
**Transportation Environmental Research Program (TERP)
Guidance Manual**

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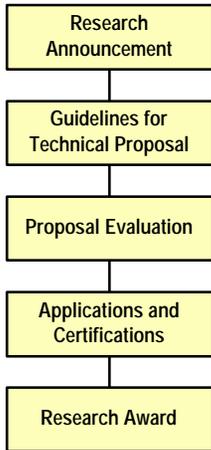
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1. INTRODUCTION

This manual is designed to guide potential applicants through the new Transportation Environmental Research Program (TERP). A simple flow chart on the left summarizes the key steps of the application and award process—with each box corresponding to a section in this manual (Sections 3-7). The flow chart appears throughout the document orienting the applicant to the process. The manual includes the following sections:



Transportation Environmental Research Program (Section 2)—provides an overview of the program, project sponsor (FHWA), eligible applicants, and approximate value of awards.

Research Topic Areas and Announcements (Section 3)—details the specific areas of research and describes the announcement process (first box in flow chart).

Guidelines for Technical Proposal (Section 4)—reviews requirements for submitting a research proposal.

Proposal Evaluation (Section 5)—explains the process and criteria that FHWA will use to select a top candidate.

Applications and Certifications (Section 6)—indicates the requirements the top candidate must meet in the second round to receive a research award. Candidates will work with FHWA to complete those requirements.

Succeeding Award (Section 7)—describes general guidelines that may be followed after research award is made.

Schedule (Section 8)—outlines general time frame for announcements and the sequence of events that follow.

2. TRANSPORTATION ENVIRONMENTAL RESEARCH PROGRAM

BACKGROUND

Transportation and environmental issues are strongly connected and in recent years, legislation at all levels of government has further heightened the links between these issues. The U.S. Department of Transportation's (U.S. DOT) Federal Highway Administration (FHWA) addresses these issues every day as complex policy decisions are made that balance mobility needs and environmental priorities. In order to understand these issues, FHWA has engaged many research efforts, but much of that research focuses on a multi-regional or national level, and can overlook the local effect. Consequently, FHWA's demand for research that is more focused and smaller in scale is growing. These types of research projects could provide a better understanding of the challenges faced by transportation practitioners.

The Intermodal Surface Transportation Efficiency Act (ISTEA) Title VI SEC. 6001 mandates that the U.S. DOT "may engage in research, development, and technology transfer activities with respect to motor carrier transportation and all phases of highway planning and development."

The U.S. DOT may accomplish this by making grants to, or entering into contracts and cooperative agreements with, any educational institution. Universities and colleges are often better positioned to conduct research of this nature, because these institutions can conduct research in a specific area or focus on a given region, producing case studies or empirical profiles. Using this work as the foundation, additional research could further propel the exploration of transportation and environmental issues. A university or college also brings a unique perspective to the research as diverse programs or departments like geography, economics, or environmental science tackle these issues.

The goal of TERP is to add to the understanding of transportation and environmental issues in areas that are not being actively investigated, and to continue the exploration of those issues through universities and colleges. FHWA hopes that by committing to TERP, the research will provide insight on the difficult policy decisions that FHWA will undertake in the future.

TERP OVERVIEW

ISTEA Title VI SEC. 6001 states that "the highway research program shall also include studies to identify and measure, quantitatively and qualitatively, those factors which relate to economic, social, environmental, and other impacts of highway projects." TERP awards of approximately \$20,000 to \$50,000 are made based on the response of universities and colleges to TERP research announcements. The program is intended to be flexible—with the duration of each project ranging from 6 months to 2 years. Finally, participation from historically black colleges and universities (HBCUs) is encouraged.

3. RESEARCH TOPIC AREAS AND ANNOUNCEMENTS

The research announcements are expected to fall into specific research topic areas (see table). Universities and colleges (including HBCUs) with related programs are encouraged to submit proposals. Specific research announcements will be made available in the announcement section of TERP's Web Page (<http://www.fhwa.dot.gov/TERP>) or via a fax request to TERP's Program Manager at (202) 366-3409.

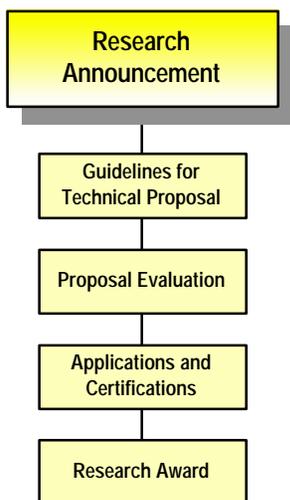
RESEARCH TOPIC AREAS

Aesthetic Highway Design	Hazardous Materials <ul style="list-style-type: none"> • Right-of-Way Hazardous Substances, Materials, and Waste • Hazardous Materials Generated During Development and Completion of Projects
Air Quality Policy <ul style="list-style-type: none"> • Air Quality Conformity • Air Quality Models • Emission Reductions (Transportation Strategies) • National Ambient Air Quality Standards 	Historic Bridges
Community Impact	Public Involvement
Environmental Impact Assessment in Transportation	Social and Economic Impact
Environmental Justice, Housing Issues, and Environmental Laws	Stormwater Constituents
Environmental Planning and Management	Transportation Noise
Global Climate Change	Transportation Planning
	Water Quality <ul style="list-style-type: none"> • Ecosystem/Watershed Planning
	Wetlands

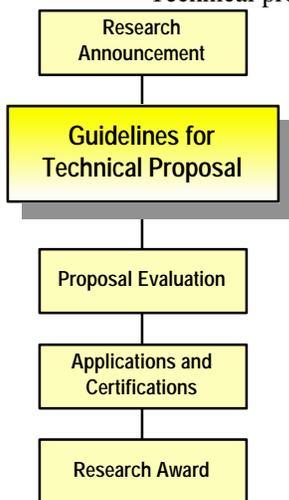
See Appendix A for a detailed description of each research topic area.

RESEARCH ANNOUNCEMENTS

A general program announcement will be issued in the Federal Register once a year. Specific program announcements will be made in the Commerce Business Daily (CBD) and on TERP's Web Page throughout the year. The research will be specific in nature, and directly related to the research topic areas. Innovative research ideas generated by colleges and universities will also be considered as they are submitted. The concentration of research announcements will fall after October 1. The closing date (deadline) for proposal submission is issued with TERP's research announcement. This deadline will be approximately two months after announcements are posted. No proposal arriving after the deadline will be considered.



4. GUIDELINES FOR TECHNICAL PROPOSAL



Technical proposals are invited in response to TERP research announcements and are limited to U.S. institutions. Each proposal should follow the requested proposal format as described in this section under the Technical Proposal Organization.

All needed information can be found on the pages of the web site available in downloadable files. Any questions or concerns regarding specific research announcements may be faxed to the Technical/Program Officer listed with the research announcement. Any questions or concerns regarding only the program may be faxed to TERP's Program Manager at (202) 366-3409 or mailed to the address below:

TERP Program Manager
Office of Environment and Planning
Federal Highway Administration
400 7th Street, S.W., HEP-40
Washington, D.C. 20590

TECHNICAL PROPOSAL ORGANIZATION

TERP technical proposals should be direct and concise—not exceeding 15 pages, including all of the following required sections:

1. Cover Page
2. Research Plan
3. Qualifications and Experience
4. Project Management
5. Budget

The information included in the proposal will be used for evaluation purposes only and will otherwise be held in confidence. Awards will be based on selection criteria described in the Proposal Evaluation Section of this document. Published documents may be attached as appendices, but FHWA reserves the right to restrict its evaluation to the 15 page submission.

1. Cover Page

The cover page should contain the following information:

TERP project number and title (posted on the Research Announcement)			
University/College—Department		Telephone & Fax Number	Address
Principal Investigator	Title	Telephone & Fax Number	Address (if different)
Administrative Officer (if different than the principal investigator). This should be the individual authorized to bind the university/college contractually and to approve the expenditure of project funds.	Title	Telephone & Fax Number	Address (if different)

2. Research Plan

Based on the research announcement, the proposal should define the objective of the investigation, indicate how the research will be conducted, and discuss any technical issues that may arise. The plan should provide a summary of the approach to conducting the research. Each phase or task of the approach should be fully described. The research plan should also indicate how the expertise and experience of the proposed team will be used.

3. Qualifications and Experience

This section should provide information on the qualifications and experience of the principal investigator and the research team members, as well as the university or college.

Investigators' Expertise

Provide the following information on the principal investigator and each research team member:

- A biography
- Areas of research (past and ongoing)
- Brief list of key published reports
- Related grants and projects (including the years when conducted)
- Other relevant experience that does not fall into the described categories (i.e., specialized course or seminar)

Institution's Assets

Provide information on the institution's resources available to the research team, such as:

- Availability of laboratory facilities or other equipment pertinent to the research
- Access to graduate and undergraduate students
- Ability to draw upon accomplished investigators within the department or institution
- Recent, notable research on related subject matter

4. Project Management

Indicate the availability of the research team by describing other commitments that could affect the project completion. For this section, provide staff-hour commitments and percentage of time committed to other work for each member of the research team.

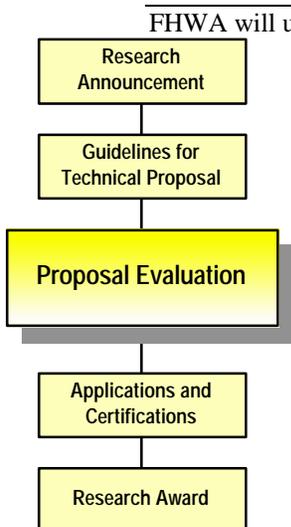
5. Budget

Estimate the cost of the research. Indicate the estimates for the government's contribution, contribution from other sources, and total cost. Offerors are encouraged to review Standard Form 424A (Budget Information) in the standard FHWA Application for Federal Assistance package.

PROPOSAL SUBMISSION

Submit five (5) stapled copies to:
TERP Program Manager
Office of Environment and Planning
Federal Highway Administration
400 7th Street, S.W., HEP-40
Washington, D.C. 20590

5. PROPOSAL EVALUATION



FHWA will use the selection criteria described below to review submitted proposals for approximately two months after the deadline. Proposals should contain sufficient information about the nature of the research and composition of the investigation team for FHWA to make an award decision. However, the TERP manager reserves the option to conduct interviews should specific situations warrant more detail. If an interview is necessary, a letter or fax will be sent to these applicants notifying them that they have been selected for an interview and FHWA will schedule a phone interview with the principal investigator and key members of the research team. During the interview FHWA may ask the applicant to clarify research details, revise the scope of the research, or re-estimate the cost to perform the research before a final selection is made. After completion of the interviews, FHWA will select the top candidate and assist them in completing the applications and certifications required to secure eligibility of Federal assistance (see Applications and Certifications section). Upon completing the applications and certifications, FHWA will grant the research award.

SELECTION CRITERIA

In order to ensure a fair and equitable selection of a college or university, the Office of Environment and Planning has established specific selection criteria for the evaluation of applications. All applications will be evaluated by the following criteria:

Technical Approach

Demonstrated understanding of the problem; appropriateness of the proposed method or approach; probability of success in meeting the project's objectives; recommended problem solution; and completeness of the investigative plans. The potential contribution to the technical and scientific merit of the proposed research to assess whether the research will lead to new discoveries or impact progress in its field or other fields.

Research Team Qualifications

The proposed research team's capabilities, qualifications, and related experience are integral factors for evaluating the applications. The qualifications, capabilities, and experience of the proposed principle investigator and research team are critical in achieving the proposal objectives.

Institutional Capability

Qualifications of the institution, particularly practical experience and past successes ("track record") in the same or closely related research area; adequacy of facilities available to the institution to perform the proposed research; availability of adequate human resources; and financial strength of the institution to undertake and successfully complete the proposed research.

Research Cost

Every applicant submits a budget for the proposed research. The budget is evaluated for reasonableness and appropriateness of the proposed cost; and to determine whether the proposed budget provides the best value to the government.

6. APPLICATIONS AND CERTIFICATIONS

Institutions in the final stages of the award process are required to submit an Application for Federal Assistance, Representations and Certifications (see below for a complete list). Although institutions will not be required to complete these forms until the later stages of the award process, they are encouraged to review the requirements in advance. FHWA will be available to

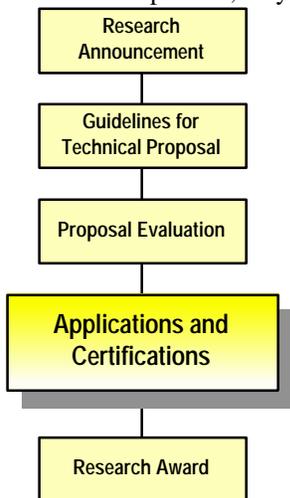
assist an institution in completing the forms, if needed. The required information includes:

- a) Standard Form 424 (Application for Federal Assistance)
- b) Standard Form 424A (Budget Information)
- c) Representations and Certifications

Copies of these required documents must be obtained from FHWA.

Department of Transportation
Federal Highway Administration
Office of Acquisition Management
400 7th Street, S.W., Room 4410
Washington, D.C. 20590

For a more complete explanation of the requirements, please see Appendix B.



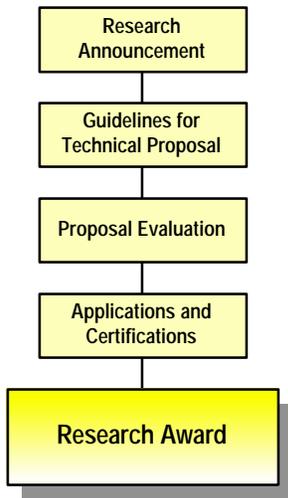
7. SUCCEEDING AWARD

After FHWA awards the research to an institution, it will finalize the scope and deliverables for the project. The likely requirements that will be requested may include:

- Periodic progress reports (Note: most research is reported quarterly)
- Annual work program
- Invoice
- Final report

Disclaimer

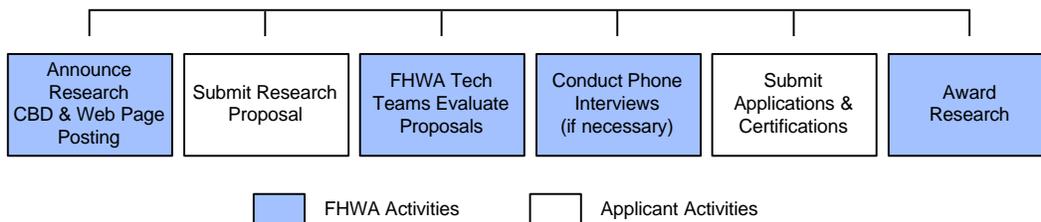
FHWA reserves the right to include additional requirements for each individual research project. The requirements will be determined for each research project once an institution is issued the award.



8. SCHEDULE

Specific program announcements will be made in the Commerce Business Daily (CBD) and on TERP's Web Page throughout the year (Section 3). The deadline for each submission will appear with each announcement and will occur approximately two months after the announcement is posted. FHWA will then evaluate each proposal using the selection criteria (Section 5). Based on this evaluation, FHWA will select top candidates. Should the option of telephone interviews be exercised, the agency will then select the top candidates and assist them in the completion of the Application of Federal Assistance, Representations and Certifications (Section 6). Based on completion of the applications and certifications, FHWA will grant the research award. The submission and review timeline below summarizes the sequence of activities from research announcements postings through research awards.

Submission and Review Timeline



ACKNOWLEDGMENT

The Office of Environment and Planning will acknowledge receipt of a proposal if a self-addressed, stamped postcard is included in the proposal package.

WITHDRAWALS

Proposals may be withdrawn at anytime before a final decision is made. A request for withdrawal must be signed by both the principal investigator and the authorized representative from the team's institution.

APPENDIX A—RESEARCH TOPIC AREAS

These topic area descriptions provide an overview of the general research issues TERP research announcements will cover. They are not specific research announcements. These will be listed in the Commerce Business Daily and TERP's Web Page.

AESTHETIC HIGHWAY DESIGN

Aesthetics is slowly becoming an integral consideration in the design of every highway. It is no longer reserved for “scenic parkways” such as Virginia’s historic Blue Ridge or a decorative overlay like the “beautification” projects of the 1960s. How a particular stretch of road looks, what it feels like to drive across or to live nearby, or how it affects air and water quality, adjoining landscapes, wildlife, culture and civic life, or the shape and pace of local development are now matters of increasing importance to many if not most Americans. In this context, the growing social and technical complexity of both urban and rural transportation problems demands new tools, insights, connections, and organizing principles that spring from deeper wells of imagination than generally accessible through computer-generated design or formal engineering techniques alone.

Although a significant body of literature exists in regard to bridge aesthetics, formal transportation research does not yet provide a working definition of “successful” highway design in terms of aesthetic, social, and environmental characteristics. Anecdotal examples of such projects occasionally appear in journals, magazines, and newspapers with appealing photographs or drawings. Yet the narratives rarely offer sufficient information on the political and organizational nuts and bolts to guide transportation planners and designers, public officials, and interested citizens facing similar challenges. Nor is there any body of comparative analysis on this subject to provide broader insight on what works, why, and under which circumstances.

AIR QUALITY POLICY

Air Quality Conformity

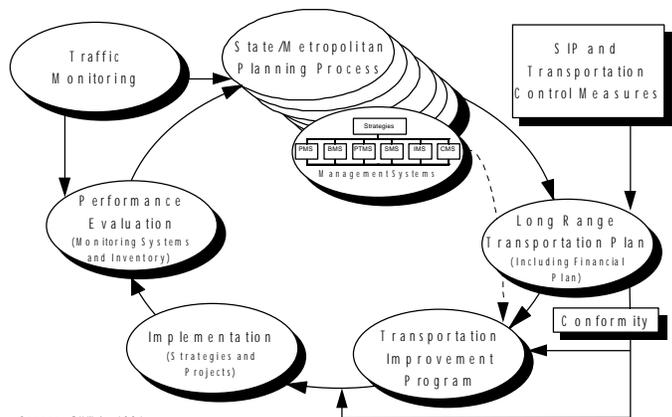
The CAAA, issued in 1990, mandate greater integration between transportation and air quality planning processes at all levels of government (see Figure 1). The conformity regulations, issued

in November 1993, set forth an elaborate mechanism to ensure that transportation planning is consistent with clean air objectives in non-attainment or maintenance areas for one or more of the following pollutants: ozone, carbon monoxide, particulate matter, and nitrogen dioxide. State and local agencies face a major challenge in meeting transportation-related CAAA provisions, including the conformity requirements. FHWA is called upon to provide both technical and policy support to these agencies and other stakeholders. It is crucial that FHWA has accurate, insightful, and up-to-the-minute information on (1) nationwide developments in air quality/transportation planning issues and (2) the strategies and practices of local and state agencies for compliance with federal transportation planning requirements.

Air Quality Models

The CAAA and complementary provisions of ISTEA strengthened controls on transportation to ensure that transportation activities contribute to the attainment of the NAAQS. As a result, a wide range of transportation projects have come under close scrutiny as potential contributors to air pollution. Increases in travel demand have traditionally been satisfied through increased highway capacity. The conventional wisdom supporting this approach has been that increased capacity reduced congestion, fuel consumption, and emissions. This school of thought, however,

FIGURE 1. Transportation Planning Process



Source: FHWA, 1994

has been challenged in recent years by analysts and planners concerned that the short-term benefits of smoothed traffic flow may be degraded by increases in travel that are stimulated by increases in highway capacity. In addition, environmental groups frequently use legal challenges, allowed under the provisions of the CAAA, to limit increases in highway capacity.

There are four generic classes of air quality modeling procedures: Gaussian; numerical; statistical or empirical; and physical. Gaussian models are most widely used for modeling non-reactive pollutants. Numerical models are most appropriate for urban applications involving reactive pollutants (such as ozone formation and dispersion), but require extensive input data and resources. Statistical or empirical models are “second-best” techniques that are frequently employed when incomplete scientific understanding or lack of data make the use of a Gaussian or numerical model impossible. Physical modeling is technically detailed and resource intensive, involving the use of wind tunnel or other fluid modeling facilities, but may be applicable for complex flow situations such as complex building or terrain conditions.

In addition to the various classes of models, there are two basic levels of model sophistication: screening models; and refined models. Screening models consist of relatively simple estimation techniques to identify sources which will clearly not cause or contribute to ambient concentrations which exceed the NAAQS or some other allowable increment, thus eliminating the need for more detailed modeling. Refined models provide more detailed treatment of physical and chemical atmospheric processes, require more detailed and precise input data, and provide more specific estimates.

Emission Reductions (Transportation Strategies)

Emissions reduction efforts range from producing lower-emitting new vehicles to reducing vehicle use. The first efforts to reduce emissions focused on producing vehicles which emitted less pollution. In fact, extensive efforts have been made to control crankcase, evaporative, and exhaust emissions from new on-road vehicles through the implementation of emission standards for new vehicles.

Despite the progress in reducing the emission rates from new vehicles, emission system component failure, lack of proper maintenance, tampering, and the normal deterioration of emission control system performance all act to offset these emission benefits. In addition, most vehicles now in customer service were designed to comply with emissions standards for only five years or 50,000 miles. Overall, the effect of emission control system deterioration and vehicle longevity is that emission rates of a large portion of the vehicle fleet exceed those of new vehicles by as much as an order of magnitude or more.

Given the high degree to which emissions from new vehicles have been reduced, increased attention has been focused on control measures intended to reduce emissions from in-use vehicles. These reductions can come from technology improvements or TCMs. Technology improvements offer a number of innovative approaches to reducing emissions. In fact, I/M programs represent one of the first and perhaps most widespread of the technology-based control measures targeted at in-use vehicles. Other in-use technology-based control measures designed to reduce ROG and NO_x emissions that have been implemented in different areas of the United States include

- Gasoline volatility restrictions,
- Reformulated gasoline requirements,
- Vehicle scrappage programs, and
- Stage II gasoline refueling vapor controls.

National Ambient Air Quality Standards

In early 1997, EPA was in the process of reviewing the ozone and particulate matter National Ambient Air Quality Standards (NAAQS). Technical and policy analysis of proposed and promulgated NAAQS revisions will be executed as deemed appropriate to assist FHWA staff in their efforts to

- Disseminate information on the scope of NAAQS revisions on the transportation planning process; and
- Provide support to state and local transportation planning agencies.

COMMUNITY IMPACT

Transportation investments have major influences on society, with significant economic and social consequences. However, in many instances in the past, impacts on people have not received the attention they deserve. The community impact assessment process alerts affected communities and residents, as well as transportation planners and decisionmakers, to the likely consequences of a project, and ensures that human values and concerns receive proper attention during project development.

Community impact assessment is a process to evaluate the effects of a transportation action (project or potential project) on a community and its quality of life. The assessment process is an integral part of project planning and development that shapes the outcome of a project. Its information is used continuously to mold the project and provide documentation of the current and anticipated social environment of an area with and without the continuation of an action. The assessment should include all items of importance to people, such as mobility, safety, employment effects, relocation, isolation, and other community issues.

ENVIRONMENTAL IMPACT ASSESSMENT IN TRANSPORTATION

Although a significant amount of guidance exists, the approach to environmental impact assessment is often reinvented. Institutional and geographic impediments have hindered the definition of a standard, or an accepted set of approaches to evaluating an issue, and the unique aspects of each project tend to blur the common elements. It will be the objective of this topic area to distill prototypical methods of impact assessment—through a hands-on case study approach that includes interviews and review of approved environmental documents; evaluation of commonly chosen methodologies, databases, and tools; and documentation of critical factors and barriers—and to provide for the transfer of successful impact assessment approaches to regional offices, NEPA practitioners, and municipal and state planning organizations. The research under this topic area will be used to generate instructional material with an immediate utility throughout the agency and in cooperative planning efforts between state and federal planning agencies. Care will be taken to highlight trends—areas where impact assessment is undergoing change—such as in wetland mitigation. In developing instructional materials it will be important to evaluate projects with a range of size and complexity, and to include as examples not only of success stories but also projects perceived as failures. In addition to projects led by FHWA, institutions should review other agencies—such as the U.S. Army Corps of Engineers—which also address issues critical to the environmental planning process.

ENVIRONMENTAL JUSTICE, HOUSING ISSUES, AND ENVIRONMENTAL LAWS

No systematic database exists to show how far state DOTs have identified, and taken steps to mitigate, discriminatory effects of their projects, programs, and policies on low-income and minority populations. On February 11, 1994, President Clinton signed Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” Two major federal laws, the NEPA and Title VI of the Civil Rights Act, are highlighted in the Order. Environmental justice and transportation equity concerns extend to discriminatory outcomes in planning, operation and maintenance, and infrastructure development by state and metropolitan systems. Discriminatory distributive transportation outcomes can be subsumed under three broad categories: procedural inequity, geographic inequity, and social inequity.

ENVIRONMENTAL PLANNING AND MANAGEMENT

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) implemented broad changes in the way governments plan for all modes of surface transportation. The overall objective of ISTEA is to improve the performance of transportation systems. A key thrust is to put transportation decisions against a backdrop of social, economic, and environmental factors early in the planning process, coordinate planning efforts among affected agencies, and involve the public earlier in the decision-making process.

Many new technologies are becoming available to facilitate implementation of ISTEA goals and commitments. For example, ISTEA specifically mandates the use of Geographic Information Systems (GISs) in the management of transportation assets as well as transportation operation and performance. Pavement, bridge, safety, and intermodal GIS-management systems are a few of those required. Much of the information that results from using these management systems can be valuable in planning future facility improvements.

GLOBAL CLIMATE CHANGE

The composition of the Earth's atmosphere is a primary determinant of the planet's temperature, which in turn affects all life on Earth. Greenhouse gases occur naturally and trap heat within the atmosphere, helping to keep the planet hospitable to life. The main greenhouse gases are water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and halocarbons (such as chlorofluorocarbons, or CFCs). According to the U.S. Department of Energy (DOE), concentrations of greenhouse gases in the atmosphere have noticeably increased over the past one hundred years.

Global climate change—often referred to as “global warming”—involves an increase in the average atmospheric temperature of the Earth. Such a temperature increase does not mean that temperatures will rise by a few degrees in all locations around the world. Rather, were global warming to occur, increases in atmospheric and oceanic temperatures might raise sea levels and alter associated weather patterns, which in turn could increase the frequency and severity of extreme weather worldwide. Such changes would likely alter current patterns of land use and human activity, as well as ecosystems and natural habitat.

In July 1996, the United States announced its support of internationally enforceable binding targets for reduction of greenhouse gases. This was a significant policy change; the United States previously had endorsed only a general non-binding commitment to greenhouse gas reduction. The new policy is likely to place additional analytical demands on federal agencies, including the Department of Transportation (DOT), as the U.S. government moves from general support to specific policies and activities which implement those targets.

HAZARDOUS MATERIALS

Right-of-Way Hazardous Substances, Materials, and Waste

The first step in any approach to controlling highway-related hazardous substances is to inventory those materials most commonly related to highway projects and their rights-of-way (ROWs). This topic area will also evaluate the success and practicability of current methods and equipment used to restore or enhance existing sites located in ROWs. The key element that differentiates this topic area from the Hazardous Materials Generated During Development and Completion of Projects topic area is that the hazardous substances are identified early in the highway planning and acquisition process, thereby enabling the acquisition/environmental staff to conduct a thorough investigation to identify the extent of hazardous materials anticipated in the ROW.

When hazardous substances are anticipated early in the planning process, the highway planner can proceed along the traditional methods to identify the extent of hazardous materials, analyze remedial options for handling the hazardous materials, designing the preferred remedial option, and implement the selected remedial action. A great advantage of early identification is that the

environmental engineer can select long-term in-situ treatment processes, such as bioventing, soil vapor extraction, bioremediation, or a “pump and treat” approach.

Hazardous Materials Generated During Development and Completion of Projects

Hazardous materials are often exposed by earth moving equipment as the ROW is cut to grade for subsequent construction. Occasionally, hazardous wastes are dumped at the construction site during off-duty hours, resulting in a need for rapid characterization and disposal of the dumped waste.

Typically, however, the soil contamination results from past disposal activities or past leakage of hazardous liquids into the soil—leakage that was undetected during the property acquisition phase. In either instance, the DOT will establish a rapid response investigative team which is required to quickly characterize the waste, estimate the volume requiring remediation, and initiate an interim removal action. The key operative words in these scenarios are “rapid response,” since prolonged delays in characterization and remediation of uncovered hazardous materials can lead to liquidated damages for the construction contractor.

In general, the options available to the DOT for remediation are limited to ex-situ remedial actions; i.e., immediate excavation of the contaminated soil and transport to an alternative location either for treatment or disposal. This transport to another location belonging to the DOT, but removed from the ROW, enables construction to proceed while treatment of the contaminated soil is carried out.

HISTORIC BRIDGES

A good highway system means more than just a good way to move people and goods. Road design, construction, and maintenance should produce a system that blends well with its environment, both physically and visually. Rehabilitation of historic bridges can provide important help in meeting this ideal while also recognizing the cultural context in which development has taken place. By rehabilitating rather than replacing historic bridges, there is a reduction in the need for new abutments, causing less disruption to wetlands and other parts of the natural environment.

Engineering techniques must be developed that are appropriate to the special structural problems of different types of historic bridges and that provide cost-effective solutions to rehabilitation goals. Cost is an important factor since many historic bridges have been bypassed by safer roads better able to carry high volumes of modern vehicles. Given the financial limits that all state DOTs face, can low traffic volumes justify expensive rehabilitation projects?

PUBLIC INVOLVEMENT

Today, transportation project work demands an increasingly sophisticated and thorough approach to public involvement. This has not been by chance. Increased public concern and awareness, generally coupled with specific provisions of ISTEA, its Final Rule on Metropolitan Planning, and related federal guidance such as FHWA/FTA’s training course for major investment studies, all call for renewed emphasis on public involvement.

MPOs and states are grappling with the new ISTEA public involvement requirements with varying degrees of success. A small but growing group of states and MPOs have enthusiastically embraced public involvement and are sponsoring programs characterized by high degrees of commitment, responsiveness, and innovation. Such agencies are eager to enhance their participatory planning activities and are requesting information that is at the cutting edge. A second, much larger, group believes public involvement is useful (or convinced that it must be done), and has taken steps to enhance their programs. This group needs “how to” information and is especially anxious to learn from the experiences of counterpart agencies. Finally, there are still states and MPOs that view public involvement as either ineffective or impossible to achieve. These folks need to be convinced through success stories and documentation of benefits that participatory planning is worthwhile and necessary.

SOCIAL AND ECONOMIC IMPACT

This task aims to identify and document techniques for assessing social and economic impacts, including techniques that respond to their current legal environment. Yet these methodologies are changing rapidly to reflect the increasingly sophisticated demands of the public and decision-makers as well as to respond to the new, post-ISTEA and CAAA environment. Because of this complexity, the work plan should rely on experts with practical, applied project experience.

STORMWATER CONSTITUENTS

Stormwater discharges from roads and highways represent an environmental issue requiring an understanding of not only the technical aspects of highway design and operations, site environmental impacts assessment, and regulatory requirements, but also the relative contribution and magnitude of the environmental impacts on the ecological system. Although available data and research shows highway stormwater discharges are most likely to have significant impact on localized areas, the holistic approach which integrates highway stormwater runoff into the overall watershed-based ecological framework allows for the evaluation of long-term water and water quality trends.

Monitoring of stormwater runoff from roads and highways continues to generate valuable information which, integrated with mathematical and statistical predictive models, can be used in various planning and engineering activities:

- Stormwater analysis and characterization of receiving water quality;
- Evaluation of ecological and human health impact analysis and compliance with water quality standards;
- Environmental impact assessment studies and compliance with associated regulatory requirements;
- Review, evaluation, and comparison of citing plans alternatives;
- Consideration of design alternatives to mitigate potentially significant impacts;
- Evaluation of stormwater management needs and development of pollution control programs; and
- Evaluation of water quality and ecological health of valuable and sensitive resources.

TRANSPORTATION NOISE

Noise, defined as unwanted or excessive sound, is an undesirable by-product of today's society. It is often annoying, can interfere with sleep, work, or recreation, and in extremes may cause physical and psychological damage. While noise emanates from many different sources, transportation noise is perhaps the most pervasive and difficult source to avoid in society today. Noise impacts are not uniform with respect to vehicle miles traveled (VMT). One mile driven by a heavy truck on a local street creates much greater impact than a passenger car driven on an interstate with a landscaped shoulder. Given these differences, the level of highway traffic noise depends on three things: the volume of traffic, the speed of traffic, and the number of trucks in the flow of traffic. Noise associated with road transport is a combination of the noises produced from engine operations, exhaust, pavement-wheel contact, aerodynamic affects, and vibrating structures during operations. The loudness of traffic noise can also be increased by faulty equipment on vehicles, any condition that causes heavy laboring of motor vehicle engines (such as a steep incline), as well as more complicated factors (i.e., as a person moves away from a highway, traffic noise levels are reduced by distance, terrain, vegetation, and natural and manmade obstacles).

If noise impacts are identified, various noise abatement measures are considered to mitigate the adverse impacts, for example, noise barriers. Other possible noise abatement measures include: traffic management measures, creating buffer zones, planting vegetation, installing noise insulation in buildings, and relocating the highway.

TRANSPORTATION PLANNING

In a completely transport-dependent society, the overriding role of transport in the nation's economic and social development is to continue the levels of service that have contributed to the economic progress to date. A parallel charge is to assure that transport programs and policies are responsive in a climate of economic uncertainty and budgetary constraints. Transportation policies need to be aimed directly at supporting national and community goals.

National goals that can be substantially aided by transportation include increasing industrial productivity, promoting energy efficiency, facilitating trade, upgrading the cities, protecting the environment, guiding urban growth, and exploiting the opportunities conferred by the global economy. These goals must also consider environmental and social impacts and techniques used to decrease those impacts, such as, transportation control measures (TCMs).

WATER QUALITY

Where possible, States, Tribes, and other jurisdictions identify the pollutants that degrade water quality and indicators to document water quality degradation. Water quality monitoring is technically demanding and expensive. Furthermore, ideas about what indicators should be monitored and how to interpret the results continue to change.

Monitoring provides information that helps set policies and programs to protect and improve the quality of our Nation's streams, rivers, and lakes. It provides a basis for prioritizing needs so limited funds can be effectively allocated to improve conditions. Monitoring also provides the basis both for determining whether those policies and programs actually result in measurable environmental improvements, and to increase policies and programs effectiveness.

Ecosystem/Watershed Planning

The watershed protection approach is a place-based strategy that integrates water quality management activities within hydrologically defined drainage basins—watersheds—rather than areas defined by political boundaries. Thus, for a given watershed, the approach encompasses not only the water source (such as a stream, lake, estuary, or ground water aquifer), but all the land from which water drains. To protect water resources, it is increasingly important to address the condition of land areas within the watershed because water carries the effects of human activities throughout the watershed as it drains off the land into surface waters or leaches into the ground water.

Several key principles guide the watershed protection approach: place-based focus, stakeholder involvement and partnerships, environmental objectives, problem identification and prioritization, and integrated actions. The watershed protection approach is envisioned as the primary mechanism for achieving clean water and healthy, sustainable ecosystems throughout the Nation. This approach enables stakeholders to take a comprehensive look at ecosystem issues and tailor corrective actions to local concerns within the coordinated framework of a national water program.

WETLANDS

The proper application of functional evaluations is critical to mitigating adverse impacts of transportation projects on wetlands. Functional evaluations of newly created wetlands can be extremely useful in measuring the success of efforts to replace lost wetland functions. Such assessments require careful definition of objectives and a comparison of results to certain baseline conditions. Depending on the objectives of the wetlands project, the baseline may be defined as the same wetland prior to alteration or as a nearby unaltered wetland of similar hydrogeomorphic type. Comparisons may also be made with other stated mitigation objectives, based on a reference wetland representing a desired target condition.

Functional evaluations are also useful in providing performance standards for the design of new wetlands. The target condition for the proposed wetland can be defined based on the conditions of key factors related to capacity levels for the desired functions. With expert implementation of

these approaches, newly created wetlands will be more successful in replacing impacted wetland functions.

While mitigation objectives are important, however, the primary considerations governing whether specific performance standards will be achieved are the site characteristics and their limitations. The objectives for replacing functions and functional capacity in the created wetland must be closely attuned to the site conditions, and this requires that the hydrologic, physical, chemical, and biological conditions at a mitigation site be characterized completely. The performance standards for the created wetland can then be based on those key functional capacity factors that correspond with conditions at the mitigation site.

After a proposed new wetland has been planned based on site limitations and opportunities, a functional evaluation may be conducted. The results of this evaluation can be compared with the stated mitigation objectives to determine whether a compensation ratio greater than 1 to 1 is necessary to replace functional capacity losses. When conducted properly, this process ensures that mitigation efforts will be sufficient to reach desired objectives and allows assessments of whether those objectives have been met in newly created wetlands.

APPENDIX B—SUMMARIZED APPLICATIONS AND CERTIFICATIONS

COMPLIANCE REQUIREMENTS

Please see Section 6, Applications and Certifications, for a general description of the requirements the top candidates must meet. FHWA will assist applicants as needed. Requirements in this section do not need to be met to submit a technical proposal, yet must be met to receive a research award.

To be eligible for award, all potential recipients of Federal assistance under this program will be required to demonstrate compliance/agreement with a number of standard terms and conditions. The Government may, at its discretion, impose additional requirements on an individual award recipient as needed to reasonably ensure the awardee's ability to conform to these standards. Most of these requirements are contained in the Application Package which may be obtained from FHWA upon request. In addition, potential applicants are encouraged to review OMB Circular No. A-110, Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations.

{<http://www.whitehouse.gov/WH/EOP/OMB/html/circulars/a110/a110.html>}.

The following is a summary of the compliance/responsibility requirements for potential award recipient. Questions on any of the issues discussed below should be addressed to the FHWA Contracting Officer named in the applicable Commerce Business Daily announcement (see Section 8, Schedule):

a) *Financial Management System*

Institutions must possess a financial management system capable of satisfying the Government's requirements for reporting financial data on program income, budgeting, audit, fund availability/accountability, outlays/expenditures, and satisfying cost sharing/matching requirements. Institutions must demonstrate ability to comply with regulations governing allowability of incurred costs {OMB Circular A-122}.

b) *Payment*

Institutions that demonstrate ability to comply with the financial management system requirements above may be eligible for advance payment procedures. Otherwise, reimbursement will be the preferred payment method.

c) *Property/Inventory Control and Reporting*

Institutions must demonstrate the ability to manage all property that is (i) furnished by the Government; and/or (ii) whose purchase cost is reimbursed by the Government through Program funds. Institutions that demonstrate compliance capability may be eligible to retain this property upon completion of the effort.

d) *Procurement Standards/Procedures*

Institutions must demonstrate the capability to procure materials and services in conformity with Federal regulations, including the ability to match procured items/services with project requirements, ensure competition, avoid unnecessary purchases, utilize small and disadvantaged enterprises, use the correct purchase/contract method, and maintain satisfactory records of purchases under the project.

e) *Termination*

Potential recipients of Federal assistance should be cognizant of the Government's right to terminate awards due to noncompliance with the terms and conditions of each award.

f) *Principal Investigator*

Institutions must demonstrate the commitment of proposed Principal Investigator(s) to perform responsibilities under the project for a stated minimum percentage of his/her time.

g) *Certifications*

Applicants may be required to certify compliance/agreement with the following, depending on the size and type of award:

- Equal Opportunity Act.
- Acknowledgment of FHWA Support, and Disclaimer of FHWA's agreement with research findings/conclusions, in all published materials resulting from work performed under the award.
- [Government's] Rights in Data. FHWA reserves the right to use, reproduce, and authorize use, of findings, reports, data, etc., produced/delivered by the grantee (university or college), except for restricted computer software.
- [Government's] Rights to Inventions and to Copyrights. FHWA reserves the right to use and to authorize use of inventions and copyrights. The grantee (university or college) retains "ownership" rights to inventions (patents/copyrights).
- Clean Air Act.
- Federal Water Pollution Control Act.
- Anti-Lobbying/Procurement Integrity.
- [Institution is not] Debarred and Suspended.
- Certification of Non-Segregated Facilities.
- Certification of Drug-Free Workplace.
- Data Collection {OMB Circular No. A-40}.
- Rehabilitation Act [non-discrimination due to handicap].
- Age Discrimination Act [non-discrimination due to age].
- Fair Labor Standards Act [minimum wage and overtime].
- Hatch Political Act [political activity limitations].
- Intergovernmental Cooperative Act {see SF 424, block 16}.