach could occur through merger agreements or through changes in legislation. Sixty percent of the respondents with primary responsibilities for or interests in funding or constructing a highway project and 50 percent of respondents with primary responsibilities for or interests involving resources rated the approach highly. According to FHWA, 29 states have adopted agreements to unify NEPA environmental reviews and section 404 Clean Water Act permit reviews to ensure that the reviews are conducted concurrently.

Wetlands banking. Slightly less than half (46 percent) of the respondents rated the concept of wetlands banking highly. As required under section 404 of the Clean Water Act, transportation agencies must compensate for any wetlands that are disturbed by highway projects, as determined by the Army Corps of Engineers and state environmental agencies. Transportation agencies address these wetlands impacts by creating new wetlands areas near the highway project site. The problem cited by some is that this approach to wetlands is piecemeal rather than comprehensive. According to respondents, these efforts can add significant time to highway projects, especially if the wetlands are not detected until late in the project. Under wetlands banking, state departments of transportation and wetland permitting agencies enter into blanket agreements to create large areas of wetlands rather than small wetlands at each construction site. While saving time on project completion, proponents state that wetlands banking can also provide more wildlife habitat and more ecologically significant

restoration and enhancement in larger areas. Fifty percent of the respondents with primary responsibilities for or interests in funding or constructing a highway project and 33 percent of the respondents with primary responsibilities or interests involving resources rated this approach highly.

Improving Agency Staffing and Skills

Two of the 13 most promising approaches involved improving staffing through interagency funding agreements and increased training as a means for reducing highway project completion time.

Using interagency funding agreements. About 60 percent of the respondents rated highly the use of interagency funding agreements to provide staff at resource agencies. As noted above, some believe that resource agencies do not always provide needed feedback to FHWA or departments of transportation on the environmental effects of proposed highway projects in a timely manner. Various reasons for this were cited, but both respondents with responsibilities for or interests in funding or constructing a highway and respondents with responsibilities or interests involving resources noted that staff shortages at resource agencies were a significant reason for this problem. As a result, state departments of transportation have increasingly used federal funds authorized under section 1309 of the Transportation Equity Act for the 21st Century to pay for technical staff positions at resource agencies, including biologists and historic preservation specialists. According to FHWA, 34 states have agreements that provide state and federal environmental agency personnel for expediting reviews. The hired personnel devote their attention solely to proposed federally funded highway projects, thus potentially improving the timeliness of resource agency assessments of any environmental issues associated with these projects. Slightly less than one-half of those with responsibilities or interests in funding or constructing a highway project (45 percent) rated this approach highly; however, over four-fifths of those with responsibilities or interests involving resources (83 percent) did so.

Increased training. Finally, about half of the respondents supported increased training for state department of transportation officials regarding understanding the requirements associated with completing a highway project.⁷ About 50 percent of those with primary responsibilities for or

⁷We did not ask the respondents to identify specific areas where training would be beneficial.

interests in funding or constructing a highway project and 58 percent of those with primary responsibilities or interests in involving resources rated this approach highly.

Conclusions

Our results showed, overall, strong stakeholder support for 13 approaches to reduce the time it takes to complete a federally funded highway project. While stakeholders' support varied, 8 of these approaches had strong support across groups representing different primary interests. We recognize that it may be neither feasible nor appropriate to utilize each of these 13 approaches on every federally funded highway project. In addition, some of these approaches, such as interagency funding agreements, are already being utilized at the state level and still others may require congressional action. Nonetheless, they do represent a reasonable number of actions that can be considered further as to the benefits, in relation to the costs, that they bring to reducing highway project completion time. FHWA would need to work with other lead agencies to assess how these actions would be implemented, including whether any legislative changes would be required. Such assessments could lead to more widespread adoption and corresponding increased transportation and environmental benefits.

Recommendation for Executive Action

In order to reduce highway project completion time, we recommend that the Secretary of Transportation direct the Administrator, FHWA, to consider the benefits of at least each of the 13 most promising approaches discussed in this report relative to the costs and feasibility of implementing them and take the actions needed to foster more widespread adoption of those approaches that appear to be the most cost effective.

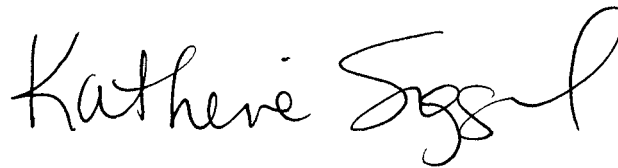
Agency Comments and Our Evaluation

We obtained oral comments on a draft of this report from the Department of Transportation. Generally, the Department agreed that the 13 most promising approaches discussed in our draft report represent opportunities to reduce project completion time. While it did not directly comment on our proposed recommendation, the Department noted that most, if not all, of the promising approaches coincide with the streamlining activities that the Department and its partners, such as state departments of transportation and resource agencies, have been developing and implementing under section 1309 of the Transportation Equity Act for the 21st Century.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of this report to congressional committees with responsibilities for highway issues; the Secretary of Transportation; the Administrator, Federal Highway Administration; and the Director, Office of Management and Budget. We will also make copies available to others upon request. In addition, this report will be available at no charge on our home page at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact either James Ratzenberger at ratzenbergerj@gao.gov or me at siggerudk@gao.gov. Alternatively, we may be reached at (202) 512-2834. Key contributors to this report were Jennifer Clayborne, Kenya Jones, SaraAnn Moessbauer, James Ratzenberger, Deena Richart, and Matthew Zisman.

Sincerely yours,

A handwritten signature in black ink that reads "Katherine Siggerud". The signature is written in a cursive style with a large, looping "S" for the first letter of the last name.

Katherine Siggerud
Acting Director, Physical Infrastructure Issues

Scope and Methodology

To perform our work, we reviewed laws and regulations governing the construction of federally funded highway projects. We discussed these requirements, the time required to complete projects, and initiatives to reduce this time with officials from the Federal Highway Administration (FHWA), the Advisory Council on Historic Preservation, the Environmental Protection Agency, the Army Corps of Engineers, the Coast Guard, the Fish and Wildlife Service, the American Association of State Highway and Transportation Officials, the American Road and Transportation Builders Association, the American Society of Civil Engineers, private transportation engineering firms, and others. We also interviewed officials from California, Florida, North Carolina, Texas, Vermont, Washington, and Wisconsin departments of transportation about highway project completion time and initiatives to reduce the completion times of these projects. We chose these states either because they spent the most federal-aid highway funds or because officials we interviewed identified these states as making efforts to reduce project time. We also reviewed federal and private studies on highway project completion.

To determine transportation stakeholders' views on the most promising approaches to substantially reduce project completion time for federally funded highway projects, we reached out to 62 organizations with a role or interest in highway project completion. (See table 4.) Of these organizations, officials from 42 organizations agreed to participate in structured interviews, including federal and state agencies with responsibilities relating to the construction of federally funded roads, transportation engineering organizations, transportation professional associations, historic preservation organizations, environmental organizations, tribal organizations and a university. To identify the 62 organizations, we initially contacted agencies and organizations that have primary responsibility for highway project completion or that have been vocal on the issue. We asked these officials to identify, for subsequent interviews, other agencies or organizations undertaking or knowledgeable about promising approaches for substantially reducing highway project completion time. We continued to ask for names from the subsequent organizations until no new names were identified.

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Scope and Methodology

Table 4: Organizations Contacted to Determine Most Promising Approaches to Reduce Highway Project Completion Time

Organization

Advisory Council on Historic Preservation
American Association of State Highway and Transportation Officials
American Concrete and Pavement Association
American Council of Engineering Companies
American Highway Users Alliance
American Public Transportation Association
American Road & Transportation Builders Association
American Society of Civil Engineers
Association of General Contractors
California Department of Transportation
Center for Transportation and the Environment (North Carolina State University)
Construction Industry Institute
Defenders of Wildlife
Delaware Department of Transportation
Endangered Species Coalition
Environmental Council of the States
Environmental Defense
Federal Highway Administration – Historic Preservation
Federal Highway Administration – Infrastructure
Federal Highway Administration – Planning
Federal Highway Administration – Right-of-Way
Federal Highway Administration – Technical Modeling
Florida Department of Transportation, State Highway Engineer's Office
Georgia Department of Transportation, Office of Environment/Location
Georgia Department of Transportation, Transportation Planning, Data and Intermodal Development Division
Georgia Institute of Technology, School of Civil and Environmental Engineering
Georgia Regional Transportation Authority
HDR, Inc.
Institute of Transportation Engineers
Kentucky Heritage Council
Lafayette, Louisiana Metropolitan Planning Organization
Maryland State Highway Administration, Enhancement Program
Maryland State Highway Administration, Project Planning Division
Minnesota Department of Transportation
National Association of Development Organizations

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Scope and Methodology

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Organization

National Association of Tribal Historic Preservation Officers

National Coalition to Defend NEPA

National Conference of State Historic Preservation Officers

National Trust for Historic Preservation

National Wildlife Federation

Natural Resources Defense Council

Navajo Nation, Historic Preservation Department

New Hampshire Department of Transportation

New Jersey Department of Transportation, Quality Management Services

North Carolina Department of Transportation, Division of Highways (Pre-construction) and Planning and Environment Unit

Pennsylvania Department of Transportation, Engineering District 10

Rhode Island Historical Preservation and Heritage Commission

San Diego Association of Governments

Sierra Club

Smart Growth America

South Carolina Department of Transportation

Surface Transportation Policy Project

Transportation Development Institute

Texas A&M University

Tribal Preservation Programs of the National Park Service

University of Utah

U.S. Army Corps of Engineers

U.S. Army Corps of Engineers – Wilmington, NC District

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

Vermont Division for Historic Preservation

Washington Department of Transportation

Source: GAO.

Using a structured interview, we asked knowledgeable officials at each of the 42 organizations to provide information about the most promising approaches for substantially reducing completion time for projects of all types and complexities and in each project phase (i.e., planning, preliminary engineering and environmental review, final design and right-of-way acquisition, and construction). We also obtained information from these contacts on opportunities to reduce project completion time through administrative changes, changes in federal or state law, improvement of staff skills, and improvements in disseminating information about

approaches to reduce project completion time. For each approach cited as the most promising for substantially reducing project completion time, we asked these officials to provide information on: (1) the nature of the approach, (2) reason(s) why the approach was taken, (3) agencies/organizations involved with the approach, (4) size of the project, (5) changes to federal or state law (if any) required for each approach, (6) expected/actual benefits, and (7) methods (if any) for measuring these benefits. (See table 5 for the structured interview questions.)

Table 5: Structured Interview Questions Used to Identify the Most Promising Approaches to Reduce Highway Project Completion Time

1. Please identify any initiatives your organization has taken to expedite project delivery (e.g., earlier coordination between state departments of transportation and environmental resource agencies; historic preservation programmatic agreements; design/build construction techniques). For each initiative, please provide the following information: (1) description of initiative; (2) why initiative was taken; (3) organizations participating in initiative; (4) type of project to which initiative applies (size, complexity); (5) project phase to which initiative applies; (6) whether this initiative required any changes to federal or state law; (7) expected/actual benefit of initiative; and (8) how benefit is measured.
2. Please identify any further opportunities that exist to measurably reduce project delivery times through changes in federal or state law, while keeping basic policies (e.g., metropolitan/statewide planning; environmentally responsible projects) in place. For each initiative, please provide the following information: (1) law that should be changed; (2) why change is needed; (3) organizations affected by change in law; (4) type of project to which initiative applies (size, complexity); (5) project phase to which change in law applies; (6) expected benefit of change in law; and (7) how benefit would be measured.
3. Some have commented that highway oversight is historically focused on engineering and contracting rather than oversight of management and financial issues. Please discuss if this is the case and if any reforms in this area are needed. Also, please identify any initiatives your organization has taken that address human capital reform (e.g., refocusing staff efforts from oversight of engineering and contract issues to management and financial issues) to improve project delivery. For each initiative, please provide the following information: (1) description of initiative; (2) why initiative was taken; (3) organizations participating in initiative; (4) type of project to which initiative applies (size, complexity); (5) project phase to which initiative applies; (6) expected/actual benefit of initiative; and (7) how benefit is measured.
4. How well is information about initiatives to improve project delivery times shared among federal and state agencies? Do you have any suggestions to improve the current practices? Please describe how your organization shares what it has learned with others and how you learn about initiatives that other organizations are taking by providing the following: (1) method of dissemination/learning; (2) initiative to which this applies; and (3) agencies involved.
5. Please identify any further opportunities that could be pursued to expedite transportation project delivery. Please provide the following information: (1) opportunity; (2) problem to be addressed; (3) organizations affected; (4) project type to which opportunity applies (size, complexity); (5) project phase to which opportunity applies; (6) expected benefit of opportunity; and (7) how benefit would be measured.
6. Are you aware of any promising initiatives that other organizations are taking to improve highway project delivery times? If so, please provide the following information: (1) organization; (2) nature of initiative; (3) point of contact; (4) phone number; (5) email/web address.

Source: GAO.

To determine which of the identified approaches hold the most promise for substantially reducing highway project completion time, we compiled a list

of 49 approaches identified by the respondents and asked each of the 42 officials we interviewed to rate the potential of each of the approaches to reduce project completion time on a scale of 1 to 5.¹ Thirty-three officials agreed to participate in this aspect of our work. Of those not participating, officials declined for a variety of reasons. We compiled these ratings and calculated an average rating for each approach where at least 75 percent of the 33 officials provided a rating. We identified the most promising as those with an average rating of 3.5 or higher. There were 13 approaches with ratings of 3.5 or higher. None of the 13 most promising approaches were rated by all 33 officials. Eleven of these 13 approaches were rated by 30 or more (91 percent) officials, while the remaining 2 approaches were rated by 26 officials (79 percent). We did not attempt to corroborate the need to implement these approaches or obtain details on how they might be structured. In addition, we did not attempt to determine how effective the promising approaches, where already implemented, were in reducing highway project completion time.

We conducted our work from September 2002 through March 2003 in accordance with generally accepted government auditing standards.

¹1=little to no potential to reduce project completion time; 2=some potential to reduce project completion time; 3=moderate potential to reduce project completion time; 4=great potential to reduce project completion time; 5=very great potential to reduce project completion time. Respondents could also indicate whether they did not know or had no basis to judge.

Promising Approaches for Reducing Highway Project Completion Time as Identified by Respondents

Of the 34 approaches that were assessed by at least 75 percent of respondents, 19 (56 percent) were rated on average as having moderate, great, or very great potential to reduce highway project completion time. (See table 6.) The remaining 15 approaches (44 percent) were assessed as having, on average, some, little, or no potential to reduce highway project completion time. Fewer than 75 percent of the respondents provided an assessment for 15 other approaches, and we did not report on these results.

Table 6: Promising Approaches to Reduce Project Completion Time Identified and Rated by Respondents, by Average Rating

Approach	Description	Number of respondents	Average rating ^a	Percent of respondents indicating approach has great or very great potential
Early partnership and coordination	All affected parties (e.g., federal government, state government, tribal, public) with input into the project completion process (1) collaborate early and throughout project planning so that technical, environmental, policy, and program issues can be resolved in a predictable and timely manner; and (2) develop collaborative work plans that are comprehensive, realistic, and deliverable.	31	4.5	90.3
Programmatic agreements	Use programmatic agreements (i.e., between transportation and resource agencies at the federal and/or state level) to review environmental impact of routine projects or commonly occurring resource effects (i.e., commonly encountered species, typical project types) or delegation of authority (i.e., reviews from state historic preservation agency to state department of transportation).	31	4.0	67.7
Revise section 4(f) process	Use the protections found in section 106 of the National Historic Preservation Act instead of the protections found in section 4(f) of the Department of Transportation Act for consideration of historic properties and other historic resources.	30	4.0	70.0
Unify Clean Water Act section 404 and National Environmental Policy Act (NEPA) processes	Unify the Clean Water Act section 404 permit and NEPA environmental review processes to ensure that projects that pass the NEPA review process also comply with section 404.	26	3.7	57.7

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Approach	Description	Number of respondents	Average rating ^a	Percent of respondents indicating approach has great or very great potential
Training	Determine agency staff skill set and establish training programs to eliminate knowledge shortfalls among transportation staff on requirements to complete all phases of highway projects. Ensure that new recruits to the transportation field have orientation and training for all phases of project completion.	32	3.7	53.1
Establish time frames for NEPA process	Provide specific time frames for resource agencies to respond to environmental documents and produce any needed analyses. Reduce the 6-year time frame for lawsuits filed under NEPA.	30	3.6	60.0
Interagency funding agreements	State departments of transportation fund additional staff at state or federal resource agencies. Work of funded staff must have a measurable impact in reducing time to complete environmental reviews on transportation projects.	32	3.6	59.4
Preliminary environmental assessment reports	Provide information on any conditions and constraints early in the process, prior to programming project cost and schedule. Reports are based on a field visit, literature search, geographic information systems, and photo log review to include a work plan for the subsequent environmental analysis for NEPA.	32	3.6	53.1
Establish project milestones and performance monitoring systems	Specify key dates, such as when final design must be completed, when the contract is let, and when construction must conclude, and manage the project to meet the dates. Use project-scheduling software available off the shelf that indicates where project delays occur as well as what is ahead of schedule.	31	3.6	51.6
Context sensitive design	Projects must be designed to consider their environmental and social context so that projects meet the needs of the communities. These factors are incorporated into the transportation planning process.	32	3.5	50.0
Geographic information systems	Use of data collected by various federal and state resource agencies to identify environmental and historic issues early during environmental review, determine alignments that minimize adverse impacts, and support integrated interagency review.	32	3.5	62.5

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Approach	Description	Number of respondents	Average rating^a	Percent of respondents indicating approach has great or very great potential
Public information meetings	Hold public meetings early and often to provide information on projects that are planned or underway.	32	3.5	50.0
Wetlands banking	Blanket agreements between state departments of transportation and wetland permitting agencies to create large areas of wetlands rather than small wetlands at each construction site.	26	3.5	46.2
Partner with groups	Identify groups that have developed best practices, or offer technical expertise, to ensure that information is shared in order to expedite project completion.	31	3.3	41.9
Acculturation	Work to achieve recognition in transportation staff of the inherent benefits of environmentally sound projects; work to achieve recognition of the value of transportation projects on behalf of resource agencies.	31	3.3	41.9
Formal elevation process	Formalized process in which resource agencies elevate unresolved issues through the chain of command, with the final step being senior management.	32	3.2	46.9
Internet	Use the internet to provide technical training and reference materials. Use the internet to allow access to agency guidance materials, regulations, and federal and state laws.	32	3.0	34.4
Allow early right-of-way acquisition	To save time and money associated with relocation, acquire potential project right-of-way during project design.	29	3.0	34.5
Biennial reviews	Conduct biennial reviews by state transportation agencies to help identify bottlenecks.	29	3.0	31.0
National conferences	Hold national conferences to bring practitioners and other stakeholders together to share information.	31	2.9	25.8
Environmental information center	Fund and operate a central information storehouse for transportation and resource agencies.	31	2.8	22.6
Aerial surveying and imaging technology	Highly accurate digital terrain data models and maps can become available early in project design with substantially reduced time, effort, and expense compared with only using ground surveys. Contractors can manage the earthwork of a project with significant precision.	28	2.8	25.0

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Approach	Description	Number of respondents	Average rating ^a	Percent of respondents indicating approach has great or very great potential
Hire consultants or contractors	Consultants or contractors provide technical analyses instead of agency staff who instead focus on project management.	27	2.8	25.9
State funding of historic preservation activities	State governments provide funds for historic preservation activities outside the federal State Historic Preservation Officers program.	30	2.8	33.3
Metropolitan capacity building	Work to improve the technical skills of metropolitan planning organizations so that planning can focus on policy decisions rather than technical and administrative issues.	26	2.8	38.5
Environmental compliance mitigation systems	Provide a system to ensure that mitigation measures are carried out as needed and specified.	32	2.8	28.1
Single agency point of contact	Rather than have multiple contacts for members of the public, have one single contact, reducing confusion, and communication delays.	30	2.7	16.7
Videotaped guidance on promising approaches	Videotaped presentations on methods to reduce project completion time.	31	2.7	19.4
Travel model improvement	Improve transportation modeling to more accurately portray traffic patterns and growth.	28	2.6	25.0
Awards programs to recognize agency achievements	Design a national awards program to provide recognition for departments of transportation and resource agencies for innovative projects and leadership.	30	2.5	13.3
Regular publications	Organize and distribute publications on a regular basis (i.e., weekly newsletters, monthly magazines, and quarterly web magazines).	32	2.5	25.0
Peer reviews	Federal transportation officials provide state transportation officials with recommendations on revising existing specifications or procedures. Surveys of peers allow transportation and resource agency officials to determine performance relative to peers.	30	2.4	6.7
Infer the presence of endangered species	Proceed under the assumption that endangered species are present at a project site, reducing the likelihood of later delay and ultimately saving costs.	30	2.4	6.7
Professional organization membership	Participation in engineering, accounting, finance, management, and other discipline organizations.	29	2.2	17.2

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Approach	Description	Number of respondents	Average rating^a	Percent of respondents indicating approach has great or very great potential
Subsurface utility engineering	Provides accurate mapping of existing underground utilities during the project design process using geophysics, surveying and civil engineering rather than determining utility locations later during the construction phase.	24	b	b
Clarify role of metropolitan planning organizations	Clarify laws to reduce confusion of roles between state departments of transportation and metropolitan planning organizations for creating and implementing transportation plans.	24	b	b
Incentive/disincentive construction contracting	Giving the contractor a financial incentive for every day that the contract is completed early and a financial disincentive for failure to complete a project on time.	23	b	b
Use consultants or contractors	Expedite the procurement process for appraisal services and reduce fees and costs.	22	b	b
Design build contracting	One entity, the design-builder, forges a single contract with the state transportation agency to provide for architectural and engineering design and construction services.	21	b	b
A + B bidding for construction contracts	Involves cost and time in the low bid determination. Submitted bids consist of dollar amount of all work to be performed, as well as total number of calendar days required to complete the project.	21	b	b
Advanced clearing and grubbing contracts	Contract for clearing vegetation and removing roots and stumps (grubbing) in the project right-of-way in advance of the project.	21	b	b
Change control policy for construction contracts	Establish procedures to monitor and limit contractor change orders.	21	b	b
Lane rental construction contracts	Assess the contractor a fee for each day of lane closure in excess of the number of total lane rental days originally bid by the contractor.	20	b	b
Lump sum construction contracts	Contractor submits a lump sum price to complete a project as opposed to bidding on individual items.	20	b	b
Utility relocation contracts	Include utility relocation in construction contract.	20	b	b
Indefinite quantity, indefinite completion contracting	Contractors bid on work items with the location to be determined under future work orders (e.g., for installation of traffic signals on a citywide, or areawide basis).	19	b	b

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Approach	Description	Number of respondents	Average rating ^a	Percent of respondents indicating approach has great or very great potential
Noncost selection factor contracting	Allow contracts to consider such factors as previous work quality, rather than selecting the lowest bidder.	19	b	b
System integrator contracts	Allow contractors to serve as the construction manager, including advertising, letting and awarding contracts using state and federal acquisition guidelines. In addition to contract management, the contractor will perform project supervision and system integration.	18	b	b
Bid averaging method of contracting	Once a minimum number of bids are received, state determines the average bid and selects contractor whose bid is closest to the average.	16	b	b

Source: GAO.

^aRespondents rated each approach's potential for reducing project completion time using the following scale: 1= little to no potential to reduce project completion time; 2= some potential to reduce project completion time; 3= moderate potential to reduce project completion time; 4= great potential to reduce project completion time; 5= very great potential to reduce project completion time. Respondents could also tell us that they did not know or had no basis to judge.

^bNo statistic is reported because less than 75 percent of the 33 respondents provided a rating for this approach.

In some cases, respondents with similar primary interests or responsibilities rated approaches similarly; in other cases, their views diverged. (See table 7; approaches in bold are the 13 approaches that respondents rated most highly overall.)

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Table 7: Views on Approaches to Reduce Highway Project Completion Time Often Varied by Respondent Affiliation

Approach	Views among agencies or associations primarily affiliated with funding, managing, or constructing highway projects			Views among agencies or associations primarily affiliated with natural or historic environmental issues		
	Number of respondents indicating approach has great or very great potential	Number of respondents indicating approach has moderate potential	Number of respondents indicating approach has no to some potential	Number of respondents indicating approach has great or very great potential	Number of respondents indicating approach has moderate potential	Number of respondents indicating approach has no to some potential
Early partnership and coordination	17	2	1	11	0	0
Establish time frames for NEPA process	16	3	1	2	4	4
Revise section 4(f)	16	4	0	5	3	2
Programmatic agreements	14	5	1	7	4	0
Establish project milestones and performance monitoring systems	12	8	0	4	3	4
Formal elevation process	12	4	4	3	3	6
Unify Clean Water Act section 404 and NEPA processes	12	7	1	3	2	1
Geographic information systems	10	4	6	10	1	1
Wetlands banking	10	10	0	2	2	2
Training	10	8	2	7	5	0
Preliminary environmental assessment reports	9	7	4	8	3	1
Interagency funding agreements	9	5	6	10	1	1
Allow early right-of-way acquisition	8	9	2	2	0	8
Partner with groups	8	7	4	5	6	1
Public information meetings	8	8	4	8	3	1
Biennial reviews	7	3	8	2	5	4
Hire consultants or contractors	6	6	7	1	3	4
Context sensitive design	6	9	5	10	1	1

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Approach	Views among agencies or associations primarily affiliated with funding, managing, or constructing highway projects			Views among agencies or associations primarily affiliated with natural or historic environmental issues		
	Number of respondents indicating approach has great or very great potential	Number of respondents indicating approach has moderate potential	Number of respondents indicating approach has no to some potential	Number of respondents indicating approach has great or very great potential	Number of respondents indicating approach has moderate potential	Number of respondents indicating approach has no to some potential
National conferences	5	5	10	3	5	3
Internet	5	8	7	6	3	3
Metropolitan capacity building	4	3	11	6	2	0
Acculturation	4	8	7	9	2	1
Single agency point of contact	4	9	7	1	3	6
Environmental compliance mitigation systems	4	5	11	5	4	3
Aerial surveying and imaging technology	3	7	8	4	4	2
State funding of historic preservation activities	3	6	10	7	2	2
Professional organization membership	3	5	11	2	1	7
Environmental information center	3	8	9	4	5	2
Video	3	6	11	3	5	3
Regular publications	3	4	13	5	1	6
Awards program to recognize agency achievements	2	7	10	2	6	3
Infer the presence of endangered species	2	5	13	3	3	3
Travel model improvement	1	6	12	6	2	1
Peer reviews	1	9	10	1	4	5

Source: GAO.

Notes: Includes the 34 approaches where more than 75 percent of the 33 respondents rated an approach.

The table is ordered from most popular to least popular among respondents with primary responsibilities for or interests in funding or constructing a highway project to better show similarities and differences in rating.

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