

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP Report 435

**Guidebook for Transportation
Corridor Studies:
A Process for Effective
Decision-Making**

Transportation Research Board
National Research Council

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Report 435

Guidebook for Transportation Corridor Studies: A Process for Effective Decision-Making

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Subject Areas

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Rail
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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

The Transportation Research Board of the National Research Council was requested by the Association to administer the research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose as it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communications and cooperation with federal, state and local governmental agencies, universities, and industry; its relationship to the National Research Council is an insurance of objectivity; it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

The program is developed on the basis of research needs identified by chief administrators of the highway and transportation departments and by committees of AASHTO. Each year, specific areas of research needs to be included in the program are proposed to the National Research Council and the Board by the American Association of State Highway and Transportation Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are the responsibilities of the National Research Council and the Transportation Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

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FOREWORD

*By Staff
Transportation Research
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This report contains the results of research into the design and management of corridor and subarea transportation planning studies. It is intended to provide transportation organizations, planning practitioners, and transportation decision-makers with practical tools and guidance for designing, organizing, and managing these studies to effectively support transportation investment decisions tailored to the specific conditions and performance needs for major transportation improvements. Presented as a guidebook, it brings together lessons learned from different regions of the country on corridor and subarea studies with different scopes and levels of complexity. It provides a structured approach to the process of conducting corridor studies, with an emphasis on designing each study to address the conditions unique to the particular physical, social, and institutional environment. The guidebook should be especially valuable to state Departments of Transportation (DOTs), Metropolitan Planning Organizations (MPOs), and local transportation planners, as well as other practitioners concerned with planning, programming, and implementing multimodal transportation projects. The report will also be useful as an educational resource into the concepts, tools, and procedures currently employed for establishing and carrying out corridor and subarea studies that sustain effective transportation planning consensus and timely project development.

Recent federal transportation policy, as embodied in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21), placed a high priority on integrating and coordinating transportation decision-making through improved corridor and subarea transportation planning studies. This new emphasis represents a shift away from predetermined modal decisions toward a broader consideration of tailored multimodal solutions within the context of transportation performance expectations and investment commitments. As such, this emphasis is intended to result in transportation plans, programs, and decisions that are driven by the needs of the specific area, as opposed to the modal restrictions of the funding source or program. Given this emphasis, transportation planning and development must be based on decisions that reflect the unique needs and characteristics of the area.

Research is needed to build upon the body of work accomplished to date on major investment studies, corridor studies, and subarea studies in order to assist practitioners and decision-makers with designing and managing these efforts to achieve the best possible decisions and plans. Specifically, research is required to define where, when, and how specific approaches to conducting these studies can be most useful and effective. There is a vast array of planning environments and transportation corridors within which such planning studies are conducted. These environments and corridors differ in terms of adopted policy, available resources, character of the built environment, and size of the metropolitan area. Analytical and procedural frameworks that fit specific types of tools to types of situations are needed.

Under Project 8-34, "Major Investment Studies: Development of a Practitioner's Guidebook for Effective Study Design, Management, and Implementation," TransCore, of San Bernardino, California, developed guidance for use by planning practitioners and other decision-makers to most effectively design, initiate, manage, and complete corridor and subarea studies that will support timely implementation of transportation decisions. Although the *Guidebook* addresses many of the fundamental activities that are included in effective corridor planning studies, the emphasis is not primarily on the study itself. Rather, the emphasis is on how to employ systematic, effective study procedures to bring stakeholders together with decision-makers to achieve consensus on transportation decisions. The corridor study should be viewed as a focal point or catalyst for decision making, not as the goal in itself. The principles and procedures are intended as guidance to practitioners, to be applied in a way that is tailored to the decisions being made. The *Guidebook* focuses on the planning-level decisions. However, it emphasizes the importance of carrying out planning and project development as integrated functions, including a decision-making process that is, in effect, seamless. The *Guidebook* also places a strong emphasis on community involvement as part of the decision-making process.

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INTRODUCTION AND EXECUTIVE SUMMARY

Purpose of the *Guidebook*

A decision by a metropolitan area or community to invest in any major infrastructure improvement is often a major undertaking. Most of these decisions do not come easily, as there are many perspectives, concerns, costs, and potential impacts. Major improvements to the transportation system are a prime example of the difficulty. The facilities that carry cars, trucks, buses, and trains are generally not perceived to be good neighbors, yet these facilities are vital to everyday life. Decisions on major transportation facilities frequently highlight the dilemmas and tradeoffs between maintaining mobility and safety for people and goods while minimizing the costs and impacts, particularly on the facilities' neighbors. Public policies have been established to promote cost-effective and environmentally sensitive improvements, but the exact balance of concerns in any particular area or corridor must be tailored to the unique characteristics (institutional, physical, financial) of the communities involved.

The *Guidebook for Transportation Corridor Studies* focuses on making transportation investment decisions. This is the reason for the subtitle, "A Process for Effective Decision-Making." Although the *Guidebook* addresses the "how-to's" of effective corridor studies, the emphasis is not primarily on the study itself. Rather, **the emphasis is on how to employ systematic, effective study procedures in bringing stakeholders together to make transportation decisions**. The corridor study should be viewed as a focal point or catalyst for decision-making, not as the goal in itself. A corridor study can be conducted following all of the best procedures, and can be prepared as an excellent paper product, but will be worth little if it is not viewed to be a means for decision-making. **Thus, the term "corridor study" is not used here mainly in reference to a product but as a process for effective decision-making.** The *Guidebook* suggests certain products, but these products should always be viewed as contributing to decision-making, not as the ultimate goal. The principles and procedures are intended as guidance to practitioners, to be applied in a way that is tailored to the decisions being made. They are not intended to be applied blindly to every situation in the same way.

Decisions on major transportation investments can be made at several levels. Some are regional in scale, requiring considerations of how facilities interconnect together within a larger system. Others focus on a more limited corridor or subarea. The *Guidebook for Transportation Corridor Studies* focuses on transportation decision-making at the corridor or subarea level. But it is critical to remember that there is often interplay between regional and corridor/subarea considerations. Regional-level decisions need to consider input from individual corridors; corridor-level decisions need to include regional considerations. Therefore, the *Guidebook* also addresses concerns that may be considered more regional in nature.

Corridor Study History

The *Guidebook for Transportation Corridor Studies* was developed as part of a National Cooperative Highway Research Program (NCHRP) project originally designed to address "Major Investment Studies" (MISs). The requirement for MISs was defined in the October 28, 1993, regulations on Metropolitan Planning promulgated by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). Prior to the FHWA/FTA joint regulations on Metropolitan Planning and Statewide Planning, the FHWA and FTA had significantly different procedures for planning major improvements, notably FTA's requirements for an Alternatives Analysis and FHWA's highway corridor planning procedures. The MIS requirements consolidated these procedures into one planning process.

On June 9, 1998, President Clinton signed into law the Transportation Equity Act for the 21st Century (TEA-21). One of the provisions of this legislation was that

“The Secretary shall eliminate the major investment study set forth in section 450.318 of title 23, Code of Federal Regulations, as a separate requirement, and promulgate regulations to integrate such requirement, as appropriate, as part of the analyses required to be undertaken pursuant to the planning provisions of title 23 USC and chapter 53 of title 49, USC and the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) for Federal-aid highway and transit projects. The scope of the applicability of such regulations shall be no broader than the scope of such section.” (TEA-21, SEC 1308).

TEA-21 also addressed the issue of environmental streamlining. The TEA-21 Summary (available on the U.S. DOT web site) describes this part of the legislation as follows:

“The Secretary will establish a coordinated environmental review process for the DOT to work with other Federal agencies in ensuring that major highway and transit projects are advanced according to cooperatively determined time frames. The coordinated process will use concurrent, rather than sequential, reviews. It will allow States to include their environmental reviews in the coordinated environmental review process. The Act also authorizes the Secretary to approve State requests to provide funding to affected Federal agencies in order to meet established time limits. If the Secretary finds that a project-related environmental issue has not been resolved with another Federal agency, the heads of the two agencies will meet within 30 days (of the Secretary’s finding) in order to resolve the issue.”

The expectation is that current planning regulations (23 CFR Part 450) and 23 CFR Part 771 (Environmental Impact and Related Procedures) will be modified to reflect the intent of TEA-21. However, the exact nature of these changes may not be known for some time. The intent of the *Guidebook* is to describe and illustrate good practices and procedures for corridor and subarea planning. Describing good planning practice is independent of the issue of how FHWA and FTA will reformulate Federal regulations. Nevertheless, practitioners should be aware of any changes in Federal and state regulations, as they occur, that may affect the planning process. The *Guidebook* does not make reference to MISs, other than the historical discussion in this section. There are also several references to MISs in a variety of examples of corridor study practices that have been applied by various transportation agencies. But the focus is on good planning practice, not whether the work took place in response to a regulatory requirement.

Even though the MIS phraseology is not being used in the *Guidebook*, it is useful to understand the genesis and intent of the NCHRP project under which the *Guidebook* was developed. NCHRP Project 8-34, *Major Investment Studies: Development of a Guidebook for Effective Study Design, Management, and Implementation*, was initiated by the Transportation Research Board in 1997 to help practitioners and decision-makers most effectively design, initiate, manage, and complete corridor and subarea studies that will support timely implementation of transportation decisions. As indicated above, the important issue is not so much the name that is used for the study, but the nature of the activity. Some states or regions may continue to use the MIS terminology. Others may use the terms “corridor study,” “feasibility study,” “needs study,” and so forth. The purpose is not to define and categorize types of studies but to help practitioners understand how to bring stakeholders together to make effective and timely decisions based on useful and appropriate information generated as part of a study.

The *Guidebook* brings together lessons learned from actual experiences in different regions of the country and on corridor/subarea studies with different scopes and levels of complexity. The *Guidebook* provides information that addresses issues identified by practitioners as being important

to the successful conduct of corridor/subarea studies. These have continued to serve as the guiding objectives for the project, even with the changes brought about in the MIS requirements by TEA-21.

The *Guidebook* uses the term “corridor study” to represent a range of activities and study elements that can be useful in bringing information together to help communities make transportation decisions. It includes the concept of a subarea, not necessarily just a linear corridor. The *Guidebook* uses the terms “corridor study” and “corridor planning study” to represent activities in both linear corridors and subareas. The *Guidebook* refers to a “corridor study process” not as a rigid step-by-step procedure but as the overall approach to analysis, stakeholder involvement, and decision-making.

One could summarize the purpose of a corridor study as the following:

“to assist in making planning decisions regarding the design concept and scope of a transportation investment that best meets community needs, taking into account a wide range of factors relating to transportation service, impacts, and financial feasibility.”

A fundamental principle of the *Guidebook* is to provide agencies with choices of approaches that can be adapted to a variety of conditions. There is no single right way to conduct a corridor study and there are no “cookie cutter” approaches. However, there are many lessons learned on good and bad practices. Practitioners can learn both from successes and from mistakes. **The *Guidebook* is intended to help practitioners make an assessment of circumstances and to determine the types of practices, procedures, and approaches that may be appropriate for the given set of conditions.** The following section provides a summary of some of the key points concerning the conduct of corridor studies. It draws from material throughout the remainder of the *Guidebook*. Following this summary, Chapter 1 concludes with information on the organization of the *Guidebook*, definitions, resources, and a description of the research process used in NCHRP Project 8-34.

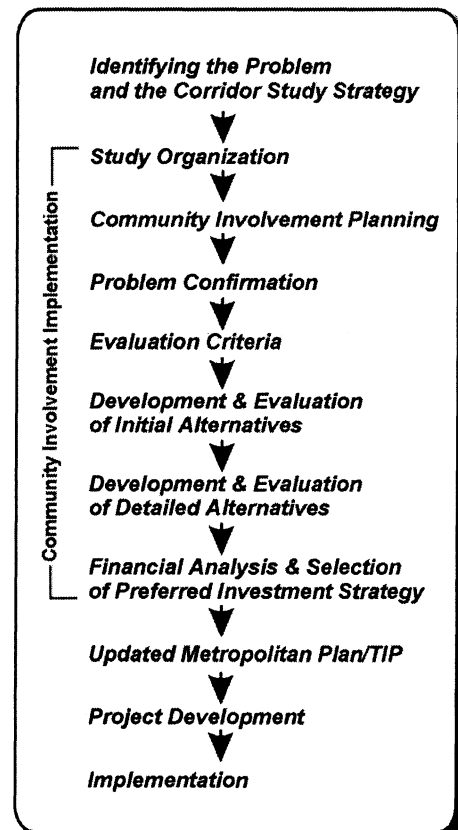
Summary

The subject of corridor studies presents a vast arena of topics, procedures, and practices that should be covered. A corridor study brings together multiple disciplines, including transportation, community planning, environmental planning and finance, to name a few. It addresses not only technical issues but institutional issues as well. It is difficult to cover the breadth of these issues in a summary. Yet it is useful to condense some of the primary principles and practices so as to highlight some of the more important concepts and points to remember.

Typical Flow of a Corridor Study

There is no one single approach to conducting a transportation corridor planning study. Each study needs to be adapted to the conditions and issues that exist in the local area. However, it is useful to have a general structure or process in mind when conducting a corridor study. Exhibit ES-1 illustrates a typical process or flow of a corridor study. The process itself is not mandated, but represents a series of logical activities that move from study initiation (e.g., planning for community involvement, problem identification, criteria development) to the evaluation of alternative

Exhibit ES-1. Typical Flow of a Corridor Study



solutions and recommendation of a preferred alternative or investment strategy. The process may vary from study to study, or the emphasis on certain elements of the process may change. For example, in some studies, the development of evaluation criteria may be conducted in parallel with or even following the development of initial alternatives. Other studies may develop evaluation criteria at the point shown in the exhibit. This underscores the point that there is no “one-size-fits-all” approach to corridor studies. Although most of the study elements shown in Exhibit ES-1 will be needed in the vast majority of cases, each study will need to adapt its approach to the conditions at hand. The sections below summarize principles for the major study elements outlined in the exhibit.

Identification of Corridor Problems and Issues

One of the fundamental concepts of a corridor study is that alternatives should be developed based on a thorough understanding of the existing and future problems in the study corridor. For a number of years, Federal agencies have been recognizing the deficiencies in the “purpose and need” sections of environmental documents. These sections were often cursory and one-dimensional, and the needs were even, at times, expressed in terms of a solution (e.g., “need” for additional capacity). A basic understanding of the corridor problems and issues is needed as the basis for determining that a corridor study is warranted. This initial definition of the problems and issues will be confirmed and expanded as additional agencies and the public are brought into the process.

Based on the lessons learned from practitioners and on a review of problem statements in actual studies, the following general principles can be stated regarding definition of problems for a corridor study.

- **Problems should not be framed in terms of a solution.** There is often a temptation to jump to possible solutions before the problems are defined or to assume that there could be only one solution to a problem. For example, saying there is a “need for additional capacity on facility x” or “need for additional transit service” states the problem in terms of a solution. Certain types of solutions may strongly address certain types of problems, but the solutions should not be identified in the definition of the problem.
- **Problems should include not only current, known problems, but anticipated future problems.** Background work may need to be done to convince elected officials and the public that the future problems will actually occur.
- **Problems should be stated as specifically as possible.** This should include times, days, and locations of occurrence. This will help in the identification of causes and of possible solutions.
- **Problems should be stated in a way that is understandable to the public and elected officials.** Much of the decision-making will hinge on the extent to which elected officials and the public understand how alternatives address the identified problems. If they do not understand the problems, they will have difficulty evaluating the alternatives.
- **Problems should be identified in a way that they can be related to the alternatives** (i.e., should be able to answer the question “did an alternative address one or more problems and to what degree?”).
- **Agencies should seek to obtain as much agreement on the problems as possible, early in the study.** For controversial studies, approval of the problem statement by the policy committee and by agencies involved in subsequent environmental and permitting reviews is advisable.
- **The problem statement should be documented in a way that is consistent with the requirements of subsequent environmental documentation.** In all likelihood, the

problem statement can be incorporated into subsequent environmental documentation if it is comprehensive and broadly agreed upon.

Developing the Corridor Study Strategy

The concept of a corridor study strategy reflects the idea that those determining the need for a study and taking the steps to initiate it should have a basic strategy in mind for how they would go about it. This should include understanding why they need to conduct the study, what types of decisions they would expect the study to address, the relationship to subsequent decisions (e.g., in project development), how the public will be brought in, and some of the basic parameters for how the study will proceed.

The development of the corridor study strategy is founded on an understanding of why a corridor study needs to be conducted. There are several possible reasons for initiating a corridor study, such as

- To determine the strategy that should be put in place to address a current or future transportation problem.
- To define improvements in a corridor to be placed in the financially constrained Metropolitan Transportation Plan.
- To determine funding needs to support improvements in a corridor.
- To provide a better context for other planning to be conducted in the corridor. For example, an agreement on a course of action in a corridor could allow land use plans to be modified to support the proposed action.
- To set the stage for advance corridor right-of-way preservation.
- To determine how improvements in a corridor will fit into a larger system plan.

A corridor study can involve substantial effort. But it is only one step in a stream of decisions that could ultimately result in implemented projects that address area goals and objectives. A corridor planning study results in the definition of a **design concept and scope** for an improvement or set of improvements. Determining the design concept and scope involves making a decision on the mode or modes of travel, type of facilities, and the general location of the improvement. These are planning-level decisions. Project development involves defining the specific location and design of the improvement. To effectively use the corridor study process, it is important to remember that planning and project development should be thought of as a seamless, coordinated decision-making process, not as isolated activities. Project development and environmental personnel should be involved in the planning phases, and planning personnel should be involved in the early project development phase to ensure a smooth transition of decision-making.

... planning and project development should be thought of as a seamless, coordinated decision-making process.

The development of the corridor study strategy will involve addressing questions such as

- What purpose(s) should the corridor study address? What types of decisions should it be expected to make?
- What should be the timing of the study given the urgency of the decision, relationship to other plans, relationship to election cycles, and so forth?
- Should the study be conducted under the specific requirements of the National Environmental Policy Act (NEPA), or should that wait until later? Typically, the prospect of potentially

having the study result near term actions increases the likelihood that the NEPA process should be engaged, if resulting projects are expected to be federally funded.

- Should multiple corridors be examined at the same time or should the focus be on a single corridor?

Development of the corridor study strategy needs to be a collaborative process so that when the study is taken into the public arena the purpose and focus of the study will be clear both to the agencies and to the public.

There is an important relationship between corridor planning studies and the National Environmental Policy Act of 1969 (40 CFR Parts 1500-1508). Their over-arching goals are basically the same, to make decisions (or take actions) that are in the overall best interest of the community through a process of technical analysis of alternative solutions, public information, and collaboration. There are three classes of actions which prescribe the level of documentation required in the NEPA process (23 CFR Part 771): (a) Class I—Environmental Impact Statements (EIS)—Actions that significantly affect the environment; (b) Class II—Categorical Exclusions (CE)—Actions that do not individually or cumulatively have a significant environmental effect; (c) Class III—Environmental Assessments (EA)—Actions in which the significance of the environmental impact is not clearly established. All actions that are not Class I or II are Class III. All actions in this class require the preparation of an EA to determine the appropriate environmental document required. NEPA documentation is required for all projects proposed for Federal funding. State environmental regulations may also apply to these and other projects.

Agencies will need to make a decision on whether to prepare the NEPA documentation simultaneously with a corridor planning study or after the corridor study is completed. The decision whether to include NEPA documentation depends on the objective and timing of the decisions to be made. Several factors to be considered in this decision are discussed in Chapter 3. **However, agencies should recognize that, even if NEPA documentation is not included as part of a corridor planning study, the study should be conducted with a recognition that the NEPA process will apply for resulting projects that use Federal funds.** Agencies should think through the relationship between planning decisions, project development decisions, and the ultimate need for NEPA and state-required environmental documentation. **In effect, agencies should think of a corridor planning study and compliance with environmental regulations as an integrated set of activities.** If this linkage is not understood, there is an increased possibility of wasted effort and public confusion over the decisions being made.

Exhibit ES-2. Study Initiation Steps

1. Assemble the relevant transportation agencies
2. Assemble all potentially interested stakeholders
3. Prepare draft work plan
4. Form policy and technical committees
5. Define agency responsibilities/need for consultant
6. Select consultant and/or arrange for internal agency resources
7. Develop outreach/public involvement plan
8. Develop/confirm agency study management plan/principles

Study Organization

The organization and initiation of a corridor study will be tailored to the specific circumstances, both institutionally and technically. Exhibit ES-2 illustrates some typical steps in initiating the study. It is typically an incremental approach, beginning with the formation of mutual understandings among the government agencies and broadening the involvement to the public. Some of the key principles in study initiation include

- Study initiation meetings, with broad representation of stakeholders, are critical to the identification of issues that need to be addressed in any particular study. A proactive effort should be undertaken to ensure good representation.

- To properly scale the level of detail, focus efforts on those issues that are key to making a decision and limit effort in areas that will have little to do with the decision.
- A good work plan is critical to the effective undertaking of a corridor study. The work plan should spell out the methods and approaches as clearly as possible, but must also have the flexibility to change course in response to circumstances that arise during the study. A work plan is important whether or not a consultant is involved.
- A clearly defined decision-making structure is important to the successful achievement of study objectives. Most studies will have technical and policy committees, but the organization can range from the use of committees already established for ongoing planning purposes to committees specifically established for the study. The approach often depends on the geographic scale of the study, the specific issues being addressed, and local practice.

Community Involvement Planning

Community involvement encompasses outreach to four distinct groups that will be critical to the success of most major corridor studies: the public, elected officials, the media, and resource agencies. There is considerable research and documentation available on community involvement techniques. The techniques need to be selected in keeping with the corridor study strategy. But it is important to recognize that how the techniques are carried out is usually even more important than what techniques are used. Creating adversarial relationships only makes an already tough decision-making process even more difficult. Consensus is built on listening carefully to what others are saying, taking it seriously, and keeping the dialogue constructive. It involves finding areas of common ground and building on them. Agencies that build long-term trust with their constituents tend to be better prepared to deal with other agencies and the public on individual corridor studies. The following represent general principles for working with the public, elected officials, the media, and resource agencies.

. . . how the techniques are carried out is usually even more important than what techniques are used.

The Public

- **Maintain a constructive tone.** Those who have problems with a particular course of action must be encouraged to offer feasible alternatives not merely to speak against the action. Points of view can be expressed with courtesy and respect, even though they may differ from the viewpoints of others.
- **The dialogue needs to include responsible representation of stakeholder groups as well as representation of the broader community interests.** Responsible representation means individuals who will fairly articulate the views of the group or groups they represent not merely convey their own views.
- Representation of broader community interests (i.e., not just those who are negatively impacted) can be difficult, but is essential to achieving balanced decisions. Opinion polling can be a useful tool here.
- **Avoid hidden agendas and give honest answers.** The public tends to recognize when project participants are being less than honest. It is better to correct a misstatement or mistake at the earliest possible point, rather than make excuses or hope that no one will remember.
- **Be sure to follow up when promises have been made for information or answers to questions.** Credibility of the process will largely rest on agencies being perceived as responsive to their constituents. Where follow-up cannot occur in the timeframe originally stated, provide a revised date to the individuals who have an interest in the answer. In

making promises, agencies should weigh the resources needed to provide the promised information. If the information cannot be provided, it should be identified as a resource issue not as mere resistance on the part of agencies.

- **Do not make promises that cannot be kept and do not soft-pedal the difficulties inherent in a particular course of action.** There may be no way to mitigate the impacts on some parties or interest groups. Providing honest assessments will establish long-term credibility and will protect good decisions from being overturned.

Top ten ways to gain credibility (Source: PennDOT Public Involvement Handbook)

1. Involve people in decisions that will directly affect their lives.
2. Provide information that meets people's needs in a timely manner.
3. Listen to what people are telling you; respond to it.
4. Respect people's values and feelings.
5. Speak plain English.
6. Be open and candid; respond in a personal way, not as a bureaucrat.
7. Make only promises you can keep.
8. Be honest; admit when you do not have the answers or when you have made mistakes.
9. Act consistently trustworthy; do not get defensive.
10. Improve your interpersonal skills.

- **Do not downplay uncertainties nor make more of them than necessary.**

Uncertainties will exist. The best approach is normally to acknowledge the uncertainties and make them a part of the decision-making process. Sensitivity testing or risk analysis can be used to set the limits of the uncertainties.

- **Maintain a balance between providing adequate time for input while moving the process forward.**

It may be best to delay a major decision when more input is needed, but decisions should not be delayed merely because they are difficult. Keep in mind that elected officials making difficult decisions will need as much justification as possible.

- Where there are major differences in views among agencies or among

segments of the community, **it is best to have the dissenting parties at the table, rather than exclude them from the process.** They may still dissent from the ultimate decision, but at least their input will have been a consideration in the decision.

- **Document all significant decisions.** Having clear documentation of decisions that already have been made can eliminate much misunderstanding.
- **Manage expectations by establishing public involvement goals and measures of achievement.** The study initiation meeting should include an opportunity for public representatives to contribute to the formulation of the public involvement and public information programs. This activity has several positive benefits. First, it establishes direction and focus for the public participation. Second, it provides mutually agreed upon parameters for assessing the success or failure of the involvement process. Third, it provides boundaries for the subsequent discussions and analyses.
- **Provide access to data and information.** This access includes not only final analyses but work-in-progress that is properly labeled, described, and reviewed by the agencies. One of the common complaints of stakeholders is that the methodologies and subsequent analyses are conducted without appropriate access and explanation of data and study methods. This will require the planning professionals to explain in simple language the key assumptions, methods, and procedures, given the state of the art and information available. Many stakeholders will be unfamiliar with the transportation planning process. A simple explanation of the process will help them understand how to convey their concerns and the appropriate time for doing so. This information can be handled cost-effectively through written materials (handouts at meetings, newsletters, pamphlets, resource papers.).

- **Establish the scope and scale of the public involvement process based on the size and importance of the corridor study.** Often, a potentially large transportation investment will have greater impact and will attract more attention just because of its magnitude. Some efforts may justify opening a project office in the corridor.
- **Coordinate public involvement activities and events so that the public can actually influence the decisions.** The public involvement effort will appear shallow if the key public input comes after important decisions have already been made.

Elected Officials

Decision-making involves bringing factual information together with the values of the community. The job of study staff is to provide the best possible technical information and to organize community input so that decision-makers can make choices that are in the overall best interest of the community. Elected officials are normally the ultimate decision-makers, in conjunction with the regulatory authority of Federal, state, and local agencies. Elected officials have many issues to deal with other than transportation. Information presented to them needs to be concise and to the point. Some of the considerations in addressing the needs of elected officials include

- **They do not like to be surprised.** Keeping them informed is crucial to maintaining study credibility. Once study credibility is lost, it is difficult to regain.
- **Help them through the decision-making process by keeping options open.** When final decisions must be made, help them to understand why a recommended course of action is in everyone's interest.
- **Help them with intermediate decisions.** Dealing with issues in bite-size chunks helps them with the ultimate decision.
- **Be sensitive to election cycles.** Certain decisions can influence political careers, and these decisions should be timed with regard to election sensitivities.
- **Be sensitive to budgeting cycles.** In some cases, it may be important to time study decisions in advance of budgeting cycles. In other cases, avoiding the budgeting cycle will help elected officials with their decision.
- **Bring newcomers up to speed.** Players change frequently. Newly elected officials will usually need a personal briefing to provide them with the information on prior decisions and rationale, where the study is headed and so forth.
- **Elected officials need information that takes only a short time to absorb and is simple to understand.** Decision-makers have many competing demands on their time. Voluminous information is counter-productive.
- **Develop good communication linkages with elected official aides.** Direct access to elected officials will often be limited, and their aides can be key to communicating crucial information.
- **Work with the town, city, or county clerks to understand their basic procedures for notification, and when information needs to be submitted for placement on their agendas.** For complex efforts, a comprehensive calendar of these dates should be maintained.

Decision-making involves bringing together factual information and the values of the community.

The Media

The media are often viewed as foes, but they can actually be a significant resource in obtaining good exposure for the study. In taking advantage of this opportunity, the following principles should be considered:

- **Help them understand the process**, where it has been and where it is going. Their articles will be more helpful to the public if they understand the big picture.
- **Be as open and honest with them as you are with other groups.** Hiding information or the appearance of hiding information usually spells trouble with the media.
- **Be proactive in giving them information to shape their story.** If they have to drag out the details, it is more likely that the story will be shaped according to their pre-conceived notions. Be aware of when reporters may be trying to put words in your mouth and respond with straightforward, factual information that will be useful to the public.
- **Be constructive, not critical, in helping them correct misinformation.** Reporters are being evaluated on how well they do their jobs. If you help them do their jobs, they are more likely to become your ally. Reporters have pressure, too.
- **Convey technical issues in simple, straightforward language.** Reporters need to convey ideas to the public. If you do not simplify it for them, they will do it themselves, and their interpretation may not be correct.
- **Provide one point of contact or spokesperson on the study team to interface with the media, and make sure that person is consistently available.**
- **Just as the corridor study has a budget, establish a budget for media outreach.** Given that mass media is still the main way people obtain information for these studies, the study team should not shortchange the use of these outlets.

If a decision hinges on the views of a certain resource agency, it is imperative that contact be made to identify its perspectives.

Resource Agencies

If a decision hinges on the views of a certain resource agency, it is imperative that contact be made to identify its perspectives. Resource agencies are typically accustomed to dealing with specific project proposals, not planning-level alternatives. It is difficult for them to voice their concerns on proposals that are too abstract. Yet their early input and direction can be critical to avoid embarrassing situations, retracing steps, or unnecessary conflicts. There are ways to obtain resource agency input even at the planning stage, but it must be done in a way that the agencies can understand it and deal with it. The following are observations on resource agency involvement:

- **Protecting resources is their job.** It is not their job to present the case supporting a new transportation improvement. However, they can be given information to understand why an improvement is important to the community, which is key to helping them see why working out resource agency impacts is important.
- **Resource agencies have limited time to deal with all the issues.** Making their life as easy as possible by going to their turf and making the issues easy to understand is more likely to elicit a response.
- **A viewpoint expressed by a resource agency is not a commitment.** Federal, state, and local regulations spell out what is required to obtain a commitment. If a commitment from a resource agency is needed to make a key decision, it should be obtained in writing.

- **Understand “who calls the shots.”** The viewpoint of a lower level staff person may not necessarily be the viewpoint of the agency. If it is a critical issue, bring the real decision-maker into the picture, but do not go around the protocol. A written request may force the issue if oral communication does not.
- **If leadership at the resource agency changes, bring the new staff up to speed.** Response by the new leadership may not be the same as for the previous leadership.

Evaluation Criteria and the Evaluation Framework

Prior to identifying the criteria to be used for evaluation, study managers should consider the overall evaluation approach or “evaluation framework.” There are several fundamental questions that should be asked:

- What type of decision is being made? Is the study to recommend a preferred alternative? Narrow down the alternatives? Address corridor preservation? The evaluation approach may vary depending on the types of decisions anticipated. (See the discussion of corridor study strategy in Chapter 3.)
- What information is important to the type of decision being made? This should have been determined as part of study initiation when key issue areas were discussed (see Chapter 4). These issues will directly influence the range and type of evaluation criteria.
- Who will be making the decision and providing input to that decision? The evaluation approach will need to be designed in a way that provides information that allows decision-makers and the involved stakeholders to understand the differences among the alternatives. The presentation of the information is often as important as the information itself.

The presentation of the information is often as important as the information itself.

The selection of evaluation criteria for a corridor study requires balance between having enough criteria to distinguish among the alternatives, while not generating so much information that the key distinguishing features are lost. Some of the potential sources of criteria include

- **Identified problems.** The problems describe the reasons that improvements are being considered. It is essential that evaluation criteria be included to measure the extent to which alternatives address the identified problems.
- **Regional or local goals, objectives, and policies.** Goals, objectives, and policies define what is important to the community. Criteria should be generated to determine the extent to which these goals, objectives, and policies are addressed by the alternatives.
- **Impacts.** Alternatives will create impacts of varying degrees of severity. Those impacts that are likely to distinguish the alternatives or provide information on the overall viability of any alternative should be reflected in evaluation criteria. The number of these criteria usually increases with the level of controversy associated with the study.
- **Regional project selection criteria.** The region may have established a system for choosing among alternative projects for the Metropolitan Transportation Plan (MTP) or Transportation Improvement Program (TIP). If any preferred alternative is to be competing for funding, the criteria used for selection should be considered as candidate criteria in the corridor study. However, it will probably not be appropriate to consider these criteria if they tend to focus on specific travel modes or improvement types.

- **State or national funding eligibility.** Certain information may be important for obtaining funding from state or Federal governments. An example would be the FTA's "New Starts" criteria for discretionary transit funding. This is not to say that these criteria will necessarily be discriminators among alternatives in any single corridor. However, in the course of performing a corridor study that could result in a transit project eligible for such funding, agencies will usually want to know how the transit alternative(s) will "stack up" against those criteria. Such funding criteria should be considered as candidate evaluation criteria, but there is no requirement to do so. These types of criteria generally exist because they provide some indication of the likelihood of success. Therefore, they should be considered as a valid source for potential corridor study evaluation criteria.

Some good questions to ask in cutting down the criteria to a manageable level include

- Is the information likely to be a major factor in the decision?
- Is it likely that a different decision would be made if the information were not provided?
- Is the information critical to certain stakeholders' support a decision?
- Can the information be generated to support the criterion within the available budget?

Some of the factors that should be considered to tailor the evaluation criteria for any particular corridor study could include

- **Focus information on key issues.** Stakeholder input will generally tell you which issues are likely to be the most important. Make sure the criteria address these issues. On the other hand, those performing corridor studies should not live by the adage "more is better." More is not necessarily better if the sheer volume of information clouds the issues that are most important to making a decision. Decision-makers and the public need the right information, in consolidated form, to weigh criteria against one another.
- **Cost.** Resources are limited, and judgments need to be made as to how much data collection and analysis can be afforded to support the evaluation effort.
- **Schedule.** While usually not as constraining as cost, schedules can be a limiting factor.
- **Capability of the analysis tools.** Although analysis tools are constantly improving, they also have limitations. There are also cost implications for applying some of the more sophisticated tools. **The evaluation criteria cannot go beyond the ability of the tools**

to generate the information.

- **Selection of independent criteria.** To the extent possible, the evaluation criteria should be independent of one another. They should provide new information not just overlap with information provided already.

Identification and Evaluation of Alternatives

The statement of the problem and development of evaluation criteria represent the foundation of the corridor study process. The definition and evaluation of alternatives are where the decision-making process begins to take place. The decisions in certain corridors may be simple and straightforward, possibly even determined at the study initiation meeting (assuming that all the stakeholders agree). In most cases, however, multiple alternatives will need to be identified and evaluated. The exact number and nature of alternatives will depend on the problems and circumstances being addressed. Some principles include

- Alternatives should directly address the identified problems. The exact number and nature of alternatives will depend on the problems and circumstances being addressed.

- The result of a corridor study could be a single preferred alternative or investment strategy or could be a set of reasonable alternatives that are analyzed later in the NEPA process. The development of the corridor study strategy, discussed in Chapter 3, indicates some of the possible options.
- Three basic approaches to identifying and analyzing alternatives include a traditional screening/detailed analysis approach; an incremental “learn-as-you-go” approach; and analysis of individual components, followed by assembly of those components into alternatives for further analysis. Studies may consist of a combination of these approaches.
- The financially constrained MTP (minus any corridor transportation improvements that are included in a study alternative) will be the preferred choice for the base condition in the large majority of cases. However, there are exceptions, depending on whether the MTP is viewed as realistically reflecting improvements that could influence travel in the corridor being analyzed.
- One of the most important principles in dealing with uncertainties in assumptions is that the potential implications be discussed in an open environment so that there are no surprises. Analysis methodologies should be reviewed with the technical committee or subcommittee before application.
- Land use has become an important consideration in transportation corridor studies. There are two primary occasions when land use should be considered for specific inclusion as a study issue: (1) when one or more new major facilities (either highway or transit) are being considered as alternatives and have the possibility of influencing land use or (2) when the study has as an explicit goal the rethinking of land use policies and strategies tied to the transportation strategy.
- The study team must have qualified individuals involved in each of the subject areas important to the analysis. The *Guidebook* provides general information to assist study managers and other stakeholders in understanding the issues. The methods employed need to be designed by the stakeholders to address the objectives of each particular study.

Land use has become an important consideration in transportation corridor studies.

Many lessons have been learned over the years regarding the definition and evaluation of alternatives. Principles that have been applicable to the NEPA process are also generally applicable to pre-NEPA corridor studies. Listed below are some of the general principles that apply to the definition of alternatives:

- **Alternatives should respond directly to the identified problems and needs.**
- **A range of alternatives should be identified to provide decision-makers with a spectrum of choices and tradeoffs.** Even though the alternatives should target the same problems and needs, the objectives may vary (e.g., some may focus on demand reduction, while others focus on capacity increases or service to different travel markets).
- **Alternatives should be developed through a collaborative process.**
- **Alternatives should be reasonable.** Although opinions may differ on what constitutes reasonableness, responsible agencies need to make decisions that control the number of alternatives investigated. Investigating alternatives that have no possibility of implementation drains off resources that could be applied to addressing other key study issues.
- **Alternatives should be as competitive as possible within the limits of the objectives of each alternative.** If a decision is made to move a particular alternative forward based on a comparison with other alternatives that were poorly constructed, this could cause the results of the decision-making process to be vulnerable.

Financial Analysis and Development of the Preferred Investment Strategy

There are many political and technical aspects to decision-making. Each situation is unique. Each study has its own historical background, transportation problems, alternatives, impacts, agency positions, political personalities, constituencies, and so forth. Therefore, one could not expect there to be a formula by which the optimal decision is reached. However, a good study design will not only have identified the type of decision to be made but have identified who will make the decision and the process by which it will be made. Legally, there are several actions that authorize expenditure of Federal funds on a transportation project. At the planning level, the projects must be included in the MTP and TIP. In air quality non-attainment areas, the MTP and TIP must also be in conformance to the State Implementation Plan, and projects must be in that conforming plan and TIP to receive Federal funds.

At the project development level, the project must be cleared environmentally, receiving either a categorical exclusion (CE), Finding of No Significant Impact (FONSI), or Record of Decision (ROD) if Federal funds or permits are required. Other appropriate permits must also be obtained. The identification and commitment of funds by participating agencies, through the approval of budgets and local capital improvement programs, is also a part of the decision-making process that leads to project implementation. The point is that there are multiple decisions that lead to implementation of a project. The role of the planning-level decision is to collectively determine the course of action that is in the best interest of the community. It is up to the stakeholders to determine that a decision has been made. For studies conducted under NEPA, the recognition of the decision-making process is well established. For pre-NEPA planning studies, some of the choices include the following (more than one may be chosen):

- The decision-making committee/group approves a report that identifies a preferred alternative or investment strategy.
- A motion to endorse an alternative or investment strategy is adopted by the designated decision-making committee (e.g., the transportation policy committee of the MPO).
- The decision-making body of the agency that owns or operates the portions of the system for which improvement is being recommended approves a recommended alternative (e.g., state DOT, transit agency, city, or county). Approval of the entire package would be dependent on approval of the individual parts by the appropriate agency. Each agency's portion of the alternative would then be recognized in their respective plans and budgets.

The decision-makers participating in the corridor study process ultimately must determine what action to take. As indicated in Chapter 3, the type of decision will depend on the corridor study strategy. The nature of the financial analysis will depend on the type of decision to be made.

Some elements of a financial analysis may occur before the selection of the preferred alternative; other elements may occur following the selection of the preferred alternative. Prior to the selection of the preferred alternative, the focus of the financial analysis is on the implications of funding availability for the selection of the alternative. For example, a certain highway-oriented alternative may appear to be most cost-effective, but a similar alternative that is toll-based may provide a higher likelihood of implementation. Following the selection of the preferred alternative, the emphasis is on developing the specific funding strategy that will allow the project or transportation service to be implemented in the appropriate time frame. This would be part of the "action plan" that is developed to guide future implementation actions. Exhibit ES-3 indicates several possible types of decisions and their implications for the financial analysis.

Documentation

The focus of a corridor planning study is on decision-making. Documentation, while not the decision-making process itself, is necessary for a number of reasons:

- It records the basis upon which the decisions were made.
- It provides a historical record of the study process for later reference. The need for reference could include refreshing the memories of stakeholders from time to time, conveying the rationale for decisions to stakeholders who were not involved earlier, or conveying information so that others can carry out the next steps in the planning, project development, and implementation process.
- It serves as the “paper trail,” describing the processes that were followed and the technical analyses conducted. This could be important for several reasons, including revisiting decisions or defending decisions that are challenged or litigated.

Exhibit ES-3.

Types of Decisions and Possible Implications for Financial Analysis

Type of Decision	Implications for Financial Analysis
Designate a preferred alternative, Possible short-term implementation.	Analysis of specific funding sources, for possible inclusion in the TIP. Financial analysis would assess likelihood of funding for remaining alternatives.
Designate a preferred alternative, Possible long-term implementation.	Provide cost and financial information to next update of MTP. General analysis of funding opportunities, possibly even extending beyond the timeframe of the financially constrained MTP.
Designate a set of reasonable alternatives to be examined in the immediate future under NEPA (i.e., do not select a preferred alternative at this point).	Have enough financial information to ensure that one or more of the alternatives is capable of being funded and implemented. Specific funding sources may be developed as alternatives move through NEPA.
Identify a set of recommended improvements in multiple corridors for possible long-term implementation (i.e., in a multi-corridor study).	Provide cost information, general analysis of funding opportunities. Allow the MTP and TIP processes to determine the financial commitments and timing.

Documentation is also important because study participants, including project managers and consultant personnel, change over the course of a study. Good study documentation can help to bring newcomers up to speed.

It is important to recognize that documentation does not mean simply writing the study report. In fact, other types of documentation often become more important than the study report itself as far as documenting decisions that have been made and the information behind the decisions. For example, meeting minutes and exchanges of agency correspondence are critical to maintaining a paper trail of decisions and chronology of events, which may be extremely important even in cases where decisions are not controversial. The following represent some basic principles of corridor study documentation.

... documentation does not mean simply writing the study report.

- Documentation at all levels should be designed to support the decision-making process.
- Voluminous documentation can be counter-productive and should be avoided. Backup material can be provided in appendices or maintained in agency files.
- Documents should be organized so that the relationship between the written documentation and the decision-making process is readily understood.
- Ideally, every comment should be responded to, both comments received during the meetings and public outreach as well as comments received in response to a draft report or other reports. This is particularly important if comments from the public and agency have been specifically solicited as part of the public involvement program. Sometimes, this need can be partially addressed by compiling answers to frequently asked questions and making the information broadly available.
- Circulation and commenting for a pre-NEPA corridor planning study will depend on a wide range of conditions pertaining to the scale of the study, level of controversy, overall public involvement approach, and so forth.
- It is important to remember that decisions are made by elected officials and agency administrators, who have relatively little time, many other issues on the table, and, in most cases, a surface understanding of the technical issues. There are exceptions, of course, but it is critical to remember that the decisions elected officials make can be no better than the amount of information they are able to absorb.
- The inclusion of corridor study documentation within subsequent NEPA documentation should be anticipated as the corridor study documentation is prepared.

Actions Agencies Can Take to Facilitate the Conduct of Corridor Studies

Corridor studies can be made easier if agencies set the stage through their regular, ongoing planning activities. The development of some of these capabilities takes time, and an agency cannot expect those capabilities to be available unless it plans ahead and invests over the long term. Most of these activities are useful for other transportation planning and project development functions as well. Examples include

- **Transportation Model Improvement.** Getting the model ready to be responsive to the types of issues corridor studies will need to address.
- **Staff Training.** Special emphasis may be appropriate in study management, public speaking, and public relations.

- **Geographic Information Systems.** These systems can greatly improve the quality of information available to corridor studies, particularly in the areas of community impacts and environmental resources.
- **Local Cost Data.** A consistent set of cost data and methodologies can produce better “apples-to-apples” comparisons when regional decisions are made on project priorities.
- **Programmatic Mitigation.** A project-by-project approach to mitigation can be time consuming and costly. Addressing mitigation for certain types of resources can make individual corridor decisions easier.
- **Building Intra- and Interagency Communications.** Building agency relationships is an ongoing process and usually pays dividends when decisions need to be made in individual corridors.
- **Ongoing Public Relations Activities.** Building communication channels and trust with the public will make their involvement on specific corridor issues more constructive.

Chapter 1 provides a general orientation to the *Guidebook* and some of the key issues it addresses.

CHAPTER 1

ORIENTATION TO THE *GUIDEBOOK* AND KEY ISSUES

The Introduction and Executive Summary provided an overview of approaches to corridor studies. It introduced the idea of a corridor study being primarily a decision-making process, as part of the stream of decisions that may ultimately result in the implementation of transportation strategies that address an identified problem. It is a collaborative exercise. Chapter 1 provides information on the structure of the *Guidebook* and an introduction to a variety of issues that will be addressed in the remaining chapters.

1.1. Organization and Contents of the *Guidebook*

The *Guidebook* is organized into the following chapters:

- Chapter 1. Orientation to the *Guidebook* and Key Issues
- Chapter 2. The Transportation Planning Process and Corridor Decision-Making
- Chapter 3. Identifying the Problem and the Corridor Study Strategy
- Chapter 4. Corridor Study Organization and Initiation
- Chapter 5. Community Involvement and Consensus Building
- Chapter 6. Confirming the Problem and Developing Evaluation Criteria
- Chapter 7. Defining and Evaluating Alternatives
- Chapter 8. Financial Analysis and Selection of the Preferred Investment Strategy
- Chapter 9. Corridor Study Documentation
- Chapter 10. Dealing with Technical and Institutional Issues That Arise During a Corridor Study
- Chapter 11. Actions Agencies Can Take to Facilitate the Conduct of Corridor Studies



Some examples of the types of material contained in the *Guidebook* include

- Discussion of transportation decision-making, how communities can make effective decisions, and how those decisions can be sustained over time.
- Description of how the corridor decision-making process integrates with system planning, the overall planning process, and project development.
- Examples of actual practices from the field. These practices center on how specific corridor study elements have been addressed in different metropolitan areas and under various sets of circumstances.
- A variety of principles, checklists, reminders, sample formats and helpful how-to's to assist in the design and management of corridor studies.
- References to material and resources that can be accessed by practitioners for the purposes of designing and conducting corridor studies. A comprehensive bibliography is not provided. Rather, references and resources pertinent to the corridor study issues are contained in the sections pertaining to those issues. A list of selected key documents is provided later in this chapter.

Each chapter contains a summary of “principles and lessons learned.” These represent a consolidated set of principles, drawn from the research and outreach, that practitioners can use in the design, conduct, and management of corridor studies. Each chapter also addresses specific issues that have surfaced in the outreach to practitioners.

1.2. How to Use the *Guidebook*

It is expected that the *Guidebook* will be of interest to a diverse audience. Although the core audience is expected to be transportation planners and engineers with responsibilities for designing and managing corridor studies, many types of individuals become involved in corridor studies and are likely to find the material useful. These individuals could range from administrators and elected officials to staff and citizens with more targeted interests. The *Guidebook* has been organized to make it easier to locate and use material that will be of interest to the various types of readers. Some of the features include

- **Chapter topics in a nutshell.** This is a list of the major topics is provided at the beginning of each chapter. 
- **Summary of principles and lessons learned.** Beginning with Chapter 2, some of the key principles and lessons are brought forward to the first page of the chapter. This provides a summary of key points at a glance. 
- **Points of emphasis.** These are contained in the **shaded boxes** throughout the *Guidebook* or in **bold print**.
- **Section headings and subheadings.** These are numbered throughout the *Guidebook* to make it easier to refer to specific sections.
- **Corridor study issues.** A comprehensive list of issues is provided in Chapter 1. The issues are listed in question format. The questions are answered throughout the *Guidebook* but are specifically addressed in Chapter 10 by either referring to a section number or by answering the question directly.
- **Observations from practitioners.** Many exhibits are provided in the *Guidebook* that list observations and lessons learned by those who have been responsible for corridor studies. These observations from practicing peers should be of great interest to agency planners and engineers.

1.3. Context of the *Guidebook*

Corridor and subarea transportation planning studies can cover a broad spectrum of activities. The *Guidebook* does not cover all possible types of studies but focuses mainly on those involving potentially major infrastructure decisions. Thus, the *Guidebook* does not address other types of transportation studies such as traffic impact studies, traffic circulation studies, traffic operations studies, or transit operations studies. More specifically, the *Guidebook*

- **Focuses on planning-level decisions.** The decisions made should be reflected in the federally required MTP and TIP. The *Guidebook* also addresses the relationship between planning and project development, stressing continuity of decision-making between planning and project development. But it does not address all the aspects of project development.
- **Addresses transportation problems primarily in metropolitan areas.** Rural studies are not generally addressed, although most of the same principles would also apply in rural and small urban areas.
- **Incorporates all modes of transportation for potential consideration as alternatives.**
- **Addresses long range planning horizons for corridors under study but includes both short-term and long-term strategies as potential solutions to identified problems.**
- **Emphasizes a problem-driven approach, wherein solutions are identified to address problems and needs, rather than attempting to justify preconceived projects.**

Corridor studies should be an integral part of a metropolitan area's transportation planning process. This process is designed to provide decision-makers with better and more complete information on the options available for addressing identified transportation problems before investment decisions are made. A corridor study provides a focused analysis and evaluation of the mobility needs and related problems of a corridor or subarea within the region. Depending on the scale of issues and factors, a

corridor study may identify an appropriate set of multimodal mobility investment and policy options to address identified needs and problems; develop measures of benefits, costs, and impacts, as well as financial requirements; and allow comprehensive, multimodal analysis and evaluation of options. The corridor study evaluation process leads to a decision on the design concept and scope for a transportation investment(s), and policies are then incorporated into the MTP. It is important to note that the decision on design concept and scope could be a modification to a project or set of strategies that are already in the MTP or could introduce a project or set of strategies that was not previously in the MTP.

As an integral element of the metropolitan planning process, a corridor study should be a cooperative and collaborative process that includes a wide range of stakeholders as active contributors in the performance of the study and the decision-making process. The direction and conduct of a corridor study should be decided locally by a cooperative, collaborative process. Corridor studies will vary in scope and scale, so that no one size fits all. (The previous two paragraphs were adapted from the *MIS Desk Reference* by FHWA and FTA.)

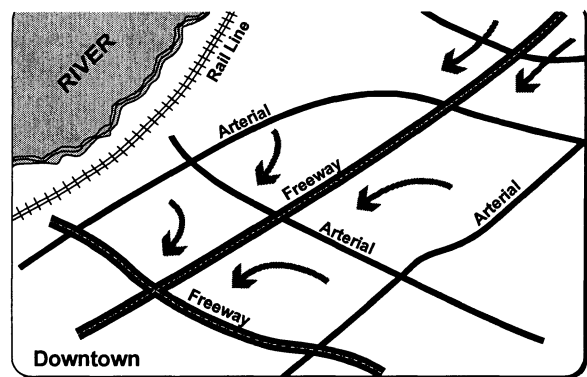
... the direction and approach to a corridor study should be decided locally through a cooperative, collaborative process.

For many years, transportation agencies have conducted a variety of types of corridor and subarea studies to accomplish the decision-making purposes listed above. However, these studies have often been conducted in the project development stage, rather than mainly in support of the development and refinement of the Transportation Plan. One of the possible objectives of a corridor study could be to examine a broad range of alternatives earlier in the decision-making process so that a more comprehensive view can be taken of choices between modes of travel and general alignments to support decision-making for the MTP.

1.4. What Is a Corridor?

Broadly defined, a corridor generally refers to a geographic area that accommodates travel or potential travel. Normally, a corridor is considered to be a “travel shed,” an area where trips tend to cluster in a general linear pattern, with feeder routes (highway, transit, or non-motorized) linking to trunk lines that carry longer distance trips in a metropolitan area.

The analogy of a travel shed to a water shed is generally a good one. However, the width and length of a travel shed would need to be determined on a case-by-case basis. **The exact extent of the corridor to be studied is best determined during the identification of the problem and determination of the corridor study strategy.** It will be related to the decisions that need to be made. A subarea could represent multiple corridors, or it could simply represent an area that is smaller than the entire metropolitan area. For the sake of simplicity, the *Guidebook* uses the term “corridor” to include both corridors and subareas. In some cases, the definition of the problem to be addressed could warrant a study covering multiple corridors. More information on corridor definition is provided in the section in Chapter 4 on defining the study area.



It is important to note that travel sheds are becoming more difficult to define. As suburbanization continues and jobs are spread throughout our metropolitan areas, trip patterns also become more diffused. Thus, a corridor may not fit within a traditional linear framework. One of the most important elements of a corridor study can be the understanding of those trip patterns so that transportation strategies can be better tailored to address those patterns.

1.5. Some Basic Definitions

It is important for readers to understand terms that will be used throughout the *Guidebook*. Some of the key terms are defined below. Most of these definitions have been excerpted from other sources, such as the *MIS Desk Reference*.

- **Corridor and subarea.** A corridor or subarea is a part of a metropolitan area that includes the set of travel markets affected by mobility problems/needs and possible transportation improvements. For simplicity, the *Guidebook* refers to “corridor study” as including subareas as well.
- **Alternatives.** At the planning stage, alternatives refer to the range of reasonable options to solve a transportation/mobility problem. The set of alternatives may be multimodal and may include policies (operating, pricing, institutional) not just facilities. In later project development stages, such as preliminary engineering, alternatives refer to specific design and location options within an established design concept and scope.
- **Scoping and study initiation.** “Scoping” is an initial step of the NEPA documentation process in which the public and interested agencies have the opportunity to comment on and provide input on the problem definition, alternatives to be considered, methodologies, key issues and level of detail of the analyses. If the NEPA documentation is to be prepared as part of the corridor study, scoping would constitute the initiation of the Draft environmental impact statement (EIS) process. If the NEPA documentation is being prepared later in the project development process, there is no formal scoping as required during the NEPA process. However, there should be a “study initiation” process that provides for public and agency input on problem definition, alternatives to be considered, methodologies, key issues, and the level of detail of the analyses to be conducted as part of the corridor study.
- **Design concept and scope.** The Environmental Protection Agency’s (EPA’s) Conformity Regulation pursuant to the Clean Air Act Amendments defines design concept and scope as **Design Concept**—the type of facility identified (i.e., freeway, expressway, reserved right-of-way transit); **Scope**—design aspects that will affect the proposed facility’s impact on regional emissions usually as they relate to vehicle- or person-carrying capacity and control (i.e., number of lanes or tracks, length of project, signalization) Design concept and scope also refer to the general location of the facility.
- **Alignment.** Location of possible transportation facilities. In a corridor planning study, there may be multiple possible alignments for a single alternative, or an alignment could represent an alternative. The alignments could be defined as relatively narrow “swaths” of land (say within several hundred feet on each side) or could be specified to very tight tolerances. The latter is typical of studies that include preliminary engineering.
- **Project.** A project is a transportation investment selected to address a transportation problem. A project emerges from the decision made on the alternatives considered and evaluated in the corridor study and is included in a conforming MTP and TIP.
- **Conceptual engineering and preliminary engineering.** Conceptual engineering is the physical and technical planning and design that is used to define the alternatives considered during the corridor planning study to support selection of a project to be added to the conforming MTP and TIP. Preliminary engineering is the more detailed physical and technical planning and design conducted during subsequent project development.

- **Environment:** The term environment generally encompasses all social, economic, and natural environmental considerations and includes constructed, cultural, and natural resources and issues.
- **Strategies:** Approaches to the solution of transportation problems, ranging from physical improvements to operational techniques to demand management options. A strategy may have multiple elements.

1.6. Outreach Methodology for NCHRP Project 8-34

One of the principal objectives of NCHRP Project 8-34 was to document experience on corridor studies from a broad cross-section of practitioners. The outreach focused on MISs, with which considerable experience had been gained at the time of the outreach in mid-1997. The objectives of the outreach were to

- Develop an inventory of a cross-section of completed, ongoing, and forthcoming corridor studies (with emphasis on MISs) to identify the range of costs, timeframes, lead agencies, and so forth.
- Provide overall direction to the *Guidebook*, based on the information needs of decision-makers and practitioners.
- Compile issues and lessons learned from the practicing community that can be incorporated into principles of corridor study practice.
- Identify practical procedures and guidelines that have been used in the conduct of corridor studies.

Exhibit 1-1 provides an overview of the outreach plan. The outreach was conducted in stages. A questionnaire was developed and targeted to state DOTs, MPOs, transit agencies, and a collection of other stakeholder and advocacy groups. The

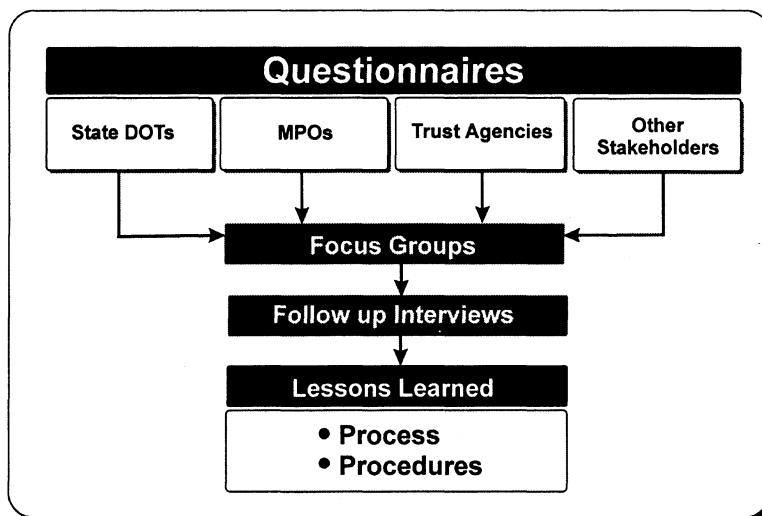
questionnaires were followed by focus group discussions, and by telephone or in-person interviews. The three techniques were designed to obtain both a breadth and a depth of information. The questionnaire was designed to obtain information from a broad cross-section of practitioners. The focus groups and interviews were designed to obtain a greater level of detail.

The outreach focused not just on MISs, but on the broader topic of planning for corridors and subareas in general. The intent was to extract good planning practice for corridors and subareas and for making corridor/subarea transportation planning decisions. The procedures used in the outreach are described below. A brief summary of the results of the outreach are provided in Appendix A.

1.6.1. Questionnaire

The emphasis of the questionnaire was primarily on lessons learned from various aspects of corridor study experience. Experience indicates that transportation planning and environmental professionals with a background in this area have ideas on how the process has worked or has not worked for them. The objective was to tap into that body of knowledge and experience.

Exhibit 1-1.
Overview of Outreach Plan



The questionnaire approach was largely an open-ended format that allowed the practitioners to identify the key issues and problems and how the issues or problems have been handled. This format avoided the problem of inadvertently steering the respondents in any particular direction but was structured enough to allow them to focus on the issues at hand.

The questionnaire was developed and distributed to 50 state DOTs, 50 MPOs, 25 transit agencies, FHWA/FTA regions, and selected other stakeholder and advocacy groups. The core of the questionnaire was the same across all agency types, but variations were needed in some of the questions to address the specific functions of each agency type.

The questionnaires were targeted to directors of transportation planning divisions and environmental divisions of DOTs, transportation planning directors of MPOs and transit agencies, and selected individuals from other organizations. For MPOs, a distribution was provided by size of MPO region and geography. For transit agencies, regions with existing or planned rail systems were primarily targeted. A follow-up phone call or fax was provided to each agency that had not responded by the time the returns had been requested. The following numbers of responses were received:

- 21 MPOs
- 32 states
- 8 transit agencies
- 5 FHWA regional offices
- 4 FTA regional offices
- 4 other stakeholder/advocacy groups

1.6.2. Focus Groups

The focus groups represented another avenue of information for obtaining practitioner thoughts on how to best conduct corridor/subarea planning. MPO-sponsored focus groups were conducted in the following geographic areas: Washington D.C., Orlando, St. Louis, Salt Lake City, and Los Angeles. Other focus groups included committees or subgroups of the Association of Metropolitan Planning Organizations (AMPO), the American Public Transit Association (APTA), and the American Association of State Highway and Transportation Officials (AASHTO). Some 120 individuals participated in the focus group discussions.

The focus groups were conducted by senior research team staff and were typically two hours long. A series of core questions were addressed, with follow-up questions, depending on the direction of the discussion. A summary was developed for each session.

1.6.3. Follow-up Interviews

The follow-up interviews were undertaken on the basis of questionnaire responses that may have indicated the need for further detail. The emphasis was to acquire perspectives on more specific issues and to obtain information on what the interviewees believe to be good corridor planning practices. Senior staff of the research team conducted the interviews.

The intent of the interviews was to obtain a cross-section of input from geographic areas that are more advanced and that may have more complex issues as well as those geographic areas where issues are less complex and where agencies have fewer staff and resources. It is important to recognize that the *Guidebook* addresses a range of complexities and capabilities not just those areas that are more advanced.

1.7. Corridor Study Issues

The outreach identified many issues that agencies have faced in the process of performing corridor planning studies. Although many of the issues were identified in the context of MISs, nearly all the issues are pertinent to corridor study practice in general.

Exhibit 1-2 provides a sampling of corridor study issues. The issues have been drawn from discussions with practitioners around the country. These and other issues are dealt with in the *Guidebook*. Chapter 10 directly addresses each issue by either referencing where in the *Guidebook* the issue is addressed (by section number) or by addressing the issue directly if it has not been addressed directly before. This provides the reader with approaches that have been used to address the specific questions listed in the exhibit.

Exhibit 1-2. Sample of Issues Related to Corridor Studies

A. Relationship of corridor studies to the overall transportation planning process

1. When should corridor studies be initiated and carried out, given transportation planning and project development requirements?
2. What is the role of system planning, and how does it relate to corridor/subarea planning?
3. What is the relationship between a corridor planning study and the NEPA process?
4. How does a corridor study recognize a strong regional policy toward particular strategies or modal options?
5. How does a corridor study relate to activities in the management systems, particularly the congestion management system?
6. How does a corridor study relate to the statewide transportation plan?
7. How does a corridor study relate to local government comprehensive planning efforts in that corridor/subarea?
8. How does a corridor study relate to project development activities?

B. Initiation and overall conduct of corridor studies

1. How should the technical and policy committees guiding the study be formed?
2. How can one determine the proper allocation of time, costs, and resources associated with a corridor study?
3. How much of a corridor study should be done in-house versus by consultants?
4. What in-house resources and capabilities should agencies be building to carry out effective corridor studies?
5. How can the costs of corridor studies be controlled?
6. What factors need to be taken into account in setting up a schedule for a corridor study?
7. What are some options for identification of problems and needs?
8. How does one determine/predict how significant certain environmental areas will be? How does one scope a corridor study to account for these uncertainties?
9. How should the technical committee structure be established to ensure fair representation?

C. The Alternatives Development and Evaluation Process

1. How should evaluation criteria be selected?
2. Should evaluation criteria be weighted?
3. What evaluation criteria and performance measures are best for comparing multimodal alternatives?
4. How are evaluation criteria best linked to the definition of the problem?
5. How should the base condition be established? What set of assumptions should be used?
6. How can one determine what is a reasonable alternative? What strategies can minimize the chance of being challenged on failure to consider an alternative?
7. At what level of detail should alignments be specified? If broad corridors are used, how does one tabulate and characterize impacts?
8. How are potential improvements handled that are beyond the planning horizon year?

D. Public Involvement and Consensus Building

1. What public involvement approaches work best under various sets of conditions?
2. Which public involvement functions are best handled in-house versus using consultants?
3. What techniques are best in working with the media?

4. What principles and approaches are useful for making technical data more understandable to the public?
5. How does one deal with responses to public comments on corridor study results or draft documentation?
6. For highly controversial issues, what types of strategies are helpful in working toward resolution?

E. Analysis Activities

1. How can one limit the level of detail in the environmental analysis, while still providing meaningful input for the decision?
2. What are some options for incorporating land use into the evaluation process?
3. How should cumulative impacts be treated?
4. What is the role of sensitivity analysis? Risk analysis?
5. How should a corridor study deal with unresolved regional issues, such as system-level decisions on a rail system?
6. How can a corridor study work around changing socioeconomic and transportation network assumptions?
7. How can one include evaluation of non-traditional strategies, such as trip reduction measures and Intelligent Transportation Systems, that cannot be readily accommodated in the four-step modeling process?
8. How should a corridor study treat assumptions in the MTP that provide for significant demand reduction but that many people may argue are not realistic?
9. How should a corridor study deal with land use scenarios when the base data in the corridor used in the approved MTP are known to be or found to be flawed or unrealistic?

F. Decision-making in a corridor study

1. How is input best obtained from resource agencies in a corridor study?
2. How valid are commitments made in a corridor study by resource and permit agencies?
3. How can a decision rendered in a corridor study be best protected and sustained?
4. What decisions are appropriate for a technical committee versus a policy committee?
5. To what extent should commitments be made to mitigation if that is key to making a decision?
6. Under what conditions may alternatives examined in a corridor planning study need to be re-opened in an EIS? How can the chances of this be minimized in the conduct of the corridor study?
7. Should a voting process be used for making decisions?

G. Documentation

1. What is the “shelf-life” of a corridor study before it would need to be updated? How thorough does the update need to be?
2. How much documentation is needed for alternatives eliminated from consideration?
3. Should a corridor study document be organized in the same way as a NEPA document? When are variations from that structure advisable?
4. What should be considered in circulating the corridor study document? If the EIS will incorporate sections on Purpose and Need, Alternatives, etc., should the lead agency be concerned about conforming to similar notification and circulation requirements?

H. Corridor study approvals and decisions

1. When a policy body approves a corridor study or decision, what is actually being approved?
2. What if only part of the recommended decision can be included in the financially constrained MTP?
3. How does approval of a corridor study relate to other competing projects in other corridors or areas?

I. Economic and Financial

1. Should a corridor/subarea planning study be financially constrained?
2. How detailed does the financial analysis need to be?
3. How firm do the funding sources need to be before a decision is made?
4. To what extent does economic development constitute a project need? How should economic development be evaluated in comparison to other criteria?
5. How should transit be evaluated in an economic sense, given that it may often increase trip time?
6. What other aspects of transit should be considered that a traditional economic analysis does not take into account?
7. How does one consider previously procured right-of-way in the analysis of costs for alternatives?

1.8. Resources for Designing, Managing, and Conducting Corridor Studies

The *Guidebook* cannot possibly cover all the management and technical topics associated with corridor studies. However, it can help point practitioners to a wide range of useful references on specific subjects related to the conduct of corridor studies. Exhibit 1-3 provides a catalogue of major references that the designers, managers, and performers of corridor studies may wish to access in carrying out their responsibilities. These resources represent just the tip of the iceberg on what is available in these subject areas. Each of these documents refers to other related documents that may also be helpful. Even though TEA-21 eliminated the MIS as a separate requirement, there are several MIS-related references that contain useful information for corridor planning studies in general.

The *Guidebook* seeks to avoid duplication of other material unless coverage of that material is essential for understanding other information in the *Guidebook*. Where other references are pertinent, the *Guidebook* points practitioners to those sources. In this respect, the *Guidebook* will assist practitioners in building a library of material that can help them to improve corridor planning and decision-making practices.

**Exhibit 1-3.
Key Corridor Study References**

Topics	References
General information on corridor studies	<p>National Transit Institute and Parsons Brinckerhoff Quade and Douglas, Inc., <i>MIS Desk Reference</i>, prepared for Federal Highway Administration and Federal Transit Administration, August 1996. (Obtain from FHWA, Office of Environment and Planning)</p> <p>Transportation Research Board, <i>Proceedings of the Conference on Major Investment Studies</i>, February 1996.</p>
General information on the transportation planning process	<p>Federal Highway Administration and Federal Transit Administration, <i>Statewide Transportation Planning Under ISTEA, A New Framework for Decision-Making</i>, 1996.</p> <p>Federal Highway Administration and Federal Transit Administration, <i>A Guide to Metropolitan Transportation Planning Under ISTEA, How the Pieces Fit Together</i>, 1995.</p>
General information on the NEPA process	<p>Federal Highway Administration, "NEPA and the Transportation Decisionmaking Process, Student Notebook," <u>National Highway Institute Course No. 14205</u>, Publication No. FHWA-HI-93-038, April 1993, Revised April 1997.</p> <p>Bass, Ronald E. and Albert I. Herson, <i>Mastering NEPA: A Step-by-Step Approach</i>, Solano Press Books, Point Arena, California (available from American Planning Association).</p>
Resource agency coordination	<p>Federal Highway Administration, "Interagency Coordination with Federal Agencies during the FHWA Project Planning and NEPA Processes," Office of Program Quality Coordination, January 1997.</p>
Public involvement and consensus building	<p>Federal Highway Administration, Federal Transit Administration, <i>Innovations in Public Involvement for Transportation Planning</i>, January 1994.</p> <p>Frank Wilson and Associates, Inc., <i>NCHRP Report 364</i>, "Public Outreach Handbook for Departments of Transportation," Transportation Research Board, Washington D.C., 1994.</p> <p>FHWA and FTA, <i>Public Involvement Techniques for Transportation Decision-Making</i>, Summer 1996.</p>

Topics	References
Evaluation criteria and performance measures	<p>Turner, Shawn M., Matthew E. Best, and David L. Schrank, Measures of Effectiveness for Major Investment Studies, Texas Transportation Institute, November, 1996.</p> <p>Rutherford, G.S. <i>Synthesis of Highway Practice 201</i>, "Multimodal Evaluation of Passenger Transportation," NCHRP Program, Transportation Research Board, Washington, D.C., 1994.</p>
Alternatives	<p>Institute of Transportation Engineers, <i>Toolbox for Alleviating Traffic Congestion</i>, Washington, D.C., 1989.</p> <p>Comsis Corporation, Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience, Final Report for FHWA and FTA, September 1993.</p>
Transportation analysis and modeling	<p>Federal Highway Administration and Federal Transit Administration, <i>Estimating the Impacts of Urban Transportation Alternatives</i>, Participant Notebook, National Highway Institute Course 15257, Report No. FHWA-HI-94-053, December 1995.</p> <p>Federal Transit Administration, <i>Technical Guidance on Section 5309 New Starts Criteria</i>, FTA Office of Planning, September 1997.</p> <p>Ryan, James M. and Donald Emerson et. al. <i>Procedure and Technical Methods for Transit Project Planning</i>, prepared for Urban Mass Transportation Administration, 1993.</p> <p>Transportation Research Board, <i>TRB Special Report 209</i>, "1994 Highway Capacity Manual," Washington, D.C., 1994.</p> <p>Periodic papers and reports from FHWA's Transportation Model Improvement Program, available through the Bureau of Transportation Statistics, web site www.bts.gov/tmip.</p> <p>Harvey, Greig, and Elizabeth Deakin, <i>A Manual of Transportation-Air Quality Modeling for Metropolitan Planning Organizations</i>, for the National Association of Regional Councils, 1993.</p>
Land use/transportation interaction	<p><i>Land Use Impacts of Transportation: A Guidebook</i>, NCHRP 423A, Transportation Research Board, 1999.</p> <p>The <i>Land Use Compendium</i>, a March 1998 product of the Travel Model Improvement Program (see TMIP web site).</p> <p><i>Transit and Urban Form</i>, TCRP Report 16, Transportation Research Board, 1996.</p>

Readers should also be aware that much of the material associated with the NEPA process is applicable to corridor planning studies as well. This includes a wealth of material on public involvement, alternatives development, environmental analysis, and so forth.

Finally, there has been an explosion of information available on the World Wide Web. This is now a significant resource available to many disciplines. Exhibit 1-4 provides a list of web sites that may be particularly useful to practitioners engaged in corridor studies.

Exhibit 1-4.**Web Sites That May be Useful to Practitioners in Obtaining Information
for Conducting Corridor Studies****U.S. Government**

Army Corps of Engineers – www.usace.army.mil
Bureau of Indian Affairs (Department of the Interior) – www.doi.gov/bureau-indian-affairs.html
Bureau of Transportation Statistics – www.bts.gov
Department of Energy – www.doe.gov
Department of the Interior – www.doi.gov
Department of Housing and Urban Development – www.hud.gov
Environmental Protection Agency – www.epa.gov
Federal Highway Administration- www.fhwa.dot.gov
Federal Transit Administration – www.fta.dot.gov
National Park Service – www.nps.gov
U.S. Coast Guard – www.uscg.mil/
U.S. Fish and Wildlife Service – www.fws.gov
U.S. Geological Survey – www.usgs.gov
U.S. Federal Government Agencies Directory – www.lib.lsu.edu/fedgov.html

Transportation and Urban Policy Associations

American Association of State Highway and Transportation Officials – www.aashto.org
American Planning Association – www.planning.org
American Public Transit Association – www.apta.org
Association of Metropolitan Planning Organizations – www.narc.org/ampo
Institute of Transportation Engineers – www.ite.org
Surface Transportation Policy Project – www.transact.org/stpp.htm
Transportation Research Board – www.nas.edu/trb
Urban Land Institute – www.uli.org

Other Environmental and Resource Agencies

Advisory Council on Historic Preservation – www.achp.gov
Environmental Defense Fund – www.edf.org
Natural Resources Defense Council – www.nrdc.org
Sierra Club - www.sierraclub.org
Council on Environmental Quality (CEQ) – www.whitehouse.gov/CEQ

CHAPTER 2

THE TRANSPORTATION PLANNING PROCESS AND CORRIDOR DECISION-MAKING



Chapter Topics in a Nutshell

- 2.1. Corridor Planning: a Decision-Making Process
- 2.2. Overview of the Transportation Planning Process
- 2.3. How Corridor Planning Decisions Are Made
- 2.4. Characteristics of a Good Transportation Decision
- 2.5. Making Transportation Decisions That Stand the Test of Time



Principles and Lessons Learned

1. There is no one size fits all in the design and conduct of a corridor study. The same is true of how agencies may choose to use (or not use) corridor studies in making corridor-level planning decisions. There are alternative approaches to making corridor-level transportation decisions, depending on the type of decision to be made, the timing of that decision, and other factors.
2. Corridor decision-making is both a technical process and a political one. Transportation professionals should have as their objective the development of factual information and community input that better informs the decision-making process, which is ultimately political in nature.
3. Clearly understanding why a corridor study should be initiated will help agencies to understand when it should be initiated.
4. Making early planning decisions in a corridor may be important for a variety of reasons not just for the purpose of reflecting the decision in the MTP.
5. There are a variety of problems that can threaten the ability to make decisions stick. The application of good planning principles not only results in better decisions but will usually improve the likelihood that those decisions stand the test of time.
6. “NEPA’s purpose is not to generate paperwork—even excellent paperwork—but to foster excellent action” (Council on Environmental Quality). The same is true of corridor planning studies. Corridor studies should have as their main goal the assembly of relevant, accurate information to promote decisions that are in the overall best interest of the community.
7. Planning and project development should be thought of as a seamless process. Addressing a transportation problem involves not just a single decision, but a series of decisions that ultimately lead to implementation of a transportation strategy. This underscores the importance of inter-divisional communications within transportation agencies, as well as communications among agencies.
8. There is interaction between transportation decisions made at the regional level and those made at the corridor level. Corridor studies need to consider regional decisions and input; regional transportation planning needs to consider information and decisions made at the corridor level.

2.1. Corridor Planning—A Decision-Making Process

Transportation planning is, in essence, a decision-making process. Because many transportation decisions involve irreversible commitments of resources and significant, long-term impacts on communities and the environment, increasing attention has been given to how those decisions are made. This increased attention can be attributed to multiple factors, examples of which include greater levels of interest by the public, greater scrutiny by the media, tighter transportation budgets, and changes in Federal, state, and local regulations. These factors have forced agencies to take a more serious look at the transportation decisions they make and to make the decisions earlier in the planning process.

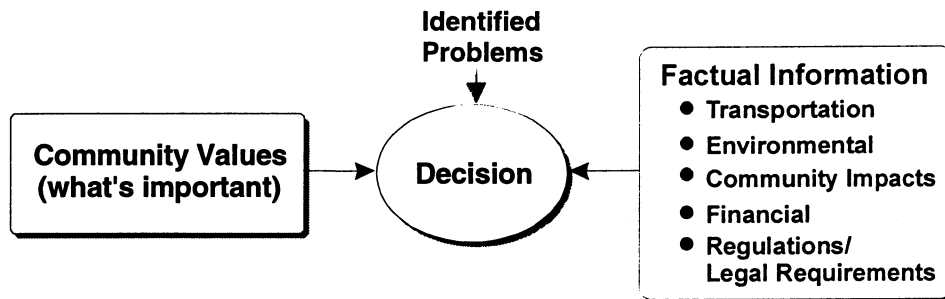
Decision-making for most major transportation investments is both a technical process and a political one. The scope and cost of improvements are of such a scale and the impacts often of such a magnitude that the images and careers of elected officials and other decision-makers can be affected, both positively and negatively. In addition, priorities often must be weighed not only among competing transportation projects but against non-transportation uses of funds as well. These trade-offs must be made in the political arena.

To be effective, the technical and political processes must work together.

To be effective, the technical and political processes must work together. Technical staff would be ill advised to work independently from the political process; likewise, elected officials and agency administrators can arrive at better decisions by understanding technical input.

Technical staff sometimes bemoan the fact that politics may alter the directions suggested from technical analyses. However, the fact that major transportation decisions are typically made in the political arena should not be viewed as a problem. Transportation decisions are not merely technical; they involve a merging of community values and factual information (Exhibit 2-1), hopefully resulting in a decision that is in the overall best interest of the community. It is in the political arena that the values of the community are reflected and weighed against one another.

**Exhibit 2-1.
Decisions Bring Together Both Factual Information
and Community Values**



One of the goals of transportation professionals should be to promote good decision-making through an informed political process. One of the objectives of transportation planning is to provide reliable, meaningful information to this process. Corridor studies and other types of transportation studies provide an opportunity to inject technical information and community input into the decision-making process.

One of the goals of transportation professionals should be to promote good decision-making through an informed political process.

2.2. Overview of the Transportation Planning Process

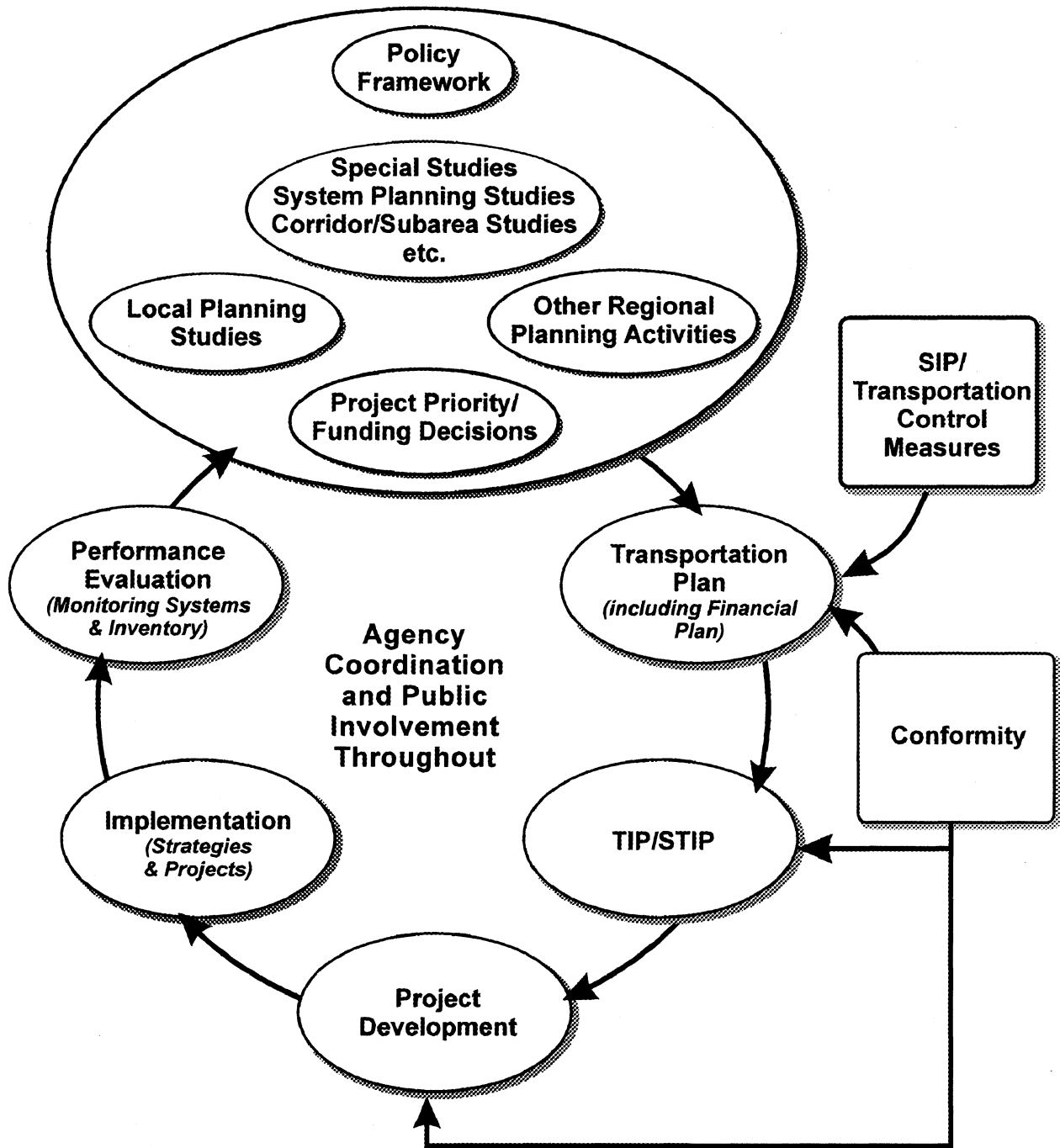
Exhibit 2-2 is one depiction of the metropolitan transportation planning process, indicating that it is iterative and has two primary products: the MTP and the TIP. Implementation is not a part of the planning process but is shown to illustrate its relationship to the planning process. Good planning should make subsequent decisions and implementation easier and more efficient.

The outcomes of corridor studies will need to be reflected in the MTP and, where project programming is appropriate, the metropolitan TIP. The statewide TIP is required to include the metropolitan TIPs by incorporation. One of the differences between the MTP and statewide plan is that the statewide plan does not require financial constraint. Many of the statewide plans are primarily policy oriented and may not include specific projects.

The metropolitan transportation planning activities shown at the top of Exhibit 2-2 represent multiple activities that feed information to the development of the MTP and TIP. There is substantial flexibility in the type and nature of the activities at the top of the exhibit. The MTP and TIP are federally required, as is air quality conformity in non-attainment areas. Federal rules for transportation planning can be found in 23 CFR Part 450. As indicated, there are a number of inter-related planning activities that could take place:

- **Transportation Planning Activities.** There are many activities that ultimately result in a set of recommended, fundable transportation projects and programs. These activities feed information to the principal products of the transportation planning process: the MTP and TIP. The process varies from one area to another and includes input from many agencies and individuals. Some of these transportation planning activities include policy definition, corridor/subarea studies, system planning studies, and so forth.
- **Metropolitan Transportation Plan.** The MTP is a primary product of the planning process and is required to be prepared periodically by each state and metropolitan area. It documents the policy direction for the region and describes how transportation projects and programs will be implemented over a 20-year (or longer) period. It addresses the entire time period out to the horizon year, including projects and programs that are short range as well as those that are long range. The MTP must be fiscally constrained and specify the design concept and scope of the planned improvements.
- **Transportation Improvement Program.** A document required to be prepared periodically by each state and metropolitan area that describes specific projects that will be constructed and/or operated over the next several years (minimum three years, some areas include additional years). Projects need to be included in this document to receive Federal funds.
- **Air Quality Conformity.** A requirement in the 1990 Clean Air Act Amendments (and prior legislation) for MTPs, TIPs, and Federally funded transportation projects to conform to the State Implementation Plan for air quality.

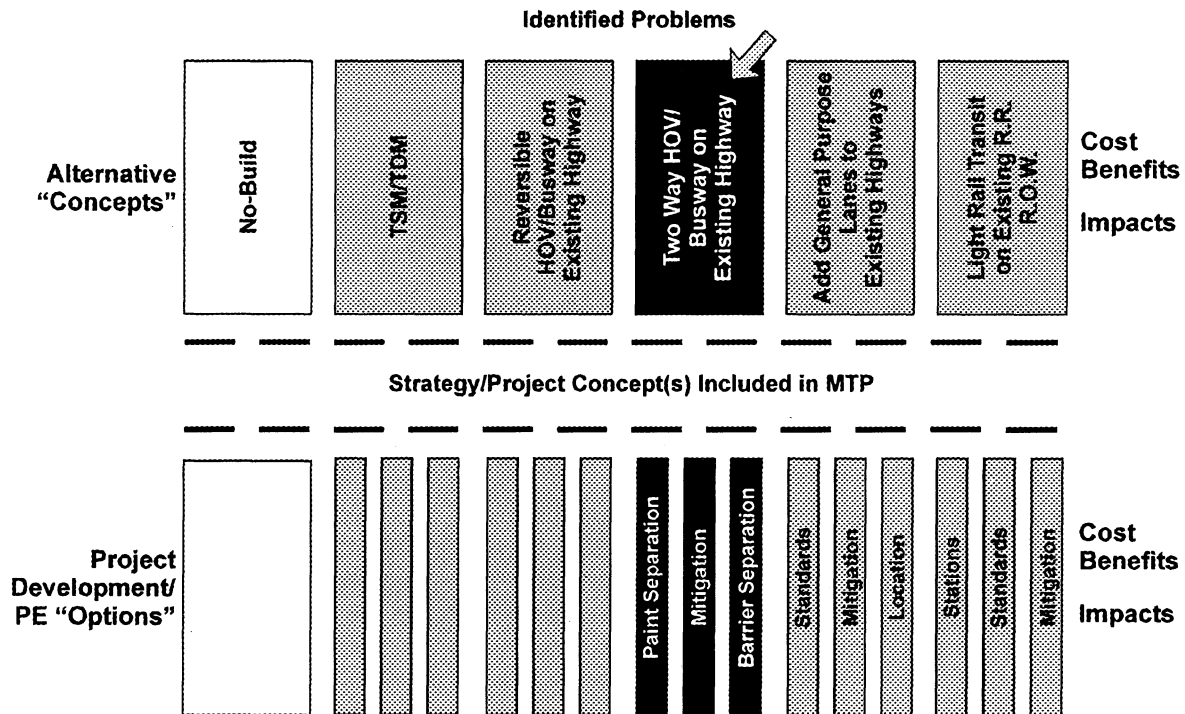
Exhibit 2-2.
The Transportation Planning Process



- **Project Development.** Takes place following planning and includes specific decisions on location, design, and environmental mitigation. It evaluates community and natural environmental impacts in detail, identifies mitigation measures, and addresses environmental issues in greater depth than in the planning process.
- **Performance Evaluation.** Achieving system effectiveness requires assessing its performance against a series of performance measures and making adjustments as necessary. Certain projects, policies, and actions may be evaluated to assess lessons learned, thereby providing feedback to making better decisions in the future.

Exhibit 2-3 illustrates how a decision on design concept and scope in planning could relate to a decision on location and design in project development. Alternatives are identified in planning that address the mode and general alignment of possible transportation facilities. A preferred design concept and scope are then refined in project development to address such things as detailed alignment options, transit station locations, impact mitigation, and so forth. There is not always a clear delineation between planning and project development decisions, and in some cases, they will be made as part of a unified or concurrent process. This is a general depiction of the typical relationship.

Exhibit 2-3.
Relationship Between a Design Concept and Scope Decision
and a Project Development Decision (Source: MIS Desk Reference)



2.3. How Corridor Planning Decisions Are Made

2.3.1. Sources of Input to Corridor Planning Decisions

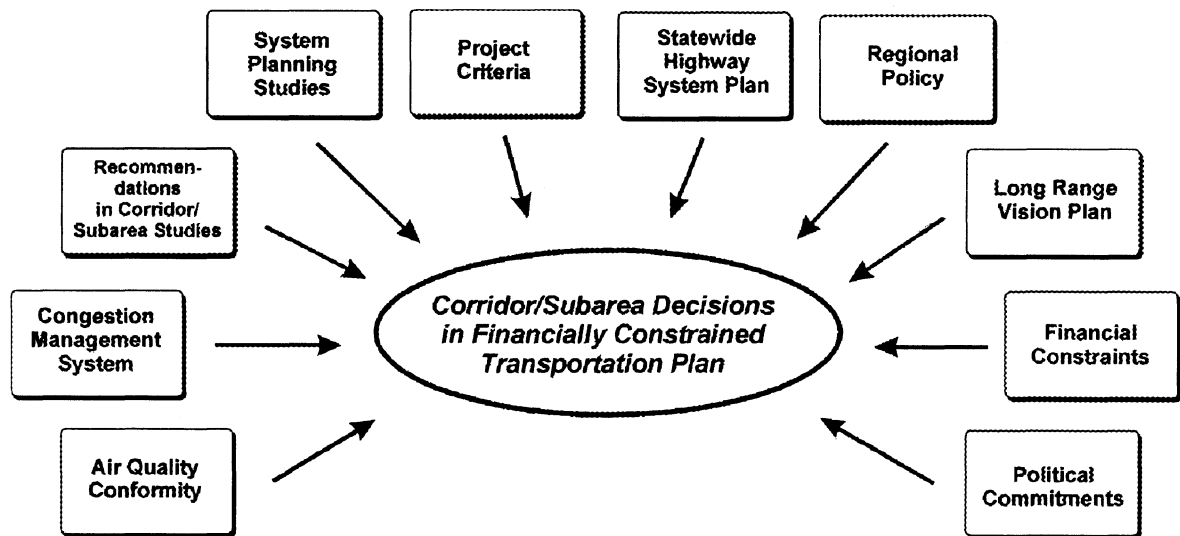
Decisions on major transportation investments are not simple and usually involve many agencies, the public, and elected officials. **Planning is an iterative process with inputs from many sources.**

The problem has been exacerbated because many transportation agencies have tended to view planning and project development as two isolated, independent activities. In reality, planning and project development should be seen as an integrated decision-making process, addressing steps in a continuum of decisions. Project development addresses the more “micro” decisions and planning the “macro” decisions. However, internal agency linkages between these two activities have often not been effective.

... planning and project development should be seen as an integrated decision-making process ...

Planning and programming decisions to address transportation problems or needs are ultimately made and confirmed in the financially constrained MTP and TIP. There are many factors that need to be accounted for in making decisions in the financially constrained MTP. The results of a corridor study represent only one input among many inputs to that regional decision-making process. All the relevant information is brought together in the context of regional decision-making. Exhibit 2-4 illustrates some of the significant considerations, which are further explained below.

**Exhibit 2-4.
Factors That Should Be Accounted for in Making Corridor-Level Decisions
for the Financially Constrained MTP**



- **Regional policy.** Policies may have been established to favor certain types of transportation solutions. For example, a policy may have been established to progress toward a regional rail system. Policies to promote transit-oriented development may have been enacted to support the rail policy. These policies will likely have a strong influence on corridor decisions.
- **System planning studies.** These studies may have been conducted in support of the MTP or to identify potential system-level plans or actions relating to decisions that may be regional in nature (e.g., a high occupancy vehicle [HOV] network, rail system, or information network for Intelligent Transportation Systems). This information will likely be a major consideration in any subsequent corridor study.
- **Project criteria.** A region may have criteria that are used for evaluating projects for consideration in the MTP or TIP. Those making a corridor decision would be well advised to consider these criteria. Any studies conducted should consider including these criteria into the evaluation process.

- **Air quality conformity.** The ability to meet conformity requirements may influence the types of strategies that are implemented regionally or within specific corridors.
- **Political commitments.** Making corridor decisions is not only a technical process but a political one. Commitments may have been made in certain corridors or even as part of a ballot referendum that must be accommodated in the shaping of the preferred investment strategy. Technical studies may provide information that will help to refine these decisions. Ultimately, NEPA requires an objective review of all reasonable alternatives, notwithstanding prior political commitments that may have been made.
- **A congestion management system (CMS) and other ongoing monitoring/management systems.** Some areas may have management systems that include system monitoring and analysis of alternatives, the results of which should be considered in corridor decisions. In some cases, the CMS may be key for making decisions in certain corridors (e.g., in an arterial corridor) or for interim decisions that may be incorporated into the MTP.
- **Statewide transportation system plans.** Plans and policies developed at the state level may influence what occurs at the regional level. This can be particularly critical in corridors that lead beyond a metropolitan area.
- **Long range vision plans.** Many regions are now conducting planning beyond the horizon of the financially constrained MTP. Decisions are influenced by the vision for that corridor or for the region in general.
- **Local government plans.** Local governments develop their own plans for infrastructure, community services, and land use. Many of these are legally required and must be accommodated by and/or refined in conjunction with major transportation decisions.
- **Financial constraints.** These constraints force decision-makers to make choices among possible courses of actions. Choices sometimes include recommending improvements in one corridor over another corridor, or in scaling back certain improvements in several corridors to make the regional expenditures match regional revenue. The existence of regional financial constraints is one reason why financial analysis is important in corridor decision-making. The project choices and tradeoffs ultimately must be made at the regional level, within the context of the financially constrained MTP.
- **Study recommendations.** Corridor planning studies bring a technical evaluation of issues to the table, along with public and agency input. Corridor planning studies bring together all the other elements as well: regional policy considerations, CMS input, political commitments, regional project criteria, and so forth. **Final decisions are made on what will move forward from planning to implementation by adopting the MTP and TIP.**

There is interaction between transportation decisions made at the regional level and those made at the corridor level. Corridor studies need to consider regional decisions and input; regional transportation planning needs to consider information and decisions made at the corridor level.

2.3.2. Relationship of Corridor Studies to Other Types of Studies

Exhibit 2-5 briefly illustrates the relationship of corridor planning studies to the MTP and TIP and to several types of planning studies that are often conducted by state, regional, and local agencies. **The planning studies are examples of types of studies that tend to be conducted. They do not represent Federal requirements, nor are they necessarily a comprehensive listing.**

Corridor planning studies and all of the other types of planning studies shown in Exhibit 2-5 have one thing in common: they provide information to decision-makers for the development of the MTP and TIP. As discussed above, the final decisions on projects that can actually be funded and implemented

are made as part of the development of the financially constrained MTP and TIP. Even these decisions can be revisited as plans and programs are updated or amended. **A corridor planning study may be an appropriate vehicle for making decisions or recommendations within the study corridor; however, decisions on priorities among corridors are generally made in the MTP and TIP.** Deliberations made for the MTP and TIP could also influence decisions within corridors as well (e.g., if budget shortfalls do not allow full construction of the corridor study recommendations).

**Exhibit 2-5.
Examples of Plans and Studies
and Their Relationship to Corridor Planning Studies**

Type of Plan or Study	Typical Study/Plan Objective	How it Relates to Corridor Planning Studies
Metropolitan Transportation Plan (a Federal requirement)	A plan required by the Federal government to document both short-range and long-range strategies/actions that lead to the development of an integrated intermodal transportation system that facilitates the efficient movement of people and goods. The plan must be financially constrained.	A corridor planning study will lead to possible refinement of the MTP. The MTP will provide overall regional context for and policy direction to a corridor study.
Metropolitan TIP (a Federal requirement)	A program of projects, or phases of a project within the metropolitan planning area proposed for Federal funding, as defined more explicitly in Federal metropolitan planning rules (23 CFR 450.324).	The results of a corridor study may be used by the MPO as a basis for including projects in the TIP.
Statewide Transportation Plan (a Federal requirement)	A plan required by the Federal government for how the state will facilitate the efficient movement of people and goods. Unlike the MTP, the statewide plan does not need to be financially constrained.	Corridor studies may be appropriate for referencing in the plan as the basis for plan elements. The statewide plan may also contain policies that could influence the alternatives considered in corridor studies or how the alternatives are evaluated (e.g., valuation criteria).
Statewide TIP (a Federal requirement)	The Metropolitan TIPs are to be incorporated into the statewide TIP.	Corridor studies and the decisions they may produce will be reflected in the statewide TIP to the extent they are reflected in the Metropolitan TIPs.
Regional Needs Study, Strategic Plan, or Vision Plan (not a Federal requirement)	Used by some agencies to identify a regional-level long-term “master plan” of improvements that may extend beyond the financially constrained MTP. Such a plan would often be used to evaluate long-term funding needs. It helps to describe what is envisioned beyond what can currently be afforded.	A corridor study may provide input to the Needs Study, Strategic Plan, or Vision Plan. A corridor study should take into account any policies, alternatives, and recommendations from these regional studies.
System Planning Studies (not a Federal requirement)	Some agencies find it useful and important to conduct system planning, sometimes on a multimodal basis and sometimes on a mode-specific basis. For example, a regional rail “system plan” may be needed to support a funding ballot measure or show elected officials how the system ultimately works together to provide geographic balance and	A corridor study may incorporate findings and recommendations from a system plan as input to development of alternatives. The system plan may also provide a basis for assumptions in corridors other than the one being studied (e.g.,

Type of Plan or Study	Typical Study/Plan Objective	How It Relates to Corridor Planning Studies
	interconnectivity. Usually, it tends to be a vision plan, as opposed to a financially constrained plan. The Federally required MTP would draw projects from this plan as the available funds allow.	other legs of a rail transit system that may tie into the corridor being examined).
Congestion Management System (a Federal requirement in Transportation Management Areas)	No specific plans or studies are required in a CMS, but only an ongoing evaluation of problems, needs, and alternatives for addressing congestion and mobility. Some areas conduct studies that are operationally or management-oriented under the framework of their CMS.	Evaluation conducted as part of the CMS could be used as input to a corridor study. This could include problem identification, development of performance measures, and identification of certain types of alternatives (particularly operational and demand management alternatives). Improvements recommended in a MIS would be considered in subsequent CMS analyses.
Feasibility Study or Corridor Needs Study (not a Federal requirement)	Agencies may conduct these types of studies to obtain an early indication of whether certain types of improvements may be physically or financially feasible. They are usually intended as a lower cost, quick look at the needs and general scale of improvements that may be necessary to address those needs. They would often be conducted with limited public involvement.	A feasibility or needs study may help an agency determine if or when a corridor may be ready for a major corridor study effort, with full public involvement. It may also assist an agency in overall financial planning. Care should be taken that this type of study is not conducted mainly to pre-ordain the selection of a specific alternative outside the collaborative process. It may allow an agency to provide a tentative improvement or placeholder in the MTP.
County and City Comprehensive Plans or General Plans (not a Federal requirement, but often a state requirement)	These plans focus on the definition of land use and transportation improvements (as well as other types of infrastructure improvements) by local governments.	The recommendations from a corridor study may have a major bearing on changes to be reflected in local plans. Ideally, possible changes to local comprehensive plans (e.g., to land use that might support certain transportation alternatives) should be considered as part of the interagency collaborative process of the corridor study so that there are no “surprises” later on. Local comprehensive plans may also impose constraints on what can be considered for alternatives in a corridor study.

2.3.3. Example State and Metropolitan Planning Process Structures

States and metropolitan areas are implementing planning processes in different ways. This section presents a representative sample of these approaches and how the regions have chosen to position corridor planning studies in these processes.

St. Louis

Exhibit 2-6 shows the planning process in the St. Louis region as represented in the East West Gateway Coordinating Council's *MTP Transportation Redefined*. It shows Major Transportation Investment Analyses (MTIAs) and other types of corridor studies as a key linkage between the MTP and the TIP. In effect, corridor analyses represent refinements or provision of additional detail laid out in the MTP. This is one distinct philosophy for positioning corridor planning studies. It is a slight variation from the process shown earlier in Exhibit 2-2 in that corridor analyses are shown flowing from the MTP, rather than flowing into the MTP. In effect, however, the net result is the same. The feedback loop in both diagrams ensures that all corridor analyses and subsequent project decisions are reflected in the next update of the MTP.

Virginia

Exhibit 2-7 from the Virginia Department of Transportation's MIS guidelines, which were developed collaboratively between the state and major MPOs, shows how the MIS was designed to support both metropolitan and statewide planning. In this case, the MIS is represented as a link between the transportation vision (or needs), which is financially unconstrained, and MTP and the TIP/STIP process, which are constrained. In addition, the VDOT diagram brings out the importance of the relationship between land use and transportation at all planning levels.

Denver

The Denver region has a well-developed planning process that integrates the corridor studies for major investment decisions into regional decision-making, as shown in Exhibit 2-8. It places the capital projects analysis after the transportation plan, but with a feedback loop directly back to the MTP. The Denver Regional Council of Governments has also integrated the congestion management system into the process, which assists in problem identification and strategy development.

2.4. Characteristics of a Good Transportation Decision

As indicated earlier, transportation planning is all about making decisions. Each transportation decision tends to be unique. Some decisions are more difficult and controversial, while others can be quite straightforward and simple. Some of the characteristics of good transportation decisions include

- **Effective in addressing the identified problems.** The need for a transportation investment is founded on a clear understanding of the problems to be addressed. If the need is recognized, the solutions will be easier to support.
- **Consistent with regional goals and objectives.** Transportation investments in any particular corridor or area should support the policy direction of the region.
- **Cost-effective.** The investment should be a good use of taxpayer dollars, yielding benefits that justify the costs.
- **Well-informed and collaborative.** Decisions should be based on sound information from technical analysis and feedback from the community. They should not be made in isolation.
- **Sensitive to community concerns.** Major transportation investments often have negative impacts. Many of these impacts tend to be localized along facility corridors, while the benefits tend to be widespread, distributed across a larger population. To the extent possible, impacts need to be avoided, minimized, and/or mitigated. But while certain transportation

investments may have negative impacts, they may still be in the overall best interest of the community. The balancing of these concerns takes place in the political arena, with ample input from the public.

- **Implementable.** The transportation investment needs to be feasible financially, physically, and institutionally.
- **Durable.** The decision must stand the test of time. This involves consideration of all the above, plus paying attention to the details of how studies are conducted, how the public is involved, and how decisions are made.

... agencies should also recognize that sometimes decisions should change.

The issue of how decisions can stand the test of time has been one of great interest to transportation agencies for many years. Legal battles over infrastructure decisions are certainly not desirable and can be costly.

Although there is no sure-fire way to avoid litigation, good planning can go a long way toward reducing the likelihood that decisions will be radically altered or overturned later in the process. The next section provides some insights into how some of these problems can be avoided. But agencies should also recognize that sometimes decisions should change. They should be prepared to change decisions or modify a transportation strategy if circumstances suggest that the prior decision is no longer in the interest of the community.

2.5. Making Transportation Decisions That Stand the Test of Time

A corridor study is not particularly useful if the resulting decision must be modified shortly after the study is concluded. Decisions that are in the best interest of the community will usually hold up. The ability of a decision to endure is promoted through the application of good planning principles. In fact, principles for making good decisions and principles for promoting “durable” decisions are essentially the same. Although agencies should avoid purely “defensive planning,” **the prospect of having a decision challenged is an additional incentive to embrace good planning principles.**

Practitioners should keep in mind that the original intent of NEPA was to promote good planning and project development. The basic principles of NEPA are virtually the same as those espoused for corridor planning. In the words of the Council on Environmental Quality, “It is not better documents but better decisions that count. NEPA’s purpose is not to generate paperwork—even excellent paperwork—but to foster excellent action.” Although agencies would sometimes say that they are forced into a defensive mode, even the defensiveness may be futile if the fundamental decision is flawed. **Even though win-win scenarios are often not possible, a win-win solution should at least be the goal in every transportation planning effort.**

... principles for making good decisions and principles for promoting “durable” decisions are essentially the same.

2.5.1. How Decisions Become Vulnerable

One way to reinforce the need for the application of good planning principles is to understand how decisions become vulnerable. We can learn from past mistakes. Certainly, there are a wide range of circumstances that could make a decision more vulnerable. Some of the problems are foreseeable and preventable, while others are not.

Exhibit 2-6.
Representation of the Transportation Planning Process
and Corridor Studies in the St. Louis Region

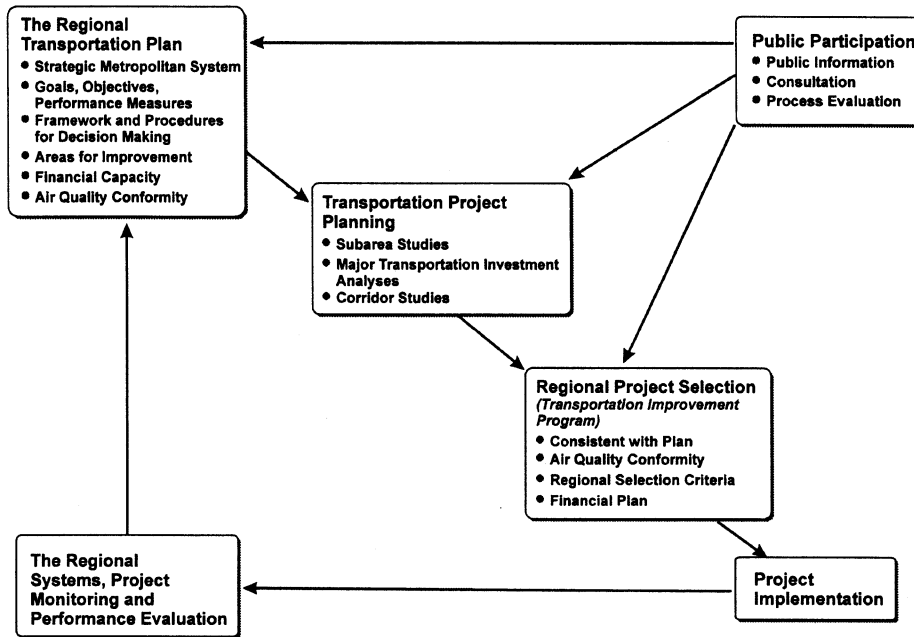


Exhibit 2-7.
Planning Process as Represented by VDOT and Partner Agencies

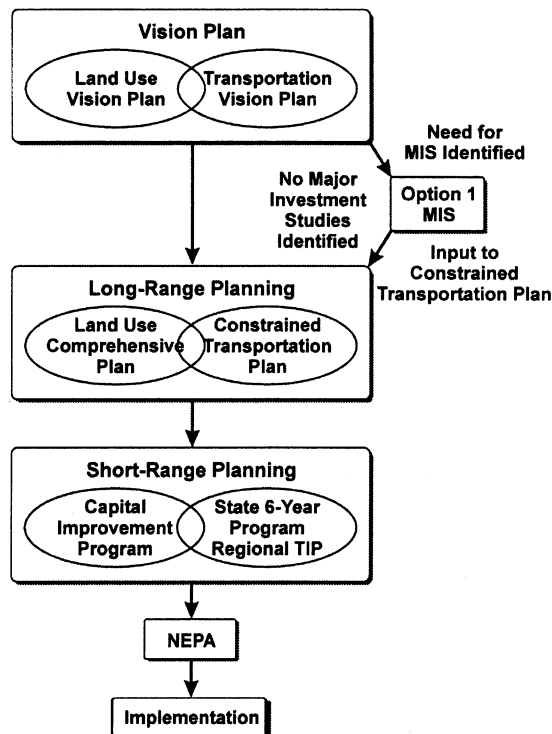
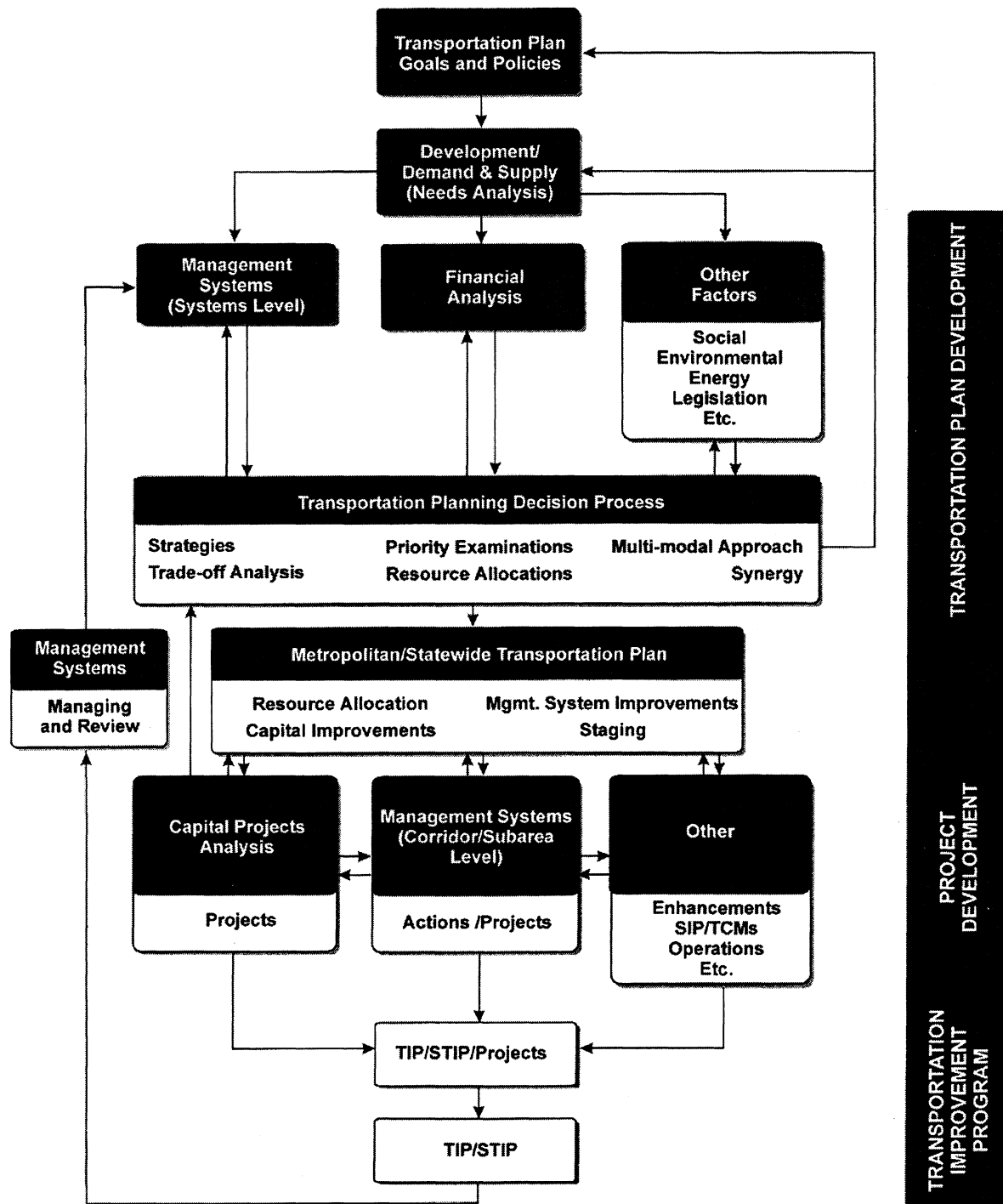


Exhibit 2-8.
Representation of the Transportation Planning Process
and Corridor Studies in the Denver Region



SOURCE: CDOT, DRCOG, PPACG

The Pennsylvania Department of Transportation compiled potential problems that can sidetrack a decision on a major transportation investment. Most of these come from NEPA experience, but are applicable to corridor planning studies as well. It is important to note that a problem that could be encountered in NEPA must be a consideration in a corridor planning study as well. **Planners and decision-makers must learn to think ahead to NEPA requirements, to see the relationship between decisions in planning and project development.** Planning and project development should be thought of as a seamless process. This underscores the importance of inter-divisional communications within transportation agencies, as well as interagency communications. Exhibit 2-9 lists some of the problems that can occur (from presentation “How to Avoid the October Surprise” by Wayne Kober of Pennsylvania DOT at the January 1998 Annual Meeting of the Transportation Research Board).

Exhibit 2-9. Common Barriers to Creating Decisions That Stand the Test of Time

(Source: Wayne Kober, PennDOT, January 1998 presentation at TRB Annual Meeting)

What are some causes of the “October Surprise?”

- Lack of incremental decision-making.
- Hidden agendas.
- People are not open and honest.
- Highly qualified multi-disciplinary project study and management teams are not formed.
- “Drive-by scoping.” All the stakeholders were not effectively engaged in the scoping process.
- The project need, goals and objectives were not clearly defined.
- Important issues were not sought out, recognized and addressed.
- Project priority, schedule and financial plan were not clear.
- Cooperating agency agreements were not established.
- Effective information communication techniques were not established.
- Study methodologies were not agreed upon.
- Efficient data storage and retrieval systems were not set up.
- Multiple agency approval processes prevent one-stop shopping.
- Lawyers and conflict management specialists are brought in to manage conflict rather than proactively prevent it.
- Poor information visualization techniques cause lack of understanding and misunderstanding of engineering and environmental information.
- Project alternatives were taken to the stakeholders, not developed in collaboration with them.
- Too much complex information is presented to stakeholders too fast, not in bite-size chunks.
- Elections occur and priorities change.
- Focus on compliance rather than problem solving.
- Focus on documentation more than process.

Most items listed in the exhibit are preventable and can be addressed through proper application of good decision-making principles. But agencies must think in terms of making decisions that are in the overall interest of the community, not in terms of merely expediently justifying projects. **A project justification approach is not only bad decision-making, but is likely to increase the vulnerability of decisions.** It can also damage an agency’s image, which makes the public, the media, and other agencies even more suspicious.

2.5.2. Principles for Making Durable Decisions

The following principles, derived from agency outreach and experience of the researchers, will help to promote quality decisions, that is, decisions that address problems, foster good outcomes, and are durable through subsequent decision phases.

- **Decisions must make sense.** It will be difficult to support and sustain a decision that is fundamentally flawed or is the wrong decision for the community. Even a decision that has significant impacts can endure if there are compelling reasons for the decision. However, if the decision is not made in collaborative fashion (e.g., it is one agency’s pet project that has serious community impact), the defensibility of the decision can be greatly reduced.

- **A planning decision must be seen as part of the chronology of decisions.** Making a decision on design concept and scope is part of a stream of decisions before an improvement can be implemented. Making the appropriate type of decision at the right time will move the corridor improvement strategy along. Making decisions prematurely or stopping short of what should have been decided could make later parts of the decision-making process more difficult.
- **Ensure that all interested and impacted parties have been provided all relevant information, have had a fair chance to provide their input, and have been heard.** All participants need to understand how the process works and how they can provide input into that process.
- **Ideally, the body that will make the final decision should also be involved in approving/confirming intermediate decisions as well.** It can be awkward (and expensive) if decisions are requested on the end result when the decision-makers may not agree with earlier assumptions. Good communication between agency staff and the decision-makers to whom they report is essential. Intermediate handout material provided to agency staff should be packaged so that it can be easily digested by decision-makers. Approval of intermediate decisions or reports are advisable (e.g., problem statement, evaluation criteria, alternative screening, etc.).
- **Thoroughly document all decisions and the basis for those decisions,** particularly reasons for screening or selecting specific alternatives.
- Differences between assumptions made in a study and what actually occurs at a later date may cause a conclusion to be questioned. **Testing the sensitivity of the results** to input assumptions can help to overcome questions on the validity of a conclusion or decision. Approaches to sensitivity testing and worst-case/best-case scenarios are discussed later in the *Guidebook*, primarily Chapter 7.
- **For critical technical issues, have assumptions and methodology reviewed by a peer group or technical subcommittee.** Document decisions regarding methodology, and make sure the study steering committee is aware of key assumptions.
- **Construct alternatives that are competitive and realistic.** Selecting a preferred alternative because it compared well against other poorly constructed alternatives will leave the door open for challenge.

PennDOT also poses some strategies to promote the durability of decisions, listed in Exhibit 2-10. These one-line observations represent a synopsis of lessons learned over the years in dealing with decisions on major transportation investments. Again, these are drawn mainly from NEPA experience, but they are equally applicable to corridor planning as well. Most of these will be reinforced with more detail later in the *Guidebook*.

Exhibit 2-10.

Strategies to Promote the Durability of Decisions

(Source: Wayne Kober, PennDOT, January 1998 presentation at TRB Annual Meeting)

What are some ways to prevent the “October Surprise”

- Strive for consensus and win-win.
- Develop the alternatives with the stakeholders.
- Be open, honest, and responsive.
- Use modern visualization techniques and technologies.
- Identify the environmental features before you develop alternatives.
- Develop a thorough understanding of project need, goals, and objectives.
- Focus on the best solution, not just compliance.
- Don't drag it out, get it over with.
- If you don't intend to build it, don't start it.
- Answer, don't avoid questions.
- Use a highly qualified team.
- Consider upgrade first, then new facilities.
- Use NEPA principles.

CHAPTER 3

IDENTIFYING THE PROBLEM AND THE CORRIDOR STUDY STRATEGY



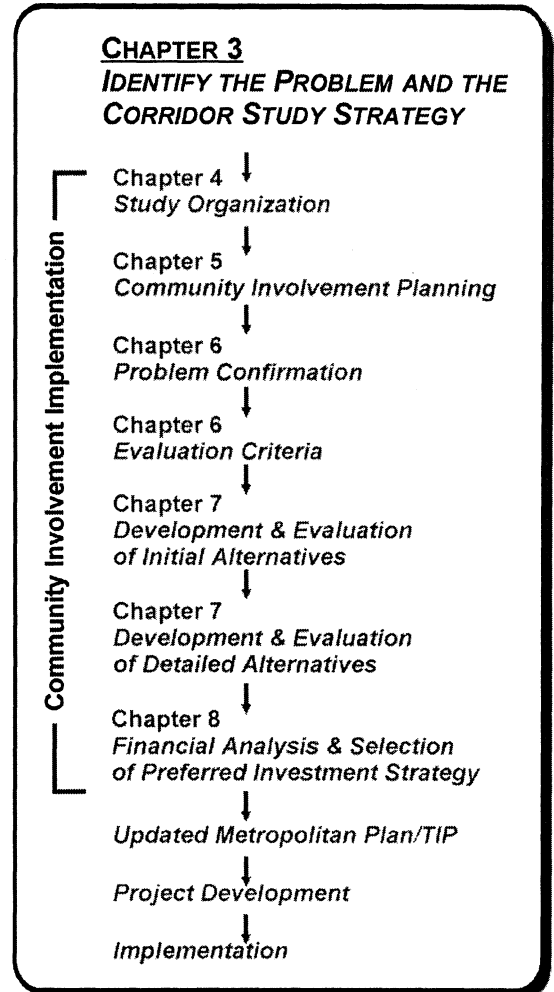
Chapter Topics in a Nutshell

- 3.1. Overview
- 3.2. Reasons for Conducting a Corridor Study
- 3.3. Problem Identification
- 3.4. Issues in Designing the Corridor Study Strategy
- 3.5. Developing the Corridor Study Strategy
- 3.6 Defining Corridor Study Objectives
- 3.7. Corridor Prioritization Criteria



Principles and Lessons Learned

1. Problem identification is foundational to conducting meaningful corridor studies. The problems to be addressed should be clearly stated, agreed to by as many study participants as possible, and, especially for controversial studies, approved by the policy committee. They should be documented in a format that will be consistent with the intent of NEPA.
2. The focus of both corridor planning studies and the NEPA process is on making good decisions, not just on producing good documentation.
3. To properly scale the level of detail, focus efforts on those issues that are key to making a decision. Issues key to the decision will usually receive more detailed analysis than others.
4. There are a variety of factors that could impact an agency's strategy for coordinating corridor planning studies with the NEPA process. Major factors include possible timing of projects that may emerge from the corridor study, the geographic scope of the study, and the individual philosophy of agencies involved.
5. There is no reason to believe that alternatives eliminated in a pre-NEPA corridor study will need to be re-studied in the NEPA documentation process if
 - The corridor study has taken impacts into account to a level satisfactory under NEPA.
 - There has been full public disclosure and input on those impacts, particularly from agencies that will later be involved in the NEPA process.
 - The information is confirmed as part of the NEPA record. There is no reason to believe that decisions made within a pre-NEPA corridor study will not be valid in subsequent NEPA documentation if the study is conducted using good planning principles and all reasonable alternatives are analyzed per NEPA requirements.
6. Inclusion of resource agency input is important even in a pre-NEPA corridor study in cases where a decision could hinge on its perspectives. A proactive effort can elicit this input even prior to the formal NEPA process being initiated.
7. A corridor study can play a role in setting the stage for corridor preservation. Good intergovernmental coordination is essential to an effective corridor preservation program.



3.1. Overview

One of the fundamental concepts of a corridor study is that alternatives should be developed based on a thorough understanding of the existing and future problems in the study corridor. For a number of years, Federal agencies have been recognizing the deficiencies in the “purpose and need” sections of environmental documents. These sections were often cursory and one-dimensional, and the needs were even, at times, expressed in terms of a solution (e.g., “need” for additional capacity).

Even the phrase “purpose and need” is not necessarily fitting for the corridor study concept of collaboratively searching for an optimum solution or strategy, because it implies that a project is already in mind. The NEPA terminology “purpose and need” was designed not only for transportation applications, where transportation infrastructure was being considered for improving a set of problems, but also for a wide range of other projects, including other Federal projects such as buildings, parkland development, and so forth. In many of these other non-transportation applications, it may be appropriate to describe why the project (that has already been conceptualized) is necessary rather than to define a problem that was in need of solution. But this is not as appropriate in the case of planning to address transportation problems and needs. The *Guidebook* talks mainly about “problem identification.” It is the set of identified problems (both existing and future) around which alternatives are to be developed.

The concept of “evaluation criteria” discussed in Chapter 6 is integrally related to the identification of problems. Evaluation criteria express the basis by which alternatives will be judged against one another. Criteria should be designed to measure the extent to which alternatives address the identified problems. But evaluation criteria are usually broader than problems. Criteria include all the considerations necessary to make a decision. They include not just how alternatives address problems, but how the alternatives impact community resources, either positively or negatively, economic concerns, and an array of other factors.

Criteria should be designed to measure the extent to which alternatives address identified problems.

The primary discussion of problem identification is contained in Chapter 3. It is in the context of an agency or group of local decision-makers considering whether the problems are significant enough to initiate a corridor study. Chapter 3 provides a discussion of the underlying philosophy of problem identification, how the problems

are perceived by the public and elected officials, and examples of problem definitions that have come from prior corridor studies. In most of these examples, the problem statements were developed as part of the public and agency involvement process, not merely the internal assessment of problems by the agencies. The initial internal assessment of problems that establishes the need for the study is usually much more basic. Chapter 6 discusses how an initial statement of problems established internally by agencies can be confirmed, modified, and expanded with the participation of other stakeholders as the agency and public involvement process is initiated. Chapter 6 also discusses the development of evaluation criteria and linkages to the statement of problems. For the purposes of a corridor study, the selection of evaluation criteria is at the core of how the decisions will ultimately be made. It is the means not only of relating the identified problems to the alternatives, but of bringing in other factors that are key to the corridor decisions.

The concept of a corridor study strategy reflects the idea that those determining the need for a study and taking the steps to initiate it should have a basic strategy in mind for how they would go about it. This would include understanding why they need to conduct the study, what types of decisions they would expect the study to address, the relationship to NEPA, how the public will be brought in, and some of the basic parameters for how the study will proceed. The remainder of Chapter 3 discusses various aspects of developing a corridor study strategy, beginning with identification of the problem.

3.2. Reasons for Conducting a Corridor Study

Determining whether a corridor study is needed is not a trivial issue, nor is determining what the study should accomplish. Conducting a study too early or having the wrong study objectives could create more problems than the study resolves. On the other hand, a properly constructed study conducted at the right time can be a significant asset to dealing with a region's transportation problems.

The ultimate objective of planning for a transportation corridor is to identify cost-effective improvements that will address the identified problems and promote the objectives established (both transportation and non-transportation objectives) for the corridor. A corridor study would usually be triggered when a set of problems, either existing or future, escalates to a level to cause enough concern that action is necessary. The corridor study would then be initiated to determine the nature and timing of the necessary action. Consideration of a study could arise through multiple avenues: public pressure, concerns of local decision-makers, problems identified in other regional or sub-regional studies, opportunities to organize and coordinate multiple actions that are already being considered, and so forth.

Agencies can better understand when a corridor study may be appropriate by first asking what they hope to achieve. If planning is a decision-making process, then knowing why a study is needed and the type of decision one wishes to make is fundamental to the corridor planning strategy. There may be reasons why it is not advisable to make a decision at this point in time. The corridor strategy may already be in place, there may be instability in the corridor politically, the corridor may lack significant transportation problems, there may be little hope of significant funding in the near future, and so forth.

Agencies can better understand when a corridor study may be appropriate by first asking what they hope to achieve.

There are several possible reasons for initiating a corridor study, such as

- To determine the strategy that should be put in place to address a current or future transportation problem.
- To define improvements in a corridor to be placed in the financially constrained MTP.
- To determine funding needs to support improvements in a corridor.
- To provide a better context for other planning to be conducted in the corridor. For example, an agreement on a course of action in a corridor could allow land use plans to be modified to support the proposed action.
- To set the stage for advance corridor right-of-way preservation.
- To determine how improvements in a corridor will fit into a larger system plan.

The first reason (addressing a current or future problem) tends to underlie most of the other reasons. Therefore, this chapter spends considerable time exploring the subject of problem identification. There can be multiple stages of problem identification. The first stage involves knowing enough about the problem to confirm that a study is necessary. A second stage may be the point at which other agencies and the public are brought into active participation in the study to confirm and further develop the definition of the problem. The definition of the problem may be further refined as analyses are conducted. The primary discussion of problem identification is included in Chapter 3 because it is one of the first and most fundamental elements that agencies and local decision-makers must consider in determining whether to move forward with a study. Some of the problem identification activities discussed in this chapter would likely occur once the study is actually initiated and the full community involvement process begins.

There are a range of perspectives concerning the need for conducting a corridor study and the timing of that study. Two extremes of agency philosophy concerning this issue are

- Initiate a study only when it is evident that any resulting projects can be kept moving through the project development and implementation process. The concern some agencies would have with this approach is that it takes too narrow a view and will miss opportunities for creating a more balanced, integrated system.
- Initiate a study on each corridor where the long-term transportation strategy has not already been defined. This represents the long-term view that the best regional transportation strategy is derived by thorough planning well into the future. The concern some agencies would have with this approach is that a large investment is made in planning, when circumstances can change significantly over time that will require plans to be changed.

There are virtues to both approaches. Usually, the optimum approach for a given metropolitan area will be somewhere in between. Other sections of this chapter touch on some of the factors to consider in study need and timing.

3.3. Problem Identification

3.3.1. Problems and the Underlying Causes

Fundamental to proceeding with a corridor study is the need to understand the types of problems the study should address. Furthermore, it is important to deal with problems at a level that penetrates to the causes of the problems, not just the symptoms. It is necessary to understand why the problems occur. This understanding is key to devising effective alternatives. The discussion in Section 3.3 is the primary discussion of problem identification in the *Guidebook*. As indicated in the previous section, however, there may be several stages in which problems are identified, further developed, and refined. Problem identification is important in determining whether to initiate a study as well as in the study itself, by providing the foundation for evaluation criteria and alternatives development with full agency and public involvement.

It is important to begin this discussion with a key premise: **the perception of problems by the public and by elected officials is critical, not just the technical/analytical assessment of the problems.** Even if the public or elected official concern is more of a symptom than a problem, the fact that it is perceived as a problem means that the study team needs to take it seriously. Likewise, if a problem is understood or projected by the study team but is not yet perceived by the public and/or elected officials, attention will need to be given to discussing, resolving, and articulating a set of problems that can be supported from all perspectives.

For example, congestion, delay, and travel time are very important to the public. Surveys have borne this out. The public and elected officials would say that congestion and delay are serious problems. What is less clear to them is what may be causing these problems. One of the obligations of practitioners in a corridor study is to help decision-makers, the public, and other agency personnel understand what is behind the problem, or why it is occurring. This is where discussions of travel markets, origin-destination patterns, and other causal factors can be introduced. Consider the following example. A perceived problem might be stated as

“long delays between 4:30 and 5:30 p.m. southbound on freeway x.”

For that single problem, there could be multiple underlying causes or contributing factors, such as

- There is a high percentage of trucks in this section, which is on a long upgrade.
- The nearby business park lets all its employees out during that hour.
- The vehicle occupancy rate from the business park is very low.

- Employees in the area generally live farther out in the suburbs where there is little transit service.
- The parallel arterial system is not well developed in this area.

It is easy to see how understanding some of the causes can help even in the formulation of alternatives to address the problem.

At times, the line between problems, symptoms, and causes becomes fuzzy. It is important not to overly debate the fine points of terminology, but to simply stress the point that the corridor study needs to look deeper than just the surface level and that problems cannot be stated in terms of solutions. **The discussion cannot become too abstract or technical; otherwise the public will become frustrated and/or confused.** This does not mean that problems must be over-simplified. The public can understand more complex concepts, if they are explained clearly and simply.

One of the obligations of practitioners in a corridor study is to help decision-makers, the public, and other agency personnel understand what is behind the problem, or why it is occurring.

One approach that is often enlightening to the public and elected officials is to provide information on where travelers in a corridor are coming from and where they are going. The preferred approach is to conduct actual origin-destination (O-D) surveys in the corridor. However, such surveys may not be possible or affordable, and the study team needs to use the region's travel demand model to produce O-D pattern information from "select link" runs. On many occasions, the study participants find their understanding of the underlying causes enhanced by better understanding the travel patterns in the corridor. These runs can be produced relatively easily, but it must be recognized that they are simulations that are only as good as the model's ability to replicate reality. Exhibit 3-1 shows one exhibit of O-D patterns that was used for public presentations on a corridor study in Southern California. In some cases, the Census Transportation Planning Package (CTPP) can be used to better understand trip patterns, but the information may not be current, particularly in high-growth corridors, and only represents the home-to-work trip purpose.

3.3.2. Observations from Practitioners on Definition of the Problem

The survey conducted as part of NCHRP Project 8-34 identified lessons learned in a range of areas relating to corridor studies. One of the areas focused on problem definition. Exhibit 3-2 indicates some of these lessons identified by state DOT, MPO, and transit agency personnel. The responses come from a range of state and metropolitan area sizes and characteristics.

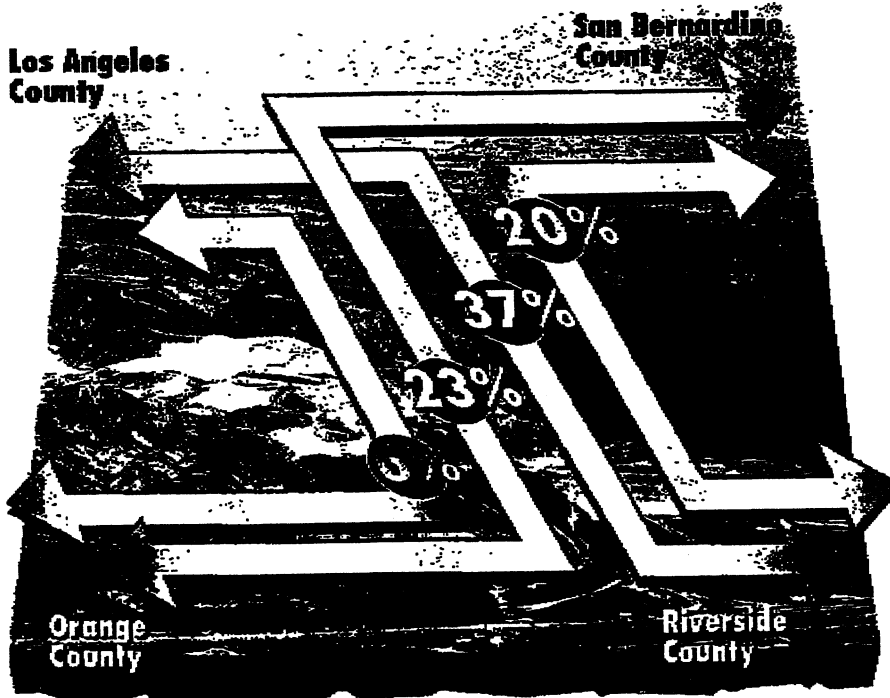
3.3.3. Examples of Problem Definitions in Actual Corridor Studies

It is instructive to examine examples of problem statements from actual corridor studies. Three examples are described. The first is from the U.S. 301 South Corridor Transportation Study (Exhibit 3-3). This was an innovative approach to study the growing demand and mobility problems along the U.S. 301 south corridor in Maryland's Prince George's and Charles Counties. A 75-member citizen task force was appointed by the governor in spring 1993 to guide the study. This area represents the developing eastern suburbs of the Washington, D.C., area. An earlier study to improve travel in this fast-growing region focused only on interstate-type highway improvements and failed amid public opposition. The task force was charged with developing comprehensive recommendations to address the transportation, land use, growth management, and environmental resource issues. The task force adopted its final recommendations with nearly unanimous support.

Exhibit 3-1.

Example Graphic Used to Illustrate Origin-Destination Patterns to the Public

Which counties will future Route 71 traffic be traveling between?



Which counties will future Route 71 traffic come from?

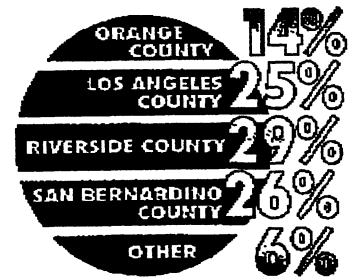


Exhibit 3-2.

Observations from Practitioners on Definition of the Problem

- Clear consensus is needed among technical and policy committees regarding what the problem is.
- Define the problem in a way that is mode neutral. Purpose and need statement should be defined meeting eventual NEPA requirements. Base problem definition on prior work.
- Defining the problem is key. There should be no project purpose and need; the corridor study should give that answer.
- Keep it simple. It is difficult to overcome preconceived solutions.
- This should be reviewed with the public. Consensus on problems is a must. This is the most important step in the process.
- Probably the most difficult part to get right and, oddly, often done a little time into the project rather than at the beginning.
- Project purpose and need should be refined, re-evaluated, or reassessed as the corridor study progresses, based on environmental analysis.
- The problem needs to be defined as clearly as possible. The problem statement helps define what alternatives will be examined. There needs to be consensus among participating agencies as to study objectives.
- Problem identification needs to be done prior to determining if a corridor study is needed.
- Allow plenty of time. Understand the baseline conditions and use them to illustrate the problem.
- This step should, in many cases, be done within the Transportation Plan initiating a corridor study.
- An excellent approach was to articulate what the study is attempting to accomplish; initiates a problem-solving approach; builds consensus on a key element.
- The problem tends to be too narrowly defined.
- Should include all neighborhoods potentially impacted.
- The Purpose and Need Statement must be specific and consider all modes of travel and key community objectives—not just mobility.
- The critical step in the process. If you do not know where you are going, or why, it does not matter how you get there.

Exhibit 3-3.**Problem Statement from the U.S. 301 Transportation Study****Amount of Growth**

- 40 percent of the state's population growth by 2020 is projected to take place in the five-county study area of Anne Arundel, Calvert, Charles, Prince George's and St. Mary's counties—an additional 425,000 people.
- The number of households is expected to nearly double, and the number of jobs will increase by 50 percent in the U.S. 301 Corridor.

Nature of Growth

- Southern Maryland is largely a collection of bedroom communities, with a comparatively small number of jobs located in the area.
- This imbalance between the number of jobs and households is one of the biggest reasons for the region's traffic congestion. U.S. 301 and MD 5 are congested each day by workers who have little choice but to spend long hours on the road commuting to jobs in the Washington area.
- The sprawl development pattern of the region also makes use of mass transit difficult. Continuation of current development patterns will only serve to exacerbate the problem and will result in less than 25 percent of residents having reasonable access to transit by walking or driving.

Impacts of Commuting Patterns

- The projected surge in new households in the study area's southern counties—with the preponderance of jobs locating in the northern counties and Washington, D.C.—will cause the commuting pattern to worsen. By 2020, the number of vehicle trips—mostly rush hour commuters—crossing the Prince George's/Charles County line from Southern Maryland is projected to increase nearly four times from 205,000 to 780,000 trips each day.

Impacts of Current Trends

- Virtually every signalized intersection on U.S. 301 will gridlock by 2020.
- An additional 230,000 acres of land will be developed by 2020, impacting forests and farmland.
- Scattered, low-density development will place added pressure on the region's environmental resources, including the Chesapeake Bay, through increased nutrient runoff and other secondary environmental impacts.
- The number of accidents on U.S. 301 is projected to more than triple by 2020.
- Commuting times will continue to increase.
- A "transportation meltdown" will develop, harming the region's environmental resources, economy, and quality of life.

A slightly different example of the identification of problems is from the Ohio River MIS in the Louisville, Kentucky, and Southern Indiana area. Here, the issues revolved around the interests of cross-river travel, economic development, preserving mobility in the center city area, and preserving natural and constructed environments. The problem statement was articulated at three levels:

- A detailed level, documenting all the facts of existing and projected conditions. The detailed documentation was approximately 50 pages and was included in an appendix to the corridor study report.
- A summary level, consisting of a synopsis of the full problem statement. This was several pages and was included in the body of the corridor study report.

- A public presentation level, representing a simple list of bullet points that was kept consistently visible at most public meetings and committee meetings. Findings from the analysis of alternatives were always related back to this list to show the connection.

This three-level structure allowed for participants to reference the detail, while keeping the public information very simple. Economic development was a major issue in the study, and was treated as a project need by identifying stated objectives in local government comprehensive plans. Exhibit 3-4 shows the problems as developed with and presented to the public.

The third example is from the West Corridor study in the Denver Region. This corridor study had a transit-oriented focus. The statements were framed not so much as characterizations of the problems but as issues or objectives that needed to be addressed as alternatives were being examined. Problems are implied in many of the issue statements. Exhibit 3-5 lists the priority issues.

Exhibit 3-4.

Problems Identified in the Ohio River Major Investment Study

- Current traffic congestion and delay during commuting hours at ramp merge and diverge areas in Spaghetti Junction. The delays negatively impact all traffic, including commuters, buses, trucks, shoppers, visitors, etc.
- Delays during commuting hours on the Clark Bridge southbound in the AM peak period and on the northbound approaches to the bridge in the PM peak period, due to constraints at signalized intersections in downtown Louisville.
- Delays to commercial vehicle traffic crossing the river.
- Accident rates more than double the typical average on interstate highways and ramps on I-65, I-64, and I-71 near the downtown area.
- Traffic accidents and incidents, including infrequent hazardous materials incidents that periodically close lanes on Ohio River bridges or ramps leading to the bridges, causing major access problems.
- Difficulty for access by emergency vehicles to service incidents on the Kennedy Bridge due to geometric limitations on each side of the bridge.
- Traffic volume growth on I-65 that is likely to exceed the capacity of the Kennedy Bridge shortly after year 2000.
- Current non-attainment for ozone in the study area and need to minimize creating carbon monoxide hotspots.
- Economic costs incurred from excess delay (both normal delays and delays due to traffic incidents) and excessive numbers of accidents occurring on roadways in the vicinity of the Kennedy Bridge.
- Need for the transportation system to support various regional economic development objectives.

Exhibit 3-5.**List of Priority Issues from the West Corridor Study in the Denver Region****Finance and Economics**

- Will enough ridership be generated to contribute substantially to financial cost of system?
- What is financial impact on governments, businesses and residents in study area?
- How should the impact of maintenance costs be addressed?

Convenience and Access

- Need for access to downtown and better travel within the corridor
- Resolve north-south travel problems in the corridor
- Improve commuter travel to major activity centers besides downtown
- Provide convenient service to residents and businesses in corridor

Residential Impacts

- Enhancing neighborhood character
- Halting the decline and decay of residential neighborhoods
- Avoiding barriers to neighborhood access and movement
- Reducing the speed of transit through residential neighborhoods
- Providing transit that is friendly, fun (like the trolley), graffiti free, pleasingly landscaped areas, and pretty

Business impacts

- Getting customers to businesses
- Providing for movement of goods
- Improving aesthetic qualities around businesses
- Improving pedestrian access
- Increasing property values
- Halting the decline and decay of business neighborhoods
- Supporting existing businesses
- Enhancing economic opportunities for future businesses

Safety

- Making sure public safety is addressed for children, women, and the elderly
- Improving sidewalk connections in the neighborhood
- Providing transit convenience and reliability in bad weather
- Scheduling West Corridor transit to meet transit on cross-town routes
- Serving the “reverse commute”

Environment and Open Space

- Preservation of the previous public investments in parks such as Sanchez, Rude, and Lakewood/Dry Gulch Parks

Balance Regional and Local Needs

- Need for better transportation linkages throughout the corridor
- Improvement of travel between suburbs
- Sharing costs regionally to provide connections to the Central Platte Valley

3.3.4. Considerations in the Identification of Problems

Based on the lessons learned from practitioners and on a review of problem statements in actual studies, the following general principles can be stated regarding definition of problems for a corridor study.

- **Problems should not be framed in terms of a solution.** Certain types of solutions may strongly address certain types of problems, but the solutions should not be identified in the problem statement (examples: “need for additional capacity on facility x” or “need for additional transit service” both state the problem in terms of a solution).
- **Problems should not only include current, known problems, but anticipated future problems.** Background work may need to be done to convince elected officials and the public that the future problems will actually occur.
- **Problems should be stated as specifically as possible.** This should include times, days, and locations of occurrence. This will help in the identification of causes and of possible solutions.
- **Problems should be stated in a way that is understandable to the public and elected officials.** Much of the decision-making will hinge on the extent to which elected officials and the public understand how alternatives address the identified problems. If they do not understand the problems, they will have difficulty evaluating the alternatives.
- **Problems should be identified in a way that they can be related to the alternatives (i.e., should be able to answer the question “did an alternative address one or more problems and to what degree?”).**
- **Agencies should seek to obtain as much agreement on the problems as possible, early in the study.** For controversial studies, approval of the problem statement by the policy committee and by agencies involved in subsequent NEPA reviews is advisable.
- **The problem statement should be documented in a way that is consistent with the intent of NEPA.** In all likelihood, the problem statement can be incorporated into subsequent environmental documentation if it is comprehensive and broadly agreed upon.

In some cases, it may be important to broaden the concept of problems to possibly include non-transportation problems. This may be appropriate when potential solutions could involve addressing environmental or community concerns together with the transportation strategy. For example, fixing a flood-prone park area in conjunction with a transportation improvement may be in the overall interest of the community. Usually, however, these types of problems are brought into the picture later in the process during the formulation of a preferred investment strategy. Creatively finding these opportunities to partner with the community can sometimes help to avoid protracted battles that can be even more costly. However, introducing these types of problems too early could misdirect the study and create false expectations of what a transportation project might bring to the community.

3.4. Issues in Designing the Corridor Study Strategy

3.4.1. Corridor Study Need, Timing, and the Metropolitan Transportation Plan

Agencies tend to have different views on how to address the need to define improvements for the financially constrained MTP. Clearly, the better the definition that can be given to future improvements in the MTP, the better the MTP will be. The MTP is also critical to establishing approaches for attainment of air quality goals and conformity to the State Implementation Plan for air quality. But improvements included in the MTP are usually defined in a variety of ways, for example

- Projects or policies from the results of corridor planning studies.
- Projects or policies from the results of system planning studies.
- Projects or policies that have had no analysis specific to that project or policy but are included in the MTP because they are viewed to be beneficial to air quality, mobility, land use, or other goals.
- Projects or policies that represent the best current judgment of agencies responsible for those facilities or areas. These can represent the assumed improvements in accordance with 23 CFR 450.322(8).

It is possible that “best current judgment” could be the preferred method by many agencies for identifying improvements that are in the “out years” of the MTP. Ideally, this should be the collaborative work of multiple agencies, rather than the determination of a single agency. The use of best current judgment tends to minimize the planning resources invested in the out years, allowing agencies to invest their planning resources on corridors that are in greater need and/or closer to having projects that can move forward into implementation. Some agencies suggest that studies should not be conducted where improvements may be 10 or more years out.

On the other hand, studies that potentially could consider improvements that have long lead times may look farther into the future. Major anticipated investments in rail systems or freeway systems could require a study that focuses more on the long term. Another benefit of addressing long-term decisions is that other planning (e.g., for land use) can take place in light of the eventual presence of such a facility in that corridor. The methods for incorporating projects and policies into the MTP will largely be a matter of the philosophy of agencies in the region and how much emphasis they believe should be placed on early planning. There is no single right answer. Whether improvements in the MTP are generated through studies or through best current judgment, all the improvements in the MTP are usually analyzed at a system level (the analysis is required in non-attainment areas) out to the MTP’s horizon year.

3.4.2. Corridor Study Need, Timing, and the NEPA Process

NEPA established processes for considering the environmental impacts of actions involving Federal funds, including transportation actions. Some agencies argue that virtually all corridor transportation decisions should be made within the umbrella of the formal NEPA process. Others have been able to use corridor planning studies outside the NEPA process rather effectively. But before dealing with decisions of whether and when to initiate a corridor study, it is important to have an understanding of NEPA in the context of transportation planning. For the purposes of this discussion, a corridor planning study conducted outside the NEPA umbrella will be referred to as a “pre-NEPA corridor study.” But it is important to remember that **planning and project development should be thought of as a seamless, coordinated decision-making process, not as isolated activities.** NEPA was originally crafted with a focus on making decisions that incorporated all the important considerations that should influence the decision at hand. It was not intended merely as a documentation process. This is one of the reasons that TEA-21 has placed such an emphasis on the integration of planning and project development. Together, planning and project development represent a flow of decisions, not independent steps. **This is the reason consideration of the legal requirements of NEPA should be discussed up front, as part of the overall corridor study strategy.**

A brief explanation of the NEPA Classes of Action (EIS, EA, and CE) was provided in the Executive Summary. A decision-making process is inherent in each of those classes of action. An EIS would culminate in a Record of Decision (ROD). An EA would end with a Finding of No Significant Impact (FONSI) or would trigger more in-depth investigation through an EIS. An appropriate determination of a CE requires no further NEPA documentation.

In addition to NEPA, there are also other environmental statutes that come into play. NEPA is a procedural statute. Agencies need to obtain the information, analyze it, and evaluate it. Based on this information, they may then choose whichever alternative is most appropriate as long as it is not arbitrary and capricious. Several other relevant Federal statutes are location determining statutes. They will affect where agencies can locate facilities. The emphasis is on avoiding the impacts. If the impacts cannot be avoided, considerations need to be given to minimizing and/or mitigating them. The primary location determining statutes include Section 4(f) of the DOT Act of 1966, the Endangered Species Act, Section 106 of the National Historic Preservation Act, the Wild and Scenic Rivers Act, and parts of Section 404 of the Clean Water Act (see Chapter 7 for an overview description of these environmental statutes).

The law requires that, under NEPA, agencies must investigate all reasonable alternatives. If a pre-NEPA corridor study has shown that some of the alternatives are not reasonable, eliminating those alternatives should pose no problem if NEPA is addressed later. However, it is generally not a good idea to have only one alternative (other than the no-build) coming into an EIS if a location determining statute could pose a problem to that alternative. If that alternative is covered or impacted by a location determining statute, (e.g., historic sites or parks that are protected by Section 4(f), endangered species, etc.) then an agency’s duty under the law is to look at alternatives to impacting those resources.

In general, there is no reason to believe that alternatives eliminated in a pre-NEPA corridor study will need to be revisited if the following are true:

- The corridor study has taken impacts into account to a level satisfactory under NEPA.
- There has been full public disclosure and input on those impacts, particularly from agencies that will later be involved in the NEPA process.
- The information is confirmed as part of the NEPA record. There is no reason to believe that decisions made within a pre-NEPA corridor study will not be valid in subsequent NEPA documentation if the study is conducted using good planning principles and all reasonable alternatives are analyzed per NEPA requirements.

However, if a pre-NEPA corridor study has not taken one or more of the impacts into account that could have influenced decisions made up to that point, agencies could have a legal duty to look at some of those alternatives again. Whether this is necessary will likely depend on the level of controversy surrounding the selection of alternatives and the extent to which other alternatives are believed to be reasonable. **One of the factors that should be weighed in determining how far to go in the selection of alternatives is the potential public confusion and controversy that could arise from having to re-introduce an alternative that had been previously dismissed.**

There is no reason to believe that alternatives eliminated in a pre-NEPA corridor study will need to be revisited in the NEPA process if the following are true:

- * The corridor study has taken impacts into account to a level satisfactory under NEPA.
- * There has been full public disclosure and input on those impacts.
- * The information is confirmed as part of the NEPA record.

3.4.2.1 A Review of Issues and Approaches Concerning Corridor Studies and the NEPA Process

A primary concern of agencies performing corridor studies is how one can be certain that the work conducted during the pre-NEPA planning stage can be carried forward as valid information within any subsequent decision-making process within NEPA. Some agencies are concerned that the work conducted within the planning studies (e.g., problem identification/purpose and need, alternatives selected) would not be recognized as valid within the NEPA process, requiring work to be repeated

and, of greater concern, causing decisions to be revisited. On the other hand, conducting a corridor study with full NEPA documentation may be viewed as “overkill” or premature for the planning-level decision to be made, particularly in cases where actual construction could be many years in the future.

In addressing this issue, two observations should be made:

- One can never have complete certainty that decisions will not need to be revisited, nor that additional analysis will not need to be conducted, even within the NEPA process. The revisiting of even those decisions made within the NEPA process is more common than most people realize. Certain circumstances may lead to revisiting decisions, such as a change in the political environment, changes in knowledge concerning an environmental issue, changes in environmental requirements, unforeseen changes in growth projections or traffic conditions, or changes in funding availability or project priority, to name a few. In addition, a failure to conduct a fair and open evaluation in the NEPA process can be a cause of revisiting a decision. In other words, going through the NEPA process is not a guarantee of a bulletproof decision. **The best defense against unnecessary revisiting of decisions is good planning and consensus building, whether within or outside the formal NEPA process.**
- The extent to which information contained in a pre-NEPA corridor study can be carried forward as valid in a subsequent NEPA document is unclear and may vary among institutional and legal settings. It would seem logical, for example, that a good planning treatment of the problem or the “purpose and need for action” in a corridor study (with all the necessary stakeholders involved) should be perfectly acceptable as establishing the purpose and need under NEPA. It would seem logical that this material could be incorporated directly or by reference, if properly prepared with full disclosure and input.

The best defense against unnecessary revisiting of decisions is good planning and consensus building, whether within or outside the formal NEPA process.

To develop improved approaches to making decisions on major transportation investments, one should view the NEPA process as much broader than just the preparation of a NEPA document. If one looks at the intent of NEPA, it embodies most of the same principles incorporated into the intent of a corridor planning study: appropriate level of detail for the decision being made, full inclusion of stakeholders, and so forth. In effect, one should take a

broader view of the NEPA process as beginning well before the initiation of a NEPA document. One needs to be building a foundation for good corridor decisions that can stand the test of time early within the planning stage, not just when the formal NEPA process starts.

3.4.2.2 Alternative Approaches Connecting Corridor/ Planning Studies with NEPA

Although there are no guarantees in the NEPA process itself, some agencies may believe that there is less likelihood of a challenge to decisions if there is a stronger, clearer connection between a corridor planning study and the NEPA process. Agencies may be concerned that major infrastructure decisions made outside the NEPA umbrella will be more easily invalidated. Other agencies may contend that a thorough, objective corridor decision-making process conducted outside the formal NEPA umbrella should be viewed as having the same validity as an identical process conducted with a formal connection to NEPA.

There are several choices of NEPA involvement available to agencies, the selection of which would depend on their views of the above two perspectives. Exhibit 3-6 summarizes these alternative choices, including mechanisms for making a stronger corridor study/NEPA connection. The alternatives are not presented in any order of preference. Agencies participating in the initiation phase of a corridor study will need to identify the most appropriate approach for their given conditions.

Because many agency staff may not be familiar with the specifics of some of the NEPA options, the following discussion is included to provide additional detail. The advantages, disadvantages, and circumstances surrounding each approach listed in Exhibit 3-6 are amplified further below. A section is also included on the subject of corridor preservation.

Approach 1. Make corridor improvement decisions only within the formal NEPA process. Some agencies would argue that they should make corridor decisions only within the formal NEPA umbrella. The basis for such an opinion is typically that the elimination and selection of alternatives is most defensible when conducted within the formal NEPA process. It would be argued that planning-level decisions to be reflected in the transportation plan and other planning documents could be made using other planning techniques (e.g., best current judgment, as discussed earlier in this chapter). Although this may be a valid argument for some agencies in some circumstances, there are also reasons not to conduct a corridor study under NEPA, such as

- When early planning is important, but the time is not right for entering the formal NEPA process. Transportation decisions in some corridors may be important but there could be a time lag between the planning decision and when project development would be initiated.
- When multiple projects could result from a planning study, each of which could require its own environmental documentation, with its own timing.

Exhibit 3-6.

Summary of Choices for Connecting Corridor Planning with the NEPA Process

Approach	Advantages	Disadvantages	Conditions in Which it May Be Most Appropriate
1. Make Corridor Improvement Decisions Only Within the Formal NEPA Process.	Decisions are made under the NEPA umbrella. Likely to generate resource agency attention. Process is usually well understood; less chance of confusion.	Requires Federal signatures, less local autonomy than if done outside of NEPA. Document has a 3-year shelf life. Must be prepared to keep moving.	When agencies expect projects will keep moving through project development and construction (i.e., document is unlikely to lapse).
2. Conduct a Tiered EIS. Tier 1 conducted for design concept and scope decisions (or possibly right-of-way protection), Tier 2 for project development decisions.	Decisions are made under the NEPA umbrella. Likely to generate resource agency attention. Federal signature on Tier 1 reinforces design concept and scope decision. Amount of information in each tier can be tailored to needs.	Requires education of resource agencies and public as to objectives of study. Could confuse public if not properly explained. Requires two draft and final EISs.	Where Federal buyoff on design concept and scope helps cement decision. When significant time lag is expected between planning decision and project development. When corridor protection is an issue.
3. Prepare less detailed (than normally expected) Draft EIS for the design concept and scope decision, with	Likely to generate resource agency attention. Provides flexibility on level of detail for Draft EIS. Provides flexibility in whether to move ahead	Resource agencies may expect more detail than Draft EIS is intended to provide. Some education needed.	When agencies are not sure whether there will be a time lag between planning decision and project development. When Federal

Approach	Advantages	Disadvantages	Conditions in Which It May Be Most Appropriate
expectation of a Supplemental Draft EIS or new Draft EIS for project development decisions.	immediately into project development or wait.		involvement in Draft (not necessarily buyoff) is viewed to be a plus.
4. Initiate NEPA scoping process to begin the corridor study, but do not prepare draft and final NEPA documents until later, when project development begins.	Allows corridor study to take place within the umbrella of NEPA. Does not require Federal signatures until project development. Planning decisions made locally.	Resource agencies may be unclear about their role and obligations in this approach. Responsibilities and expectations of all parties would need to be clearly understood and explained.	When there is a concern about making decisions outside NEPA umbrella, but it is viewed to be premature to initiate NEPA documentation.
5. Conduct corridor study outside formal NEPA process. Follow with NEPA documentation at appropriate time.	Provides greatest local flexibility. If study is conducted well, most information can usually be confirmed and incorporated into NEPA record. Have the option to initiate EIS/EA when appropriate, or “spin off” projects to EIS/EA even in middle of study.	Resource agencies may take study less seriously. Heightens possibility of revisiting decisions if study eliminates certain alternatives outside NEPA umbrella.	When a multi-corridor study is appropriate, with expectation of multiple recommended projects. When significant time lag is expected between planning decision and project development.

It is important to note that NEPA corridor studies can be conducted as EAs or as EISs. The determining factor is the extent to which significant impacts are expected. If impacts are not expected to be significant, an EA is the preferred NEPA option. If significant impacts are expected, an EIS is prepared. Transportation agencies almost always prefer to file EAs, whenever possible. Typically, many agencies use EAs for lane addition projects, particularly when widening in the median. New alignments or major widenings with substantial new right-of-way acquisition typically require EISs. One of the benefits of an EA is the processing time following completion. EAs can be processed in as little as several weeks, while EISs can require many months. One consideration in a NEPA corridor study is to begin the study as an EA and to transition to an EIS at the point where the potential significance of impacts can be confirmed. This is consistent with the intent of the EA in NEPA, as a means to determine the significance of impacts when the significance is initially unclear.

One advantage of conducting a corridor study under the NEPA umbrella is that it is more likely to gain the attention of resource agencies, whereas these agencies are sometimes inclined to ignore pre-NEPA corridor studies or treat them with much lower priority. The risk of a pre-NEPA corridor study (especially on those

Usually there are ways to obtain the feedback of resource agencies for a planning-level study conducted outside the NEPA process.

decisions that have greater impacts or are more controversial) generally lies in not obtaining early, meaningful input from resource and regulatory agencies. The risk tends to increase with more controversial projects. A “but you were notified” may not suffice in court where a significant impact was not addressed, even though a resource agency had an opportunity to make it known but failed to do so until the formal NEPA process was entered. It should also be said, however, that usually there are ways to obtain the feedback of resource agencies for a planning-level study conducted outside the NEPA process. Agencies need to be proactive in pursuing those opportunities. These approaches are discussed in Chapter 5.

Approach 2. A tiered EIS. Section 40 CFR Parts 1500-1508 address the concept of tiering an EIS. Part 1508.28 states

“Tiering’ refers to the coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basinwide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. Tiering is appropriate when the sequence of statements or analyses is

- (a) From a program, plan, or policy environmental impact statement to a program, plan, or policy statement or analysis of lesser scope or to a site-specific statement or analyses.
- (b) From an environmental impact statement on a specific action at an early stage (such as need and site selection) to a supplement (which is preferred) or a subsequent statement or analysis at a later stage (such as environmental mitigation).”

“Tiering in such cases is appropriate when it helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe.”

On one hand, a tiered EIS would seem to be tailor-made for bridging between the planning decision and specific project development requirements. On the other hand, agencies have been reluctant to use tiering. It has been most often applied to programmatic actions (such as broad Federal policy), and not to staged decisions in individual corridors. The State of California has used tiering as a method of reserving right-of-way. Some of the advantages and disadvantages of tiering include

- It requires a full draft and final EIS for each tier, with signatures by the responsible Federal agency (ies), implying more work, greater scrutiny, and the introduction of Federal approval (for the Final) into the local decision-making process. In practice, however, the only necessary difference between a pre-NEPA corridor study and a tiered EIS would be the need for Federal signatures. If an agency believes that operating under the NEPA umbrella will help protect the validity of a planning decision, greater scrutiny and Federal signatures should be viewed as an advantage. However, the schedule will be extended due to Federal review.
- Because of Federal involvement in a tiered EIS, there is concern that the cost and time required to complete the process would be extended. If handled properly, however, the cost and time do not necessarily need to be significantly greater than in a pre-NEPA corridor study. The scoping process for the EIS can be handled virtually identically to the corridor study initiation phase, except that a NEPA Notice of Intent would be filed for the EIS. The comment and response requirements are more stringent for a tiered EIS than for a pre-NEPA corridor study, but this should also be an advantage for a more controversial action.

- Because tiering is not used very often, there is a concern that the expectations of level of detail would be similar to that expected for a traditional EIS. The solution to this problem is essentially a matter of setting the appropriate expectations in the beginning. Federal regulations provide adequate grounds for a lesser level of detail in a tiered EIS, tailored to the issues that are ripe for consideration. Making a planning-level decision clearly can fall into this category.

Essentially, the decision to use the tiering approach rests on the tradeoffs one wishes to make between potential cost and time requirements (which do not need to be significantly greater than a pre-NEPA corridor study) versus the “security” of having decisions made under the recognized umbrella of NEPA. Because this approach has not been used frequently, there would also need to be an educational process and documentation of how tiering was intended to work and why it was being used. This education would likely need to be extended to resource agencies that have come to expect certain levels of detail from an EIS. One of the major advantages of a tiered EIS is that it would virtually ensure the review of resource agencies, whereas these agencies are sometimes inclined to ignore pre-NEPA corridor studies or treat them with much lower priority.

Approach 3. Prepare corridor study as a less detailed Draft EIS for the design concept and scope decision, with expectation of a Supplemental Draft EIS or new Draft EIS for project development decisions (e.g., alignments, transit stations, interchange configurations, etc.). This is essentially a traditional NEPA approach, but with reduced pressure to prepare the Draft EIS at the level of detail traditionally expected of an EIS (at least the type of EIS normally envisioned by FHWA—the FTA Alternatives Analysis/Draft EIS [AA/DEIS] was often prepared with less environmental detail). Again, the level of detail would be commensurate with what is required to make a decision on design concept and scope. However, a supplemental draft may be required (depending on changes in circumstances that have occurred) if the draft has not become final within a period of three years of the Draft EIS circulation. Agencies need to accept this if they expect a time lag between the decision on design concept and scope and subsequent project development activity.

The potential advantage of this approach is that the Draft EIS could be prepared at a substantially lower level of detail and more rapidly than the traditional FHWA EIS, saving time and money, while allowing the agencies to arrive at a decision on design concept and scope. This is essentially the process followed in the AA/DEIS process established by the FTA in the 1970s. The AA/DEIS was typically less detailed in the environmental analysis at the DEIS stage than the corresponding FHWA process. However, it was often accepted that a supplemental draft would be needed to provide additional environmental detail once agency commitments were in place based on the decisions on design concept and scope resulting from the AA/DEIS.

One of the disadvantages of this approach, particularly from the perspective of those agencies involved primarily in highway improvements, is the acceptance of a supplemental draft EIS (or a new draft EIS) as an expected part of the process. Often, from the state DOT perspective, supplemental EISs are looked upon as a failure to execute the draft properly. However, if it is desired that the design concept and scope decision be made at an early stage, with the likelihood of a significant time lag before project development is initiated, a supplemental draft should not be looked upon as a failure but as part of the integrated planning and project development strategy.

Approach 4. Initiate NEPA scoping process to begin the corridor study, but do not prepare draft and final NEPA documents until later, when project development begins. In this approach, the lead agency would initiate the study with a NEPA Notice of Intent (NOI) and a scoping process. Agencies may wish to consider this approach when they are concerned about the validity of decisions made outside the formal NEPA umbrella, but view initiation of NEPA documentation to be premature. It may appear to be an attractive middle ground between initiating the NEPA process in the traditional sense (i.e., with full documentation, as in Approach 1) and making decisions outside

the formal NEPA process (as in a pre-NEPA corridor study described in Approach 5). It also could have the advantage of obligating resource agencies to become more involved in the process. In reality, this approach could create some confusion, unless it was carefully explained and consistently applied. For example, participants, particularly resource agencies, may have certain expectations of what should occur based on their traditional experience with NEPA. These agencies may not participate in the intended way if they do not see traditional NEPA documentation forthcoming. This approach could also have the inadvertent effect of agencies taking other more traditional NEPA processes less seriously, because the understanding of the meaning of the Notice of Intent would become less clear. Thus, careful explanation of the approach is needed, including consultation with agencies even prior to issuing the NOI.

Approach 5. Conduct a pre-NEPA corridor study with the expectation that it will be valid in the formal NEPA process. This approach would conduct a corridor study without any formal involvement of the NEPA process. **However, in light of the fact that planning and project development should be seen as a continuum of decision-making, this type of corridor study should always be conducted with an understanding of how NEPA may come into play at a later time.** Staff involved in project development should have input into the corridor study strategy to ensure as smooth a transition as possible. Good planning practices applied at this stage will make the execution of the NEPA process more effective and usually much easier.

In Approach 5, it should be recognized that it may be appropriate to initiate the NEPA process at some point within a pre-NEPA corridor study or to “spin-off” one or more project development initiatives, if the timing is right. There is substantial flexibility in when and how to transition to or incorporate NEPA, but no hard-and-fast rules. Participants need to exercise their judgment based on the circumstances of the situation.

It is interesting to note that there is essentially no difference in the way that a corridor study would be conducted under any of the five options discussed above. In all cases, the level of environmental detail would be determined based on what was necessary to make a decision.

The corridor study philosophy of collaborative decision-making and tailoring of study detail to the decision at hand reinforces the original concept of NEPA. Part 1500.1 of 40 CFR states: “Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.” This idea is often overlooked in many NEPA documents. Unfortunately, “defensive planning” has tended to increase the level of analysis and detail beyond what may have been originally envisioned in NEPA regulations. This is a possible advantage of the pre-NEPA corridor study in that it can help agencies step away from the NEPA “tradition” to tailor the level of detail to the issues being addressed. However, the problem of too much detail could also be addressed through better execution of NEPA as it was originally intended.

One of the reasons sometimes given for initiating the formal NEPA process is the need to gain the attention of the resource and permitting agencies. However, measures can be taken to ascertain the views of resource agencies without being within the NEPA umbrella. This may be more difficult and may take more initiative than if the work is being conducted within the NEPA umbrella, but it is still possible. Strategies for resource agency involvement are discussed in Chapter 5. As noted earlier, **if the pre-NEPA corridor study is performed in a way that is consistent with NEPA intent, and if this can be demonstrated through the documentation of the study process, then there should be little reason that collaborative decisions made during these studies would be invalidated in the NEPA process, unless new information is subsequently uncovered affecting the decision.**

3.4.2.3. Corridor Preservation

Another aspect of the decision of when to initiate a corridor study has to do with the preservation of right-of-way for potential transportation facilities. A study could be initiated just to define a corridor that could accommodate transportation facilities or services, so that options for future use of the corridor for transportation purposes could be kept open. But there are many dimensions to corridor preservation that need to be understood.

The document *Corridor Preservation: Study of Legal and Institutional Barriers* (Mandelker and Blesser for FHWA Office of Real Estate Services) describes several approaches to corridor preservation. The following paragraphs are adapted from several sections of that document.

Corridor preservation can be applied early in the identification of a transportation corridor to

- Prevent inconsistent development.
- Minimize or avoid environmental, social, and economic impacts.
- Prevent the foreclosure of desirable location options.
- Allow for orderly assessment of impacts.
- Permit orderly project development
- Reduce costs.

The AASHTO Task Force on Corridor Preservation defines corridor preservation as

“a concept utilizing the coordinated application of various measures to obtain control of or otherwise protect the right-of-way for a planned transportation facility.”

Corridor preservation is one of the elements in both the state and metropolitan transportation planning processes. Statutory provisions require MPOs and states to “consider” in their planning process

“preservation of rights-of-way for construction of future transportation projects, including identification of unused rights-of-way which may be needed for future transportation corridors and identification of those corridors for which action is most needed to prevent destruction or loss.”

Early land acquisition may not be possible if there is no formal commitment to a corridor alignment through a plan designation. Right-of-way acquisition generally requires a ROD, FONSI, or CE, exceptions being protective buys and hardship acquisitions. Some state corridor preservation statutes also require a corridor to be shown on a state or local comprehensive plan as a condition to using corridor preservation techniques, such as official maps. Other corridor preservation techniques, such as zoning, may still be useful, and there may also be opportunities for corridor preservation through voluntary cooperation with developers and landowners. Thus, **outright land acquisition by a transportation agency is not the only method of corridor preservation**. But for all methods, corridor planning and environmental studies will often still be important, particularly for new corridors.

When establishing a future footprint, agencies should consider what could occur beyond the normal planning horizon.

The level of detail needed to support corridor preservation will vary depending on the technique employed. Actual land acquisition of key parcels by a transportation agency will require a greater level of detail and more engineering. Voluntary cooperation with developers and landowners usually requires less

detail. But even here, decisions at the level of design concept and scope are usually needed. The Illinois Department of Transportation used a process called the “Strategic Regional Arterial Program.” These involved long-range planning studies along arterial corridors, one of the purposes of which was to establish the ultimate “footprint” of the roadway. This allowed developers to voluntarily plan around the footprint, hopefully reducing the cost of future right-of-way acquisition and minimizing the future disruption of businesses. Although corridor studies usually involve

facilities of higher classification, the concept of establishing a footprint for the chosen alternative could be equally valid. When establishing a future footprint for facilities in a corridor, agencies should consider what could occur beyond the normal planning horizon.

Plans should contain two other elements to reinforce corridor preservation. One is an intergovernmental coordination element that indicates the intergovernmental strategies needed to carry out corridor preservation. Intergovernmental coordination is essential because a state transportation agency cannot carry out corridor preservation on its own. Local governments exercise the land use planning and development control powers that often are critical to the success of corridor preservation. State transportation agencies do not have these powers. If they are given permit authority over development in transportation corridors, the exercise of this authority must be carefully integrated with local government planning and land use regulation. Some state planning legislation requires the inclusion of intergovernmental coordination elements in state and local plans.

It is possible that a tiered NEPA process could be employed in corridor preservation. A tier 1 EIS would be employed to identify the specific dimensions of the corridor, setting the stage for acquisition of key parcels. The State of California has sometimes used the tiered EIS as a method for reserving right-of-way. A recent example is State Route 58 in the Bakersfield area. A 300-ft wide corridor is being preserved without the specification of mode, with the environmental analysis conducted based on the most potentially impacting scenario (an eight-lane freeway). But the corridor is being preserved with multimodal options remaining to be resolved in the tier 2 EIS. Experience with this approach indicates that agencies must be clear in what they intend to accomplish with tiering, and what are the implications of those decisions. The public and elected officials can become confused over the purposes of the two tiers, and this can lead to other difficulties in planning and project development.

Agencies must be clear in what they intend to accomplish with tiering, and what are the implications of those decisions.

The voluntary approach of right-of-way preservation mentioned earlier is the preferred solution, because it does not require transportation agency funding, leaves the land in the tax base for a longer period, and is administratively and legally less cumbersome. However, conditions must be right for this method to work. All the methods assume that the corridor to be reserved can be defined with some certainty. It is in the definition of the corridor that the corridor study can play a role. Land acquisition that is directed toward an eventual Federally funded project will require NEPA involvement. This could include any of the methods listed in the prior section, including tiered or non-tiered EISs.

3.4.3. Multi-Corridor and System Planning Approaches to Corridor Investment Decisions

Up to this point, corridor planning studies have been discussed in the context of single corridor or single subarea activities. However, there are approaches to corridor decision-making that take a broader view than a single corridor. The sections below provide some examples.

3.4.3.1. Regionwide or Multi-Corridor Planning Studies

In some cases, a major, coordinated effort can be undertaken to address both individual corridor planning and system planning at the same time. For example, the Bakersfield, California, region completed its “Major Transportation Investment Strategy” (MTIS) in 1997. This was an extensive effort to examine major transportation investment needs to the year 2020. It was not conducted as part of the development of the MTP per se, but was a significant input to the next update of the MTP. The study involved corridor-specific analysis as well as system-level analysis. The report describes the background behind the MTIS:

“... six local, regional, and state agencies teamed together to develop a transportation strategy for Metropolitan Bakersfield, known as the Major Transportation Investment Strategy (MTIS). By means of an extensive analysis of travel in the area and through consensus building in the community, the MTIS determined the future transportation needs of Metropolitan Bakersfield. The analysis included an examination of traffic patterns, and the identification of existing and potential sources of revenue. With the ongoing participation of community groups and the public, the agencies then developed a strategy for implementing those projects that would be most effective in eliminating congestion and identified those that would benefit the Metropolitan Area as a whole.”

The MTIS was the most significant process of its kind for determining transportation solutions in Bakersfield. The agencies developed an Action Plan to guide the implementation of recommended elements and accommodate needed annual updates for the phased implementation of the recommended elements. It is anticipated that many of the projects will flow directly from the MTIS to project development (after incorporation in the MTP and TIP). This approach was developed in collaboration with FHWA and FTA. It represented a relatively large planning investment for that area (approximately \$1.8 million), but with the expectation that individual pre-NEPA corridor studies will not need to be conducted.

3.4.3.2. Corridor-Specific Analysis in the MTP

Another approach to coordinating individual corridor planning with system planning is to address individual corridor issues at a broad-brush level as part of the analyses for an MTP update. This approach has not been widely used, as it requires a greater amount of analysis, well beyond what is normally invested in the development of the MTP. However, with the proper regional environmental data sets in place, the process is made much easier.

For example, the Southern California Association of Governments (SCAG) incorporated an approach to corridor-level environmental screening in their 1998 Regional Transportation Plan (RTP). The approach was implemented in the form of a “Master Environmental Impact Report (MEIR),” prepared pursuant to the California Environmental Quality Act (CEQA). Although other states may not have state environmental legislation of the scope of CEQA, the approach is equally applicable to the development of MTPs in any other region. As stated in the MEIR

“One of the Regional Transportation Plan’s main goals is to increase efficiencies and maintain the SCAG Region’s economic competitiveness. The time required and the cost incurred by project proponents to prepare environmental analysis and obtain environmental clearance are often an impediment to this goal attainment. With the Draft RTP MEIR, SCAG is implementing a way to save Caltrans, other public agencies, and private proponents of projects some of the time and money which they must currently spend on the environmental documentation to comply with CEQA and NEPA requirements.”

The basic idea behind the SCAG approach is to use the MEIR as a “first tier” analysis according to the provisions of tiering in CEQA and NEPA. This can then be incorporated by reference in project-specific Environmental Impact Reports and EISs. The MEIR included both systemwide (regional) impact analysis and project-by-project impact analysis. Most MTPs undergo regional-level analysis. The innovation in the SCAG case is the handling of project-level analysis. Using the SCAG Geographic Information System (GIS), each transportation project in the list of RTP projects was overlaid on a coverage map of each of the environmental themes included in the systemwide analysis. Transportation and air quality modeling analyses were not conducted at the project level. The potential impact of each project, level of significance of the impacts, and impact-related comments were documented in a matrix for each environmental theme. The idea was that this information would help to determine the level of evaluation needed in any subsequent corridor-level environmental analysis. Secondly, it provided environmental input into decisions regarding projects

to include in the MTP. To support the environmental analysis, cooperative efforts were undertaken with the U.S. Fish and Wildlife Service, the U.S. Army Corp of Engineers, and other agencies to create the necessary environmental coverage.

Exhibit 3-7 is an example page from the project-level analysis developed by SCAG. Each project was rated against the following criteria: land use compatibility, farmland, open space, surface hydrology, wetlands, habitat/species, flooding, subsidence, noise, seismic hazards, land sliding, soil, cultural resources, and visual resources.

It is important to note that the SCAG tiering approach does not remove responsibility for agencies to conduct a thorough environmental analysis for a corridor-specific study. The results of the MEIR “may be used only if the project proponent finds that the RTP MEIR analysis of cumulative, growth-inducing, and irreversible significant environmental effects is adequate for the subsequent project.” The SCAG approach is most interesting in its incorporation of environmental analyses to make decisions in the RTP without having to extensively invest in corridor-specific transportation and environmental analyses. This creates improved credibility for plan decisions, while controlling corridor-level analysis costs. It also helps to set the stage for consistent corridor-level analysis.

3.4.3.3. Mode-Specific System Planning Studies

On some occasions, it may be appropriate to conduct system planning studies that focus on a single mode of travel. This may be appropriate when the region has made a commitment to develop certain types of systems (for example, a rail system or HOV lane system) or is trying to determine how such a system would work together geographically and operationally. Decisions at a system level obviously have implications at the individual corridor level, and corridor-level decisions could be made for the MTP and for funding. The results of such studies may be key to forging political agreements that would move such systems forward or even as information to support a ballot measure to raise funds for such a system.

An example of a system plan is the Dallas Area Rapid Transit System Plan, shown in Exhibit 3-8. It is, in effect, a vision plan, wherein transit corridors have been identified and prioritized for future implementation. These corridors have been or will be subjected to individual corridor studies to establish and further detail the complete preferred transportation investment strategy in that corridor.

Another example is the Southern California Commuter Rail Plan. The plan was established in the early 1990s, most of which has been implemented. A regional approach was needed to develop the multi-corridor interconnectivity and operating plans to obtain political buy-in and funding agreements among many agencies. The existing and future plans for commuter rail would be accommodated in a corridor study for a corridor in which the system may have an influence.

Exhibit 3-7.

Sample Listing from the Project-Level Environmental Analysis in the SCAG Master Environmental Impact Report for the Regional Transportation Plan

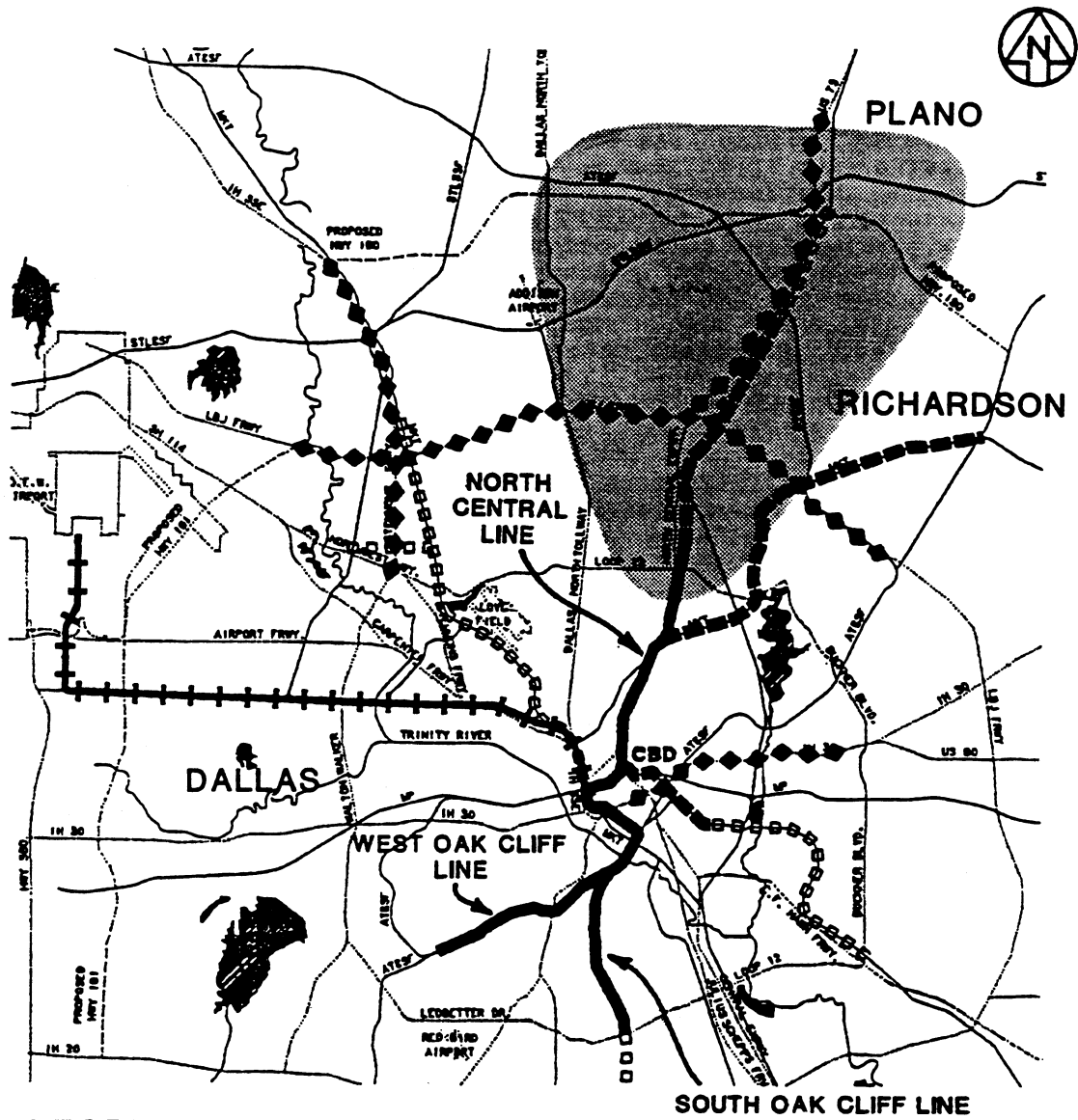
	Urban Rail Blue Line	I-5 Golden State Freeway	Rte. 2 Santa Monica Blvd. Transit Pkwy.	I-5 Golden State Freeway
Project ID	322	132	125	133
From	Downtown L.A./ Union Station	Route 134	Route 405	Route 170
To	Pasadena-Sierra Madre Villa Ave.	Route 170	Moreno Dr.	Route 118
Improvement	Light Rail	HOV Lanes	HOV Lanes	HOV Lanes
RTIP	Yes	Yes	Yes	Yes
<u>Environmental Analysis Issues</u>				
Land use	PS	LS	LS	LS
Farmland	LS	LS	LS	LS
Open space	PS	PS	PS	PS
Surface hydrology	PS	PS	LS	PS
Wetlands				
Habitat/species	LS	PS	LS	PS
Flooding				
Subsidence	LS/I	PS	PS	LS
Noise	LS	LS	LS	LS
Seismic hazards	PS	PS	PS	PS
Landsliding	PS	PS	PS	PS
Soil	LS	LS	LS	LS
Cultural resources	PS	PS	PS	PS
Visual resources	PS	PS	PS	PS

Key: PS = Potentially significant
 LS = Less than significant
 I = Information unavailable
 LS/I = Some information available, less than significant
 PS/I = More information needed, potentially significant

3.5. Developing the Corridor Study Strategy

Decisions on the need for and timing of corridor studies should consider the range of factors discussed above. There is no formula for determining what is best, but the decision should be made collaboratively, with the key agency stakeholders. The first consideration would be whether a study is needed at all. If so, decisions would need to be made on the geographic scope of the study (single corridor versus multi-corridor) and the extent of NEPA involvement.

Exhibit 3-8.
Dallas Area Rapid Transit System Plan



LEGEND

- +—+—+ COMMUTER RAIL LINE
- ◆◆◆◆ HOV TRANSITWAY
- LIGHT RAIL STARTER SYSTEM (1996)
- ■ ■ ■ LIGHT RAIL TRANSIT SYSTEM (1997-2005)
- □ □ □ LIGHT RAIL TRANSIT SYSTEM (POST 2005)

Consideration should be given not to conduct a study if

- The corridor lacks significant transportation problems.
- The corridor improvement strategy is already in place,
- There is instability in the corridor politically, likely inhibiting the ability to develop a consensus on decisions that is likely to last, or
- There is little hope of significant funding for the corridor in the foreseeable future.

Assuming there is reason to proceed with consideration of a corridor study, the following questions should be considered:

- What is the nature of the decision(s) to be made or the objective(s) agencies wish to accomplish? Is it a near-term focus to address a highly visible need expressed by the public? Is it a longer term focus to establish a framework for land use planning, transportation facilities, and funding in the corridor? Is the objective to address system interconnectivity, either geographically or among modes of travel? The answers to these questions will, in large part, be determined by the types of problems being addressed.
- Should this be a part of a broader multi-corridor or regional analysis? If so, consider a coordinated multi-corridor or system planning approach.
- What type of NEPA involvement is appropriate, given the problems and decisions to be made?

Exhibit 3-9 describes a possible study strategy if a multi-corridor or system planning approach is identified as appropriate. The multi-corridor strategy may be appropriate when problems among corridors are intertwined and/or there is a need to emphasize system interconnectivity. Such an approach would almost always be long term and not be conducted under the formal NEPA umbrella. Following the initiation of a multi-corridor study, it may be determined that projects are emerging that can be implemented in the near term. These spin-off projects would then enter the NEPA process (assuming Federal funding was envisioned), be considered in the MTP and TIP, and be environmentally cleared in project development. Other longer term projects developed through the planning process would be considered in the MTP and TIP and enter the NEPA process at an appropriate later date.

Exhibit 3-10 provides a sample “decision tree” for assisting agencies in defining their corridor study/NEPA strategy. This should not be thought of as a set of hard-and-fast rules, but as general guidance based on some of the major factors that could go into the decision. Guidelines in a state or metropolitan area may provide more specific information.

The following points summarize the considerations in Exhibit 3-10:

- **Do all stakeholders agree on solution?** If it is determined that all the affected stakeholders agree on the problems and the solution(s), then the study becomes a relatively simple, straightforward activity of bringing together available data and documenting the decision and rationale. An EIS/EA would be initiated at the appropriate time. Often, these will be EAs. Relatively simple lane additions (e.g., median lane additions) or new alignments with little or no environmental or neighborhood impact would be candidates for this simplified approach.
- **Is a near-term project or projects likely?** In most of these cases, the corridor study would most efficiently be initiated as an EIS or EA. A two-phase process, with a pre-NEPA corridor study followed by an EIS/EA, would add to the time requirements and complexity. Usually, agencies would opt for an EA, where possible. If the impacts were expected to be significant, an EIS would be initiated.

- **Is it agency philosophy to make planning-level decisions under NEPA?** The remainder of the approaches from this point are based on a two-phased process: a first phase for making the planning-level decision and a second phase for project development. How much of the planning-level decision making is done under NEPA is a matter of agency preference. Some agencies may be of the opinion that critical decisions should always be made under the NEPA umbrella. This may be particularly true for controversial decisions, decisions where concurrence by resource agencies is particularly important or decisions where Federal signatures are important. In this case, agencies could use either an EA, draft EIS or tier 1 EIS for the planning-level decision. A hiatus would then occur, followed by a supplemental draft and final EIS or tier 2 EIS (draft and final) in the project development phase. Agencies that are not particularly concerned that planning-level decisions be made under NEPA would use a pre-NEPA corridor study approach.
- **Do near-term projects or spin-off projects emerge part way through the pre-NEPA corridor study process?** Occasionally, a pre-NEPA corridor study may be initiated, during which near-term projects unexpectedly emerge. These projects could require environmental clearance faster than might have been expected when the corridor study was first initiated. These projects can be spun off, with the other portions of the corridor study continuing or the entire corridor study can be transitioned into NEPA. In either case, the work conducted to date for the corridor study would be included as part of the scoping information for the EIS/EA. Possible reasons for initiating the NEPA process part way through include need to get the project cleared as quickly as possible because funding is available, greater involvement is needed from resource agencies, or agencies simply wish to reduce the risk of decisions made in the corridor study not being accepted in the NEPA process (e.g., risk of “reasonable” alternatives being eliminated outside of NEPA). If no near-term projects emerge, the corridor study would be completed as planned.
- **Should the corridor study only narrow down alternatives or select the preferred alternative?** An option available to agencies is to stop the corridor study short of selecting a single preferred alternative or investment strategy by only narrowing down alternatives suitable for moving forward into the NEPA process at a later date. This may be a good strategy where agencies wish to identify a more limited number of alternatives for the MTP, but they are uncomfortable with selecting a preferred alternative without being under the NEPA umbrella. The MPO and partner agencies would need to determine how to reflect the results of this “partial” corridor study in the MTP.

As indicated above, this is one possible way of thinking through the corridor study options in terms of the relationship to NEPA. There are other possible variations, and state and local practice should weigh heavily into the determination.

3.6. Defining Corridor Study Objectives

Once it is determined to move forward with a corridor study, it is important that the participants be clear on the study’s objectives. One way to confirm the objectives is to draft a “**mission statement**” that can guide the process throughout the duration of the study. For example, the following could represent a broadly defined mission statement for a long range corridor planning study:

“The goal of this study is to define a long range multimodal transportation plan and supporting land use plans and policies that will address current and future transportation problems in the corridor, support economic development, protect the environment, and be compatible with the surrounding communities.”

Aside from defining why the study is being conducted, a mission statement can also provide a foundation for some of the primary criteria that should be considered for evaluating alternatives.

Exhibit 3-9. Study Strategy for a Multi-Corridor or System Planning Approach

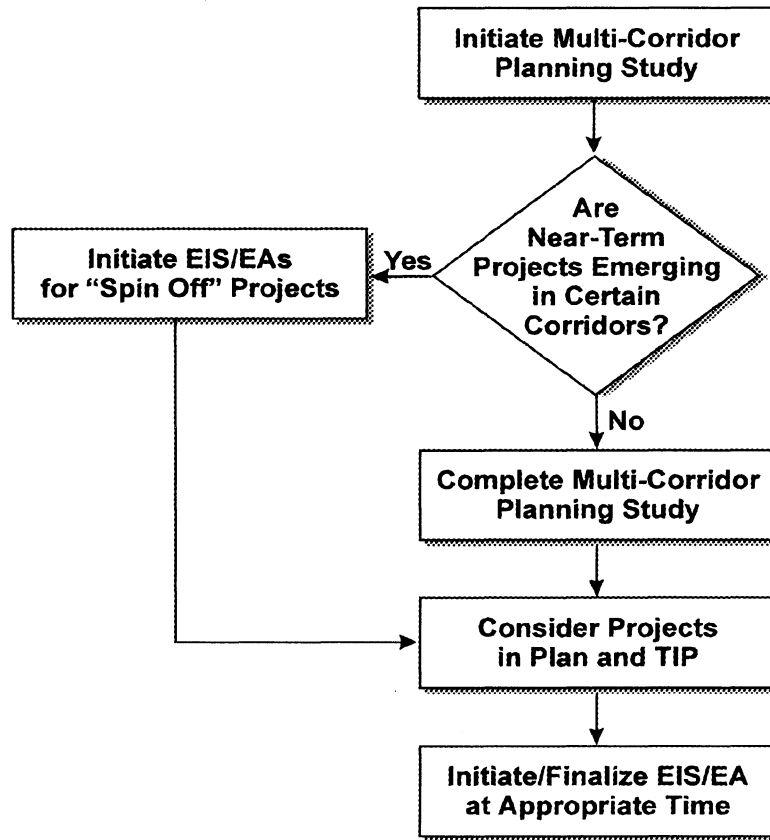
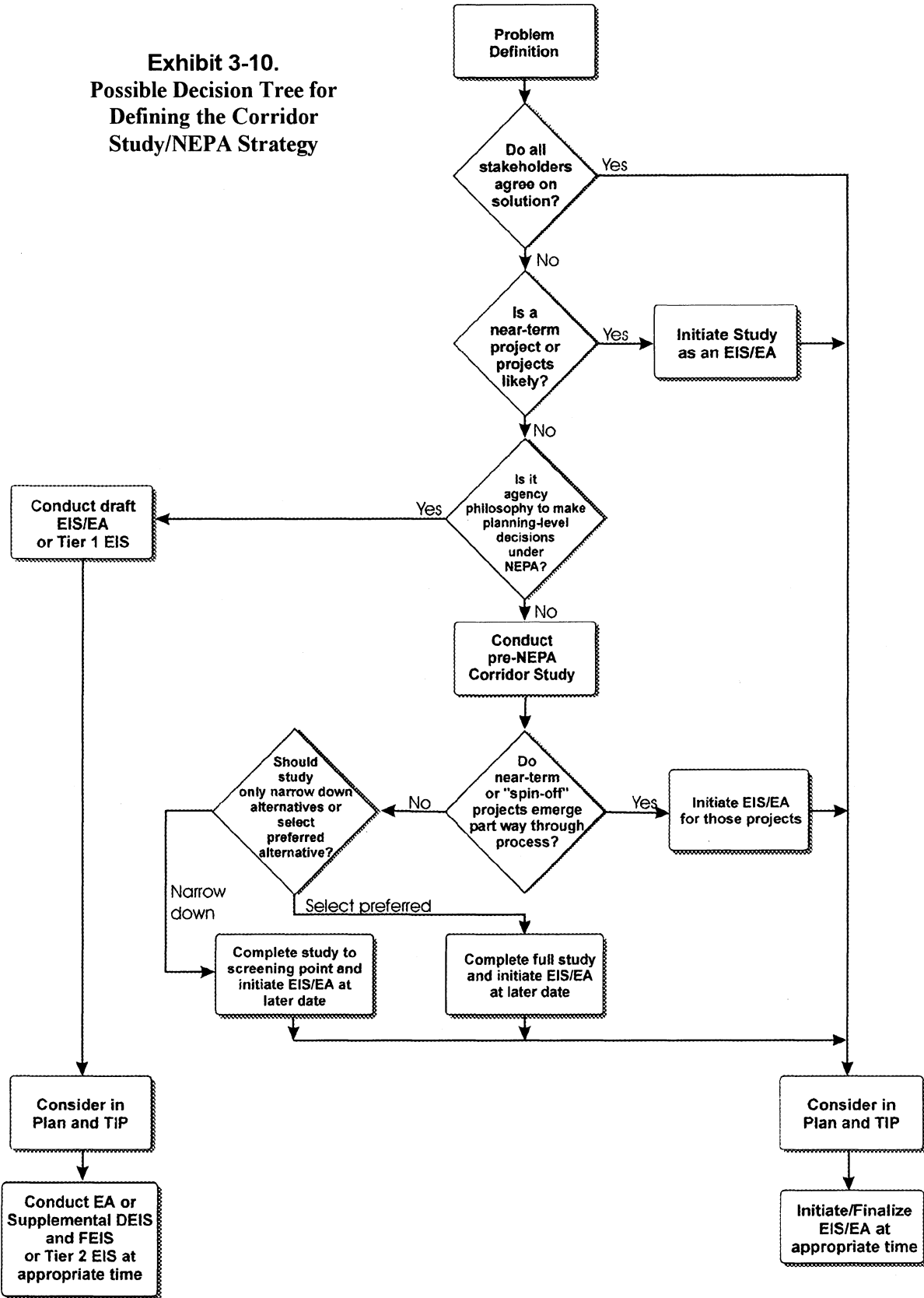


Exhibit 3-10.
Possible Decision Tree for
Defining the Corridor
Study/NEPA Strategy



Study participants may also wish to consider developing an explicit set of goals and objectives for the study. This is commonly done as part of the initiation of a corridor study and can help bring clarity and focus to the study throughout and reminds participants of the “big picture” as they proceed.

3.7. Corridor Prioritization Criteria

All corridors cannot be studied at one time. Planning funds need to be distributed over time. The use of corridor prioritization criteria is one way agencies can systematically make decisions on which corridors to study before others. These criteria would be used to help decision-makers determine when the time is right for a corridor study and the priority with which those studies should be programmed. But the criteria should provide flexibility to deal with the range of situations that tend to arise. Examples of criteria that could be used include

- Total travel demand (e.g., number of trips) in the corridor (existing and future).
- Congestion levels, travel time, and/or delay levels (existing and future—could be quantified in several different ways).
- Importance of the corridor to the regional or state economy.
- Opportunity for improvement (an assessment of the potential for improving mobility, safety, and so forth—if there is little potential for improvement, priority for study would be low).
- Need for corridor preservation. A greater need for corridor preservation would elevate the corridor in priority.

Another important point should be made regarding the need for a corridor study and the FTA “New Starts” program. In December 1996, FTA issued a Federal Register notice describing the revised New Starts justification criteria to be used to evaluate candidate transit projects for discretionary New Starts funding under Section 5309 of the Federal Transit Act. The FTA’s technical guidance on New Starts (September 1997) states that “It is likely that most transit New Start proposals will result from a Major Investment Study conducted during this phase (i.e., the system planning phase).” Although the planning regulations will be changing, agencies anticipating major transit investments using FTA New Starts funding should consult with FTA on study requirements that may be associated with application for funds. The application for funds could be a determining factor for when to initiate a corridor study. Specific criteria required for New Starts funding and the relationship of those criteria to other performance measures will be discussed later in the *Guidebook*.

CHAPTER 4

CORRIDOR STUDY ORGANIZATION AND INITIATION



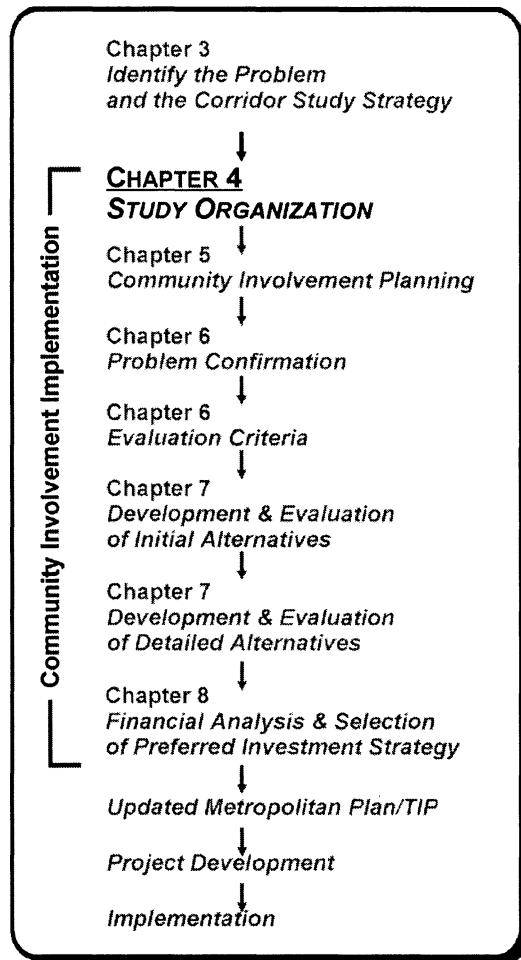
Chapter Topics in a Nutshell

- 4.1. Assemble the relevant transportation agencies
- 4.2. Assemble all potentially interested stakeholders
- 4.3. Prepare draft work plan
- 4.4. Form policy and technical committees
- 4.5. Define agency responsibilities/need for consultant
- 4.6. Select consultant and/or arrange for internal resources
- 4.7. Develop outreach/public involvement plan
- 4.8. Develop/confirm agency study management plan/principles



Principles and Lessons Learned

1. Study initiation meetings, with broad representation of stakeholders, are critical to the identification of issues that need to be addressed in any particular study. A proactive effort should be undertaken to ensure good representation.
2. To properly scale the level of detail, focus efforts on those issues that are key to making a decision. Issues key to the decision will usually receive more detailed analysis than others. A sample checklist is provided to assist in identifying critical issues and the potential level of effort to address them.
3. The size of the study area will be dependent on the nature of problems, the issues being evaluated, and the nature of the possible alternatives. The study area may change as the study proceeds, depending on the alternatives being analyzed. The impact on some environmental issues will be limited to relatively narrow corridors. Transportation and air quality impacts normally tend to encompass a much larger area.
4. A good work plan is critical to the effective undertaking of a corridor study. The work plan should spell out the methods and approaches as clearly as possible, but must also have the flexibility to change course in response to circumstances that arise during the study.
5. Good study management procedures for information flow, meeting documentation, and filing are critical to the durability of decisions, particularly for controversial studies.



Chapter 4 begins with the assumption that the need for a corridor study has been established, and a basic strategy has been identified, at least from an internal agency perspective (see Chapter 3). Chapter 4 discusses how to bring the agency and public stakeholders together to flesh out the strategy and initiate the study. From that point on, the lead and support agencies will be faced with a host of choices such as

- Who should be the lead agency?
- How large should the study area be?
- What level of analysis detail is necessary?
- What elements should be conducted in-house versus with consultants?
- Is it possible to control the number of alternatives?

It is possible that some of these issues will have been discussed as part of the internal deliberations within an agency or among a group of core agencies. But for the purposes of this chapter, it will be assumed that agencies only know that a corridor study is to be conducted in a generally identified corridor or corridors.

Exhibit 4-1 shows a typical set of steps that could be used for corridor study initiation. Again, these are not prescribed in Federal legislation. **Existing procedures and guidelines in individual states and metropolitan areas should be consulted for steps that are applicable to a particular area.**

**Exhibit 4-1.
Study Initiation Steps**

1. Assemble the relevant transportation agencies.
2. Assemble all potentially interested stakeholders.
3. Prepare draft work plan.
4. Form policy and technical committees.
5. Define agency responsibilities/need for consultant.
6. Select consultant and/or arrange for internal agency resources.
7. Develop outreach/public involvement plan.
8. Develop/confirm agency study management plan/principles.

4.1. Assemble the Relevant Transportation Agencies

In most regions there is a core set of transportation agencies that will virtually always be involved in any major transportation planning effort. The MPO, state DOT(s), and transit agency(ies) are virtually always involved. Some regions have county-level planning agencies or councils of governments that play a major role in most of these planning efforts as well. One of the above types of agencies is usually the prime candidate for lead agency. The particular circumstances surrounding each corridor study will suggest other agencies that should be in the initial core group. Practitioners responding to the NCHRP Project 8-34 surveys often suggested that involving Federal partners (FHWA and FTA) at this stage is a good idea. Although the Federal agencies will not formally sign off on the results if there is no NEPA involvement, the fact that Federal funds are likely to be used is reason enough to bring these agencies into the picture at an early stage. FHWA and FTA staff can also be a linkage to useful resources and can help agencies to avoid surprises later in the process.

It is strongly recommended that the operating agencies (state DOTs and transit operators) send both planning and project development representatives to the initial meetings. Personnel with environmental experience who know NEPA and other environmental statutes are critical to the decision-making process, even if the corridor study is being conducted without NEPA involvement. **Project development staff will usually have an appreciation of what difficulties may lie ahead in environmental analysis and decision-making and could help the technical and policy committees to avoid potential pitfalls.** The intent is to facilitate the linkage between planning and project development, designing the corridor planning study to minimize potential difficulties that could arise during project development, if definitive projects emerge from the planning study.

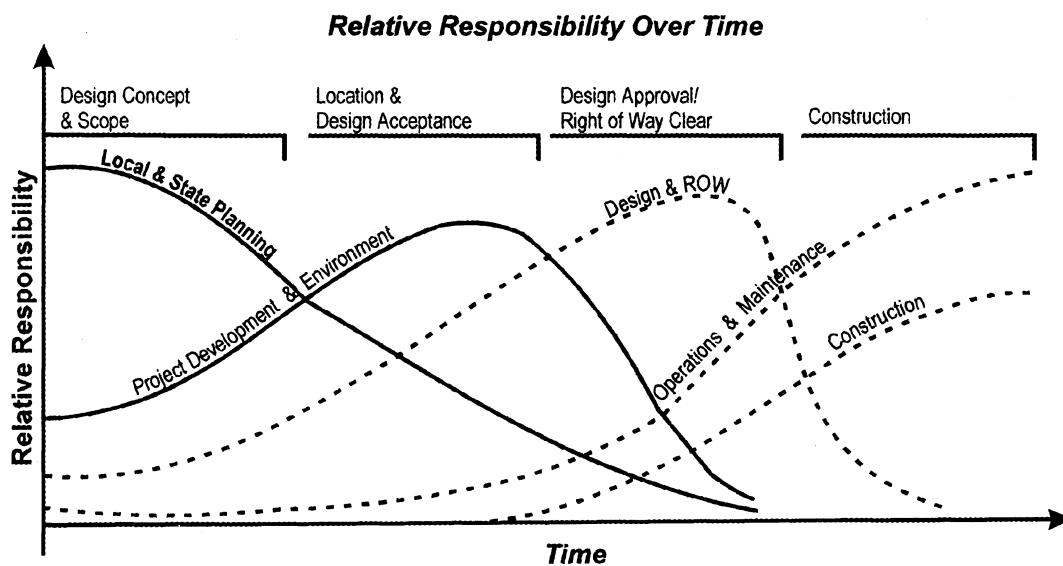
A diagram prepared by the Florida DOT illustrates how emphasis changes by project phase (Exhibit 4-2). Projects will be handed off from division to division and person to person through planning, project development, construction, and operation. All phases of this work are best served by smooth transitions, made possible by involvement of the right people at the right time. The level of responsibility will change with each phase, but communication is needed among all the divisions through virtually all the phases.

Personnel with environmental experience who know NEPA and other environmental statutes are critical to the design of the study process, even if the corridor study is being conducted without NEPA involvement.

Normally, the participants in the initial discussions will consist of the technical staff, but on some large or particularly controversial projects, discussions may take place at the policy level. The core group should

- Confirm the need for the corridor study.
- Discuss/confirm overall corridor study strategy.
- Identify other potential stakeholders.
- Confirm the lead agency.

Exhibit 4-2.
Changing Involvement Levels through Planning, Project Development, Construction, and Operation



(Source: Florida Department of Transportation)

4.1.1. Confirm the Need for the Corridor Study

Before stepping out in the public spotlight, agencies involved in the study should ask the following questions:

- Do we really want to do the study at this time? Are the problems significant enough?
- Do we have the resources to manage it well?
- Are we clear on what we would want the corridor study to accomplish? What types of decisions do we expect to make? How do we expect these decisions to relate to subsequent decisions in project development?
- Is there another approach we should use?
- Are the necessary tools in place (e.g., updated version of transportation model)?
- How far can the recommendations for this study expect to go? To a single preferred alternative? Narrowing down the alternatives for a subsequent EIS?

Chapter 3 provided a context for when a corridor study may be appropriate and described other possible planning approaches to making corridor transportation decisions, depending on the circumstances.

4.1.2. Identify Key Issues

In most cases, key issues will surface quickly from those knowledgeable of the area, prior history, and nature of the study. However, a checklist can be helpful to ensure that major concerns are not missed. Exhibit 4-3 is a type of checklist that can be used to determine the importance of particular issues. It is similar to checklists some states use to gauge the significance of environmental factors during project development. Some of those checklists are much more extensive and may be appropriate for conducting a corridor study in your area. The sample checklist in Exhibit 4-3 poses two questions related to each issue area:

- Could analysis of this issue affect the final decision? (yes or no)
- What level of effort is expected on this issue? (major, moderate, minor)

The first question is designed to be a discriminator in whether the issue is truly pertinent to making the decision at hand. It is a way of eliminating the issues that the study should not need to consider.

The second question would apply only to those issues where a “yes” was indicated for the first question. The objective of the second question is to begin to deal with where to invest study resources. Ideally, participants would fill out the checklist as a group, coming to consensus on each issue. The completed checklist would also provide documentation that all the issues were discussed. Notations can be made in the first column on any specific issues or impacts of which to be particularly aware. It would also be appropriate for each agency to complete a checklist individually. This concept will be introduced again at the study initiation meeting or meetings. It is important to note that this approach is not intended for evaluation of alternatives, it is only intended to identify issues to help in scoping the study. It is an example only and its application may not be appropriate in every case.

4.1.3. Determine Appropriate Level of Detail

There is no single prescribed level of detail for every decision. The general rule is that **“the level of detail in a corridor study needs to be sufficient to make the decision at hand.”** If stakeholders are able to agree on the problem(s) and solution(s) with very little additional information, there is no need to produce information at a high level of detail. It would be unproductive work. On highly controversial

If stakeholders are able to agree on the problem(s) and solution(s) with very little additional information, there is no need to produce information at a high level of detail.

studies, the level of detail is often much greater than normal, because the consequences of inadequate information can be much more severe. The issues checklist shown in Exhibit 4-3 will provide some guidance as to which issues will require more detail. Keep in mind that certain issues may not need to be addressed at all, while other issues require a relatively high level of detail. The stakeholders will need to decide how much detail will be adequate in any particular case. But for those issues that do not need to be addressed, it should be noted in the study documentation that this was recognized by the study participants.

4.1.4 Confirm Lead Agency

The initial meeting of agency stakeholders should result in a decision of which agency should lead the study. Where a NEPA document is involved, technically FHWA or FTA represents the lead agency. But the reference here is on the lead agency locally. On rare occasions, there have been co-

lead agencies. The lead agency decision is usually not difficult and revolves around the following general rules:

- If the decision to be made is likely to be more controversial and/or should be made in a neutral setting, the MPO or a multi-agency planning/coordination entity is more likely to be the lead.
- If the decision to be made centers around facilities or services owned and operated by a certain agency, the lead agency is more likely to be a DOT or a transit agency.
- Studies conducted under the NEPA umbrella are more likely to be led by an owner/operator (i.e., a DOT or transit agency), since a near-term implementable project is more likely to result.

Exhibit 4-3.
Sample Issue Area Checklist/Worksheet

Issue Area	Could analysis of this issue affect the final decision? (yes or no)	What level of effort is expected on this issue? (major, moderate, minor)
A. Transportation 1. Peak period congestion 2. Non-recurring congestion 3. Non-weekday travel 4. Transit service/ridership 5. Modal choice/demand reduction 6. Accessibility 7. Safety 8. Goods movement 9. Engineering feasibility/constructability 10. Other _____	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____
B. Economic and land use impacts 1. Cost effectiveness 2. Economic development opportunities 3. Land use policies 4. Job impacts 5. Tax impacts 6. Secondary and cumulative impacts 7. Other _____	_____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____
C. Social environment 1. Access to community facilities, businesses, and neighborhoods 2. Community cohesion 3. Displacement and relocation 4. Distribution of benefits and impacts 5. Neighborhood quality 6. Land use compatibility 7. Visual impacts	_____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____

Issue Area	Could analysis of this issue affect the final decision? (yes or no)	What level of effort is expected on this issue? (major, moderate, minor)
8. Noise and vibration	_____	_____
9. Other _____	_____	_____
D. Natural resources		
1. Air quality	_____	_____
2. Coastal zones	_____	_____
3. Energy	_____	_____
4. Floodplains	_____	_____
5. Hazardous waste	_____	_____
6. Navigable waterways	_____	_____
7. Prime agricultural land	_____	_____
8. Soils and geologic features	_____	_____
9. Threatened and endangered species	_____	_____
10. Water quality	_____	_____
11. Wetlands	_____	_____
12. Wild and scenic rivers	_____	_____
13. Other _____	_____	_____
E. Historic, cultural, and parkland resources		
1. Archaeology	_____	_____
2. Cultural sites	_____	_____
3. Historic properties and districts	_____	_____
4. Parklands	_____	_____
5. Other _____	_____	_____
F. Construction impacts		
1. Noise and vibration	_____	_____
2. Traffic management	_____	_____
3. Other _____	_____	_____
G. Other		
_____	_____	_____
_____	_____	_____
_____	_____	_____

4.2. Assemble All Potentially Interested Stakeholders

Section 4.1 referred to the assembly of transportation agencies to make initial decisions concerning the corridor study. Depending on the outcome of the initial agency collaboration (which could be broadened to include other agencies before entering the public arena), a study initiation meeting with a broader group of stakeholders could be held. A study initiation meeting, though not required

(unless the study is being conducted under NEPA), can be a very useful undertaking, providing the agencies with perspectives from the public, advocacy groups, and other stakeholders, as well as providing important information on how the agencies believe the study should be structured. Some of the activities involved with such an initiation meeting would normally include

- Notify stakeholders.
- Present/discuss objectives of the study and decisions to be made.
- Obtain input on issues that should be addressed.
- Modify/expand initial list of problems.
- Recommend study area.
- Identify other stakeholders that should be included.
- Discuss outreach approaches (initial public involvement concepts).
- Determine if there is consensus on solutions (if so, prepare abbreviated corridor study documentation).
- Identify potential members of focus groups or citizen advisory groups.

Approaches for dealing with selected activities are briefly described below.

4.2.1. Notify Stakeholders

Agencies will normally have a good appreciation of the stakeholders who should be invited to a study initiation meeting. The following general principles should apply. The principles are particularly important for studies where decisions are expected to be controversial.

- The target audiences would be community group representatives, usually not the general public, although initiation meetings should be open to the public.
- Err on the side of inviting more than necessary. They can always turn you down.
- Document who was invited and methods of invitation used.
- Use multiple avenues of communication. A listing only in the “Public Notices” section of the local newspaper is clearly inadequate, though it may be one means of notification. Other means would usually include letters directly to agencies, community groups, and business organizations and notices in newsletters. Phone calls should be made to stakeholders whose input is known to be critical. Posting on an agency web site is advisable.

The content of the meeting announcement can have much to do with setting the tone of the study. Whether the announcement is a formal NEPA NOI or notification of a simple corridor planning study, the basic content of the message should be approximately the same. In general, there is usually too little information in meeting announcements and NOIs. Aside from the basic meeting location and time information, some of the items that should be included are as follows:

- Description of why the study is being conducted
- Description of the problems as they have been identified thus far
- Description of possible alternatives, if appropriate
- Location map

Exhibit 4-6 is an example of an advertisement for a scoping meeting for the Newburg-Dundee corridor study in Oregon. In this instance, the NOI was issued after the initiation of the study. The intent of this particular NOI was to be fairly descriptive, including information on what had transpired up to that point in time.

4.2.2. Conduct Initiation Meeting

The stakeholders need to be given an overview of why the study is being initiated and some of the issues involved. A sample list of possible agenda items includes

- Explain why a corridor study is proposed, its objectives, and nature of decisions expected.
- Obtain input on issues that should be addressed.
- Identify reports and resources that should be examined as part of the study.
- Prepare initial list of problems.
- Recommend study area.
- Identify other stakeholders that should be included.
- Discuss outreach approaches (initial public involvement concepts).
- Determine if there is consensus on solutions (if so, prepare abbreviated corridor study documentation).

Some of the above agenda items may not be necessary. For example, it may be viewed that the initial list of problems should be identified later, with full public participation. It may also be obvious that there is no consensus on solutions and that any discussion of possible solutions is premature. Some of the more important agenda items would include explaining why a corridor study was being proposed, identifying other possible stakeholders, and discussing outreach approaches. Identifying issues would also be important as a basis for developing the first draft of the scope of work. Material on problem identification is included in Chapter 3 of the *Guidebook*.

4.2.3. Conduct Meeting Follow-Up

Good interagency communication should be established from the start. Missed meetings can be the cause of miscommunication, and good follow-up to every meeting is essential to preventing later problems. The lead agency should consider the following activities subsequent to the initiation meeting:

- Phone calls to key stakeholders who were not able to attend the meeting
- Documentation and distribution of meeting minutes
- Mailout of handout materials to invited individuals who were not able to attend
- Follow-up of action items, such as identifying and distributing key reports, communications back to constituents, contacts with elected officials, and so forth
- Filing information about the meeting

4.3. Prepare Draft Work Plan

The work plan may be one of the most important parts of the study. A poorly written or unclear work plan will create innumerable problems. **A work plan is important even if a consultant is not being used.** Exhibit 4-7 lists observations from practitioners regarding the development of a corridor study work plan or study scope.

Exhibit 4-6.**Example Notice of Intent, from the Newburg-Dundee corridor study in Oregon****DEPARTMENT OF TRANSPORTATION**

Federal Highway Administration

ENVIRONMENTAL IMPACT STATEMENT: Yamhill County, Oregon**AGENCY:** Federal Highway Administration (FHWA), DOT**ACTION:** Notice of Intent

SUMMARY: The FHWA is issuing this notice to advise the public that an environmental impact statement will be prepared for a proposed transportation improvement project in Yamhill County, Oregon.

FOR FURTHER INFORMATION CONTACT: Elton Chang, Environmental Engineer, Federal Highway Administration, 530 Center Street NE, Room 100, Salem, Oregon, 97301, Telephone: (503) 399-5749, Fax: (503)399-5838, or Dick Upton, Economic Partnerships Unit, Oregon Department of Transportation, 2950 State Street, Room 120, Salem, Oregon, 97310, Telephone: (503) 986-5816, Fax: (503) 986-5813.

SUPPLEMENTARY INFORMATION: The FHWA, in cooperation with the Oregon Department of Transportation, will prepare an Environmental Impact Statement (EIS) on a set of multi-modal solutions to transportation problems identified on the Pacific Highway West (Highway 99W) through Newberg and Dundee, in Yamhill County, Oregon. The solutions will be responses to the increasing demand for travel in and through the Newburg-Dundee area which exceeds the capacity of the existing transportation system. Specifically, weekday as well as weekend travel demands exceed available capacity, the highway's physical features constrain traffic, and few transit options are available within the corridor. Several user groups compete for limited capacity, including commuters, freight, local trips, and tourist/recreation trips between the Portland Metropolitan Area and the Oregon Coast. Traffic congestion is expected to worsen in the future on Highway 99W as Yamhill County's population and tourist activity increase. Continued traffic congestion will inconvenience travelers; divert trips to alternative routes through the communities; impede freight movement; alter commuting patterns; reduce the ability of some local businesses to attract and serve customers; and adversely affect pedestrian, bicycle and vehicular access and safety.

As a first step in the environmental review process, a corridor-level alternatives analysis will be conducted. Alternatives will be multimodal, and will combine a primary mode with other measures to address the transportation problem. Alternatives to be considered in this process include base conditions (no action), transportation management, capacity improvements to Highway 99W (including widening), a bypass north of Highway 99W from east of Newberg to south of Dundee, a bypass south of Highway 99W from east of Newberg to the Highway 99W/Highway 18 intersection, a bypass from the Highway 99W/Highway 18 intersection to Interstate 5 (through a limited portion of Marion County), commuter train service between McMinnville and the Portland Metropolitan Area on improved trackage, and light rail transit service between McMinnville and the Portland Metropolitan Area on new trackage. All alternatives will include planned projects and those likely to occur by 2020. All but the base condition alternative will include transportation system management, demand management and land use elements. All of the highway alternatives will also include express bus elements. Bypass alternatives will include consideration of tolls as a funding source.

These multi-modal alternatives will be screened by considering their relative ability to meet travel need, human health and safety, environmental quality, community economics, socio/cultural quality, project cost and implementability objectives. The alternatives that best meet these objectives will be refined and screened again. The preferred multi-modal alternative(s) resulting from this process and the base conditions alternative will be examined in detail in the EIS. Preparation of the EIS is expected to begin early in 1998.

Newsletters describing alternatives analysis activities and soliciting comments will be sent to appropriate Federal, State and local agencies, and to private organizations and individuals who have expressed or are known to have an interest in this proposal. A Project Oversight Steering Team (POST), comprised of elected officials and transportation agency representatives, will direct project work and make recommendations to the Oregon Transportation Commission and affected local jurisdictions. A Project Advisory Committee, comprised of representatives of a broad range of stakeholder interests, will make recommendations to the POST. An Agency Advisory Committee, comprised of representatives of Federal and State resource agencies, will meet periodically to provide information on key decision points. Several public workshops will be held in the project area during the process to solicit information on issues that should be addressed, evaluation criteria that should be used, and alternatives that should be evaluated as well as to present results of the alternatives evaluation and to solicit opinions on the preferred alternative. Public notice will be given of the times and locations of the meetings. These outreach activities, taken together, will function as the scoping process for the project.

To assure that the full range of issues related to this proposed action are addressed and all significant issues are identified, comments are invited from all interested parties. Comments and suggestions concerning proposed action and the EIS should be directed to the FHWA at the address provided.

(Catalogue of Federal Domestic Assistance Program Number 20.205, Highway Research, Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation of federal programs and activities apply to this program.)

Issued on: (date)

 Elton Chang
 Environmental Engineer
 Federal Highway Administration
 Salem, Oregon

Exhibit 4-7.**Observations from Practitioners on Study Work Plan**

- Success of corridor study may depend on established scope, evaluation criteria and methods, and role of lead and participating agencies in making a decision.
- Scope development should involve a broad spectrum of technical people, key citizens, and elected officials to prevent omission of key elements. Scope should be periodically reviewed throughout the process.
- Establish scope early and maintain focus.
- Keep it simple.
- Be as detailed as possible, while still building in flexibility, because no one can predict the future. Identify contingent items you have control/approval of for solving potential problems.
- For time savings, prepare background information and problem statement “in-house” by MPO or DOT or both, and work with MPO to determine MPO and agency resource dedication. Scope should be tailored to the corridor, but have a foundation used throughout the region (e.g., performance measures and objectives). Public involvement timelines and implementation must be coordinated with key milestones of the study scope. Have study management team establish the general scope and let the lead agency work out the contract details.
- Scope must be flexible. However, negotiating new work elements will be timely and costly.
- Try not to let consultant talk you into a Cadillac when a Chevy will work fine.
- Need to ask “what do I really need to know to make this decision and to satisfy others that the appropriate consideration was given to various factors?”
- One of our big weaknesses has been the financial planning requirements, which we now add to the scope of work for every future study. If the scope of all studies were restricted to a needs analysis and a financial plan, study costs would be reduced dramatically—maybe by 75%. There is too much data collection and analyses in corridor studies now.
- Need to limit number of alternatives analyzed in depth. Easy for this to get out of hand and turn into another EIS. Difficult to get stakeholders involved in making these decisions. Same for estimating costs and schedule.
- Determine how you will deal with rehabilitation requirements; are they “givens” or do they compete with other alternatives for resources? Establish up front how land uses/transportation alternatives will be linked.
- Involve interested parties, but keep scope understandable. Consider how land use options will be addressed.
- Be flexible to incorporate the unexpected, because it will surely occur.
- Include both policy and technical representatives in the project scoping process.

4.3.1. Approaches to Work Plan Development

There are two general approaches to work plan development:

- Prepare a detailed work plan that lays out the entire effort.
- Prepare work plan in phased, as-you-go fashion, only for the parts of the study that can be envisioned at this time.

Exhibit 4-8 lists some of the considerations for each approach. In general, the preparation of a detailed work plan is recommended. In this way, the study has a complete plan, but it can still be modified at any time. If the work plan does not need to be changed, this works to everyone’s benefit. If it does need to be changed, this option is still available. A good work plan takes time to develop, but it is an indispensable study management tool. If consultants are involved, a more detailed work plan is usually preferred, so that the scope and corresponding financial expectations are as clear as possible.

Some of the essential contents of a work plan include

- A list of decisions to be made and who is expected to make those decisions. Ideally, this should be laid out in the schedule. This is often neglected in work plans, because it is not a part of consultant responsibilities. But clearly defining the decisions to be made helps all parties (including the public) to understand the significance of each step, what kind of input they can provide, and when they should provide it.
- A list of deliverables and deliverable dates.
- A listing of tasks and procedures to be employed in each task.
- Responsibilities of each agency.

**Exhibit 4-8.
Considerations in Preparing a Detailed Work Plan
Versus a Phased, As-you-go Approach**

Prepare a detailed work plan that lays out the entire effort	Prepare work plan in phased, as-you-go fashion
<p>Considerations</p> <ul style="list-style-type: none"> • Requires familiarity with technical issues to make judgments on what the study should address. • Focus resources on issues that are key to the decision. Cut out details that are not necessary. • May limit flexibility in addressing issues, if you want to stick to the scope. • If study goes according to plan, detailed work plan will probably save on time and cost. • Make sure that the methods to be employed will be acceptable, to the extent budget will allow, by those who may be the greatest critics of resulting decisions. • If changes in direction occur, and scope must be modified, this can always be accommodated. 	<p>Considerations</p> <ul style="list-style-type: none"> • This approach would be best suited for controversial cases where direction is unpredictable. • May also be appropriate when the range of potential solutions is not well known in the beginning. • There is less incentive for consultant to control costs. Burden is on agency to be good negotiator. • Scope for next phase should be addressed as early as possible to minimize delays. • Requires good working relationship/teamwork between agency and consultant. It is virtually impossible to predict everything.
<p>Recommendation: Use in most cases. Be prepared to modify, however, as sticking to the scope at all costs could adversely affect the study. Some flexibility is usually necessary.</p>	<p>Recommendation: Use mainly in complex, controversial cases where direction is unpredictable. Make sure consultants (if used) are well-qualified and ones you trust with a flexible approach.</p>

4.3.2. Work Plan and Level of Detail

There is no set answer regarding the level of detail. In general, however, the level of detail need only be sufficient to make the decisions at hand. There is no need to acquire information that is essentially irrelevant to the decision. Defining this level of detail is part of the art of designing a corridor study in the no-one-size-fits-all environment.

In addition to this general principle, the following suggestions can be made on designing the work plan:

- **Ensure that the work plan focuses resources on the issues deemed to be most important to making the decisions at hand.**
- **Avoid getting into more detail on issues you are more comfortable analyzing when they may not be the most important issues.**

- **The expected level of detail can change in the course of the study.** Preliminary information could suggest that more detail is needed in certain areas, or it could indicate that the issue is not as critical as was originally thought.

Some issues may be so critical to the decision that they require a high level of detail, even in a planning study.

- **The level of detail will vary by study issue.** Some issues may be so critical to the decision that they require a high level of detail, even in a planning study.
- **Different groups will request more detail on some issues than on others.** Judgments will need to be made as to the validity of those requests. If the requested detail is well beyond what is reasonable or useful for making the decision, this needs to be conveyed to the requestor in a tactful way.

- **In some cases, it may be more efficient to provide the information, even if agencies believe the issue is not critical,** rather than to continually defend the decision and be accused of hiding things from the public. Again, this is a judgment call, weighing the cost and value of the information.

One of the significant cost-determining factors in a corridor study is the number of alternatives to be examined. In addition, the type of alternatives can significantly affect the cost. Transit alternatives are usually more costly to analyze, at least from a transportation analysis perspective, than highway alternatives. The costs are usually controlled through an alternatives screening process, followed by more detailed review of a few alternatives. Targets can be established for the number of alternatives to be subjected to screening and the number to be subjected to detailed evaluation. For a single corridor evaluation, a typical number would be 10 for screening and 3 to 4 for detailed evaluation.

4.3.3. Defining the Study Area

4.3.3.1 Study Area Principles

Practitioners vary in their opinions on defining the study area. Most would likely agree, however, on the following points:

- The study area needs to be large enough to incorporate all impacts relevant to the decision at hand.
- Agencies should try to limit the study area as much as possible to focus the study and control the costs of analysis.

These general principles leave a great deal of room for judgment. Some of the factors that can be used to narrow down this decision include

- The transportation, air quality, and energy impacts of a major transportation improvement can cover a wide geographic area. Proper analysis of these effects could, in some cases, require the inclusion of the entire region, depending on the nature of the problem and possible alternatives.
- Environmental impacts (except for air quality and energy) will tend to focus on a more narrowly defined corridor.

- One of the major considerations in defining the study area is how the potential alternatives will address the defined problems. Potential alternatives that do not address the problems will likely be eliminated quickly, if considered at all. The geographic coverage of the alternatives that do address the problems will, in effect, define the study area. However, the alternatives will usually not be known until later in the study. Therefore, the study area may need to be defined in phases, as indicated in Exhibit 4-9.

Exhibit 4-9.
Example of a Phased Approach
to Study Area Development

- An initial study area may be defined when the problems are identified.
- A revised study area may be defined when initial alternatives are identified.
- Another revised study area may be defined (probably narrowed) when final alternatives are identified.
- For each of the study areas, there may be two levels of analysis area, one for regional or sub-regional transportation/air quality/energy impacts, and another for environmental impacts.

Although study areas may generally follow “corridors,” they may not be equivalent to a corridor. A corridor was generally defined in Chapter 1 as a travel shed. A study area could be broader than a corridor, and in some cases, accommodate multiple corridors. Agencies should think of the potential “area of influence” when trying to establish the study area.

4.3.4 Florida DOT Model Scopes of Work

A state or MPO can consider a model scope of work as a way to promote a degree of consistency and continuity among studies. The scope would then be tailored to the needs of each individual study. The State of Florida has developed model scopes of work for a number of study types. One of those study types is their “Multimodal Interstate Master Plan.” The Master Plans have usually been major efforts, often several millions of dollars. The concept behind the model scopes of work is that they provide a framework based on experience within the department on what is required to conduct a successful study. But each set of circumstances is still unique: the corridor history, the institutional setting, public perceptions, environmental features, and so forth. A model scope cannot be expected to cover all the elements. However, a model scope can help to establish an overall consistency of methodology among studies and could even establish some core criteria which can be used to provide a degree of comparability among corridors. It can also serve as a starting point or type of checklist of items that agencies should be sure to include in their corridor-tailored scopes. Exhibit 4-10 provides the task structure for the model scope for a Florida Multimodal Interstate Master Plan.

4.3.5. Lessons Learned on Study Cost and Schedule Estimation

Practitioners have provided a variety of observations concerning study costs and schedule, as explained in Exhibits 4-11 and 4-12. The extent to which these observations apply to any particular study will depend on conditions.

Exhibit 4-10.**Tasks in Florida Multimodal Interstate Master Plan Model Scope of Work**

(Source: Florida Department of Transportation)

Tasks in Multimodal Interstate Master Plan Model Scope of Work

- A. Notice to proceed meeting
- B. Prepare Public Involvement Plan
 - 1. Plan elements
 - a. Print/TV/Media Plan
 - b. City/County/Regional/Officials Plan
 - c. Public meetings/presentations
 - d. Project office and public information phone services
 - e. Speakers bureau
 - f. Mailing/contact list
 - g. Citizen advisory committee
 - h. Other elements
 - 2. Agency coordination
 - a. Agency task force
 - b. Transit coordination
 - 3. Project management and coordination
 - 4. Implementation
- C. Initiate advance notification
- D. Kickoff meetings
 - 1. Notification
 - 2. The formal presentation
 - 3. Delivery
 - 4. Meeting site preparation
- E. Conduct alternatives public meetings and workshops
- F. Data collection
 - 1. Aerial photography
 - 2. Background
 - 3. Existing Interstate highways and supporting transportation facilities and services
 - 4. Traffic data
 - 5. Transportation and land use plans
 - 6. Accident data
 - 7. Pavement data
 - 8. Utilities
 - 9. Cultural features
 - 10. Relocation impact
 - 11. Noise impact
 - 12. Hazardous material and contamination impacts
 - 13. Natural features
- G. Data analysis (26 items)
- H. Prepare and evaluate conceptual mobility enhancement alternatives
 - 1. Establish conceptual design
 - 2. Matrix evaluation
 - 3. Evaluation of existing roadways and transit service facilities
 - 4. Typical cross sections
 - 5. Prepare base mobility enhancement alternatives
 - 6. Model conceptual mobility enhancement alternatives
 - 7. Analyze conceptual mobility enhancement alternatives
- I. Prepare multimodal conceptual engineering report
- J. Prepare Multimodal Interstate Master Plan

Exhibit 4-11.**Observations from Practitioners on Study Cost Estimation**

- A good cost estimate is dependent on good study scope. Possibly use experience from similar projects.
- Cost estimates should be done by a multi-disciplined team. Specify the number of alternatives. Public involvement is usually more expensive than originally anticipated.
- Estimate a little high.
- This may vary drastically depending on number of alternatives, length of corridor, level of detail, public involvement program, amount of in-house work, amount of prior work done, etc.
- Be selective of which studies are contracted out. Enough resources should be provided late in the study so that it can be adequately completed.
- Public involvement can be very expensive.
- Work with partner agencies to determine appropriate level of detail.
- Know what you can do in-house. Research the corridor so you minimize surprises.
- As schedule extends, costs tend to increase.
- Most are too high. Because of uncertainty in amount of detail necessary until initial phases of study, most are way over-estimated. Detail tends to be more than necessary.
- Need to monitor travel demand forecasting portion closely to contain costs.

Exhibit 4-12.**Observations from Practitioners on Study Schedule Estimation**

- Critical path is most often in the document review and public involvement stages.
- Anticipate potential problem areas including availability of traffic/demand forecasts, political elections, board approval cycles, volatile communities, and sensitive environmental areas. To the extent possible, identify methodologies for conducting analysis.
- Public information meetings take considerable time to set up and incorporate the results of the meetings into the corridor study process.
- Take into account any state or regional procedures for which you may need to wait for an answer from another agency.
- Be realistic. Build in a little delay time.
- The lead agency should establish the schedule, with input from others. Since the corridor study is a consensus process, schedules will always need to be somewhat flexible.
- Critical paths should be identified.
- Must be realistic and not overly aggressive.
- Do not underestimate. Sometimes takes twice as long as you think.
- Build in enough public participation time. Meetings take time, but are essential.
- The schedule needs to be clearly understood at the beginning of the study. Our schedule needed to fit into a possible public referendum.
- Do not let outside pressures and influences dictate schedule. Cutting corners and racing to meet arbitrary deadlines produces flawed results.

4.4. Form Policy and Technical Committees

Exhibit 4-13 provides some observations from practitioners regarding the formation and use of technical committees for a corridor study.

The institutional structure in each region is different, and it is expected that the approach to the formation of the policy and technical committees may be different as well. However, approaches can

be generally categorized into several options. Exhibit 4-14 shows options for the policy committee, while Exhibit 4-15 shows options for the technical committee. Some of the critical factors governing the formation of these committees include the level of controversy expected and the amount of review and input needed, especially for the policy committee. Technical committees are almost always advisory, but will still usually make a number of decisions. All members of the technical committee should be clear regarding the authority and responsibility entrusted to committee members.

Exhibit 4-13.
Observations from Practitioners on Formation and Use of Technical Committees

- Generally, the committee needs to be opened up to a larger group.
- Should be specific to the needs of each study. Try to keep the committee as small as possible.
- Put together best expertise, regardless of who is lead agency. Avoid modal preference.
- Each organization on the policy committee should have a representative on the technical committee.
- Keep the committee at a level that will allow it to operate well. Should include local government planners and environmental groups.
- Take advantage of MPO’s Technical Advisory Committee structure.
- Need to have expertise available to assess all components of each of the alternative.
- People with technical knowledge and who grant internal approvals must be on committee. Committees should have a local focus.
- Be sure to invite almost any agency affected. This has resulted in a great committee for us.
- Varies depending on where you are in the state. Large urban areas require complex decision-making structures.
- Have each type of interest represented rather than every agency and faction.
- Limit participation to those who really know what the task is.
- The technical review committee composition needs to be fluid; you should be able to add or delete representatives as the study progresses.
- Include state and Federal staff, including EPA, if possible.
- Should be limited to agency representatives.
- Having the staff from different agencies helped to build consensus and created stronger support for the locally preferred solution.
- Having all agency and local jurisdictions represented is critical.

Exhibit 4-14.
Possible Options for Formation of the Policy Committee

Policy Committee Option	When It May Be Appropriate
1. Use the MPO’s Policy Board.	When study is of regional interest and is not likely to require substantial review time.
2. Use a policy-level committee of the MPO (e.g., a transportation committee).	When the study is of regional interest and a greater degree of involvement of elected officials may be needed.
3. Specially designated set of policy-level representatives, tailored to the study corridor.	When the study is of more localized interest. Need to make sure the members are representative of the interests involved.

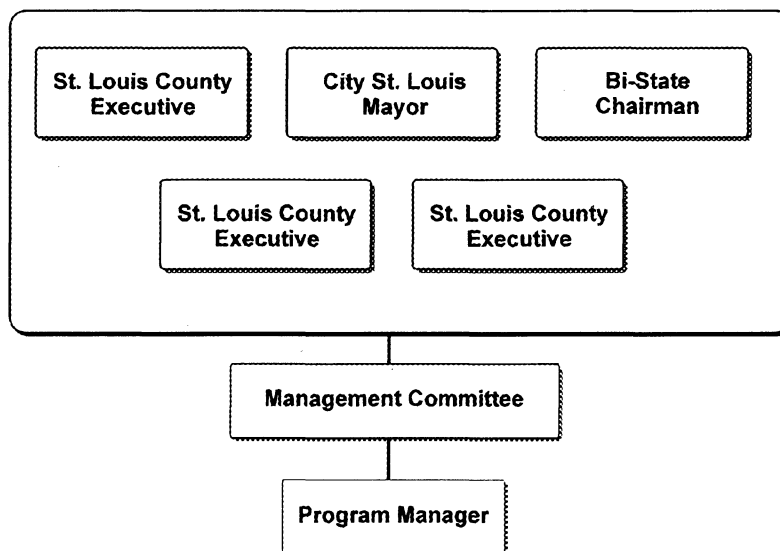
**Exhibit 4-15.
Possible Options for Formation of the Technical Committee**

Technical Committee Option	When it May Be Appropriate
1. Use the MPO's existing transportation technical committee.	When study is of regional interest, review work load is not high, and outside membership is not critical.
2. Form agency-based technical committee tailored to the study corridor.	When the study is of more localized interest and outside representation (e.g., by businesses, community groups, or advocacy groups) is not needed on the committee proper (input can still be provided through the outreach program).
3. Form technical committee that includes agencies and outside interests.	When the study is of more localized interest and it is advantageous to provide outside representation directly on the committee. Additional information on study process and technical issues may be needed.

Example of a Technical/Policy Committee Structure—St. Louis

In the St. Louis area, several corridor studies are being conducted simultaneously. The Metrolink regional rail system is a primary consideration in all the corridors. The studies are at different stages, and one is moving into project development. Because several of the studies are controversial and will involve high-level policy input, a five-member policy committee has been established to oversee the efforts. Exhibit 4-16 shows the policy committee structure. East-West Gateway Coordinating Council is the MPO. Bi-State is the Authority managing development of the transit system. There are numerous small municipalities in the St. Louis region, hence the inclusion of the County Municipal League representative. The Management Committee consists of senior agency staff representing the Policy Committee principals. The Management Committee will assist the program manager in coordinating the decision-making process. The program manager will direct the day-to-day activities of staff and consultants and coordinate with East-West Gateway and Bi-State staff in joint activities.

**Exhibit 4-16.
Example Policy Committee and Management Committee Structure
from St. Louis Region**



4.5. Define Agency Responsibilities/Need for Consultant

Each set of agencies must decide for itself what can be accomplished in-house versus with consultant assistance. For some studies, agencies may perform the work totally in-house. The larger, more complex studies are more likely to require consultant assistance to augment staff resources. For these more complex studies, work activities that are most commonly performed in-house include

- Selected portions of or all public involvement activities (e.g., overviews/opening comments at public meetings, room arrangements, mailings, etc.).
- Official interagency communications and strategic meeting arrangements.
- Travel demand modeling.
- GIS mapping.
- Some types of data acquisition, such as traffic or passenger counting.

Some of the questions that should be asked prior to committing to the in-house use of resources include

- Will the use of in-house agency staff provide the best combination of cost and technical performance?
- Does the agency have resources available to deliver on their commitments?
- If the project is particularly controversial and/or time-critical, will the agency staff resources be sufficiently available to respond to those demands?

In either case, both agency and consultant commitments should be clearly reflected in the scope of work.

4.6. Select Consultant or Arrange for Internal Agency Resources

Agencies have their own procurement practices, but the contracting strategy can make a significant difference in whether problems occur and how those problems are addressed throughout the study. Some of the issues of which to be aware include

- **Cost reimbursable versus fixed price.** Fixed price generally goes against the idea of responsiveness and flexibility inherent in the corridor study philosophy. Yet many agencies are either required to or are more comfortable with that approach. Cost reimbursable is usually more consistent with the intent of a corridor study. Possibly, fixed price elements can be included for activities that can be well quantified in advance, with other elements reimbursed on a cost basis, but this hybrid approach is unusual.
- **Selection committee and selection process.** Usually either the policy committee or technical committee will also serve as the selection committee. The public openness of this process can be an issue. Accusations of bias in consultant selection will only compound problems later. For highly controversial projects where the use of a completely open process is critical to study credibility, even the consultant interviews could be open to the public. This is unusual, but has been done on occasion, such as the Ohio River Major Investment Study in the Louisville, Kentucky, metropolitan area, a highly controversial study of cross-river mobility.
- **Multiple consultant contracts versus a single consultant team.** In principle, a single contract with subcontracts under the prime contractor will lead to greater accountability and efficiency. However, agencies must trade this off against having the team members that are best able to conduct the work.

4.7. Define the Community Involvement and Outreach Plan

The community involvement plan is integral to the overall work plan. There are many good references on this subject, several of which are cited in Chapter 1. This *Guidebook* does not seek to cover all the various techniques available. However, it addresses when various techniques may be appropriate. It focuses mainly on the decision-making process itself and on problem resolution and conflict resolution in the decision-making process.

It should be noted that each metropolitan area is required by Federal law to have public involvement procedures, and these procedures must be available for public review and comment (CFR 450.212). Because outreach and community involvement is a major issue in its own right, this topic is covered in Chapter 5.

4.8. Develop/Confirm Agency Study Management Plan/Principles

There are many things that can go wrong in large corridor studies, particularly ones that are complex and controversial. Agencies can prevent many of those problems by having a good management plan in place. Some of the areas to watch include

- Information flow.
- Meetings and meeting documentation.
- Document review and decision-making.
- Filing system.
- Consideration of coordinated corridor study guidelines for the region or state.

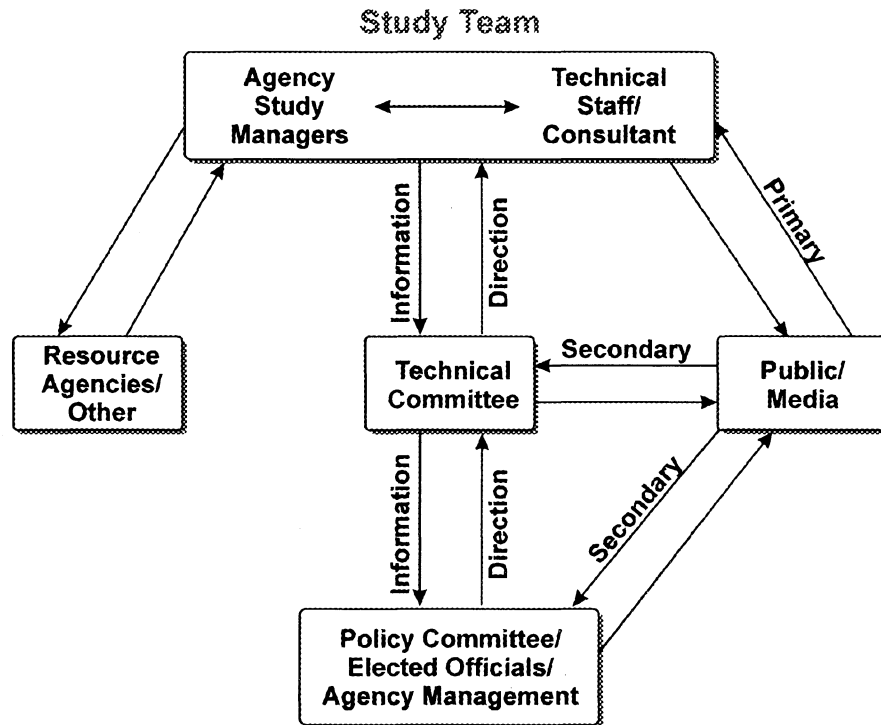
4.8.1. Information Flow

The essence of a corridor study is the generation and distribution of information to guide decision-making. The generation of information is typically the responsibility of the study team. The dissemination of information and obtaining feedback involves all participants.

Exhibit 4-17 illustrates the general flow of information for a typical corridor study structured with an agency project manager, consultant team, technical committee, and policy committee. Information is generated by the study team, flows to the technical committee and then to the policy committee. The policy committee provides direction to the technical committee on selected decisions, and the technical committee provides direction to the study team. The public and media have formal information exchange with the study team (e.g., through presentations, workshops, phone calls, etc.). The exchange among the public, media, and technical/policy committees is generally informal. However, members of both committees may be present at meetings where the public conveys comments in a more formal way.

Exhibit 4-17.

General Flow of Information for a Typical Corridor Study Management Structure



Several principles should be recognized in facilitating information flow:

- **Tailor the information to the group(s) to whom you are communicating.** Information should be tailored both in content and in quantity. For the public and elected officials, summary information is usually as much as can be absorbed. Interested individuals from the public can access backup documents. Technical committee members are usually provided with all materials, and they can provide selected backup information to their policy-level counterparts.
- **Make clear who is expected to communicate the information down the line to other constituents and put materials in their hands that make this communication easy.** Technical committee staff are often expected to keep their administrators and elected officials informed. The study team should provide the technical committee with handouts they can use to explain issues to their superiors.
- **For information deemed critical to the policy committee, communicate it directly.** Communication to the policy committee through their technical representatives may result in different messages being received. Communication of critical information to the policy committee can be by in-person meeting (ideal), by mail, or by phone. Technical staff should receive the same information as the policy committee.
- **Provide copies of newspaper articles and appropriate interagency communication to the technical committee** so that all participants have an equal understanding of the public perspectives being provided by the media.

4.8.2. Meeting Documentation

Some practitioners have said that good meeting documentation has been one of the most important parts of their corridor study process. Meeting documentation is essential for the sake

of recalling the decisions made and actions taken as well as providing the “paper trail” that is part of making decisions that stand the test of time. Some principles of meeting documentation are stated below. These principles usually increase in importance for corridor studies that are more controversial and complex.

- Recording of the technical and policy committee meetings is recommended for controversial studies, in case there is uncertainty as to what was actually done or agreed to. The tapes can be referenced to accurately represent a point in the minutes.
- Meeting minutes do not need to be long, but should focus on decisions made and action items, including specific responsibilities. This will be the study manager’s method for following up and keeping the study on schedule.
- Meetings are often required to have public comment periods, usually before conducting committee business. This will be more important for controversial studies. Public comments should be reflected either in the minutes or on a separate log that is available to all committee members.

4.8.3. Document Review and Decision-Making

As discussed in Chapter 1, the focus of the corridor study process, like the NEPA process, is on making good decisions, not merely generating good documentation. The following principles apply to the decision-making process.

- **Documentation and review procedures should be structured to support decision-making.** Good decision-making is not usually fostered by voluminous documentation. Rather, decision-making is fostered by clear and concise summary information that brings together the information pertinent to the decision at hand. Backup documentation can be provided as supporting material. This approach can also cut the costs of conducting corridor studies.
- Good decision-making is not usually fostered by voluminous documentation.**
- **In most cases, the technical committee is advisory.** Part of making a durable decision involves obtaining agreement on critical intermediate decisions at the policy level. If this does not occur, the study may proceed to a final decision without recognizing that consensus was not reached on one or more points upon which the foundation of that decision must be built. This could result in delays, repeating work already completed, or a questionable decision.
 - **The list of decisions in the work plan should be referenced periodically to ensure that the study is “on track.”**
 - **It is difficult to get all participants, even on the technical committee, to review all the documentation.** Usually, they will review the portions of interest to them. Detailed review of technical material will often need to be done by the lead agency staff or a smaller group of individuals. This detailed review is important particularly for controversial studies where there is potential for litigation. Do not assume that just because comments have not been obtained on a particular section that all the material was reviewed.

4.8.4. Filing System

Keeping track of documents, comments, and correspondence is essential, not just after the NEPA process is initiated, but during corridor-level planning as well. This is particularly true if there is an expectation that the information and decisions generated as part of the corridor study are to be carried forward into the NEPA process.

Most state DOTs have designed filing systems to govern steps in project development and construction. Sometimes these also include the planning phases. However, planning divisions and planning agencies are often not accustomed to the types of record keeping that are warranted for corridor studies, where the corridor study documents and proceedings will be referred to in subsequent project development efforts. An example filing system that could be used for managing a corridor study is provided in Exhibit 4-18. If the corridor study was being conducted under NEPA, the agency’s NEPA-oriented filing system (if available) would be used.

4.8.5. Consideration of Coordinated Corridor Study Guidelines for the Region or State

A strong argument can be made that the entire planning process can benefit by having general consistency among different planning studies as well as consistency even from planning through project development. When project opportunities are brought together within either the MTP or TIP, the tradeoffs will be more apparent if projects can be compared on more of an apples-to-apples basis. Although the coordination among studies is an activity that transcends any single corridor study, the individual studies can be a stimulus for better regional coordination. If regional or state guidelines are in place, any individual corridor study would be well-advised to adhere to them.

Exhibit 4-18.

Example Filing System for a corridor study (adapted from Caltrans Uniform Filing System, Project Development Procedures Manual of Instructions)

Project Control	Expenditure authorizations Personnel costs Contract Progress reports Invoices
Committees and Committee Meetings	Technical Committee Meeting agendas/notices Meeting minutes and attendance rosters Committee correspondence Policy Committee Meeting agendas/notices Meeting minutes and attendance rosters Committee correspondence
Public Involvement	Outreach handouts/materials Public meeting arrangements Workshop/public meeting comments Other public correspondence Individuals Groups
Agency comments and correspondence	Other agency comments (organize by agency) Other agency correspondence (organize by agency)
Study data, reports, and technical memoranda	Study initiation materials Purpose and need/problem identification Evaluation criteria Alternatives screening (organize data by category) Alternatives evaluation (organize data by category) Preferred alternative/decisions
Memos to file	Meeting notes Phone call documentation Internal agency correspondence

There are a number of areas where regional or statewide coordination of studies would be appropriate:

- **Evaluation criteria.** A core set of criteria, consistent among corridor studies, is key to being able to make comparisons among corridors. Evaluation criteria and performance measures are discussed in Chapter 6.

Inaccurate cost estimates, particularly low cost estimates, are a major problem at the planning level

- **Evaluation methodology.** Estimates of benefit and impact should be conducted in the same way, to ensure that there is basic consistency in how the results were derived.

- **Cost factors.** Cost estimates should be generated using consistent sets of unit costs and cost factors. This will avoid the problem of one set of projects looking more attractive merely because of the way in which cost assumptions were made. Inaccurate cost estimates, particularly low cost

estimates, are a major problem at the planning level, and consistent application of costing methodology should reduce this problem.

- **Baseline data and key assumptions.** There should be a common understanding of forecast years, base condition assumptions, and other factors to promote comparability among studies.

The Denver region took this approach on several corridor studies that were conducted simultaneously. Guidance was developed jointly by the agencies and corridor study consultants, for use by each consultant in conducting analyses and preparing materials for each corridor study. This has positioned the region to better understand how the various recommendations may be fit within the financially constrained MTP. The guidelines have been refined over time, and will likely continue to be refined.



CHAPTER 5

COMMUNITY INVOLVEMENT AND OUTREACH



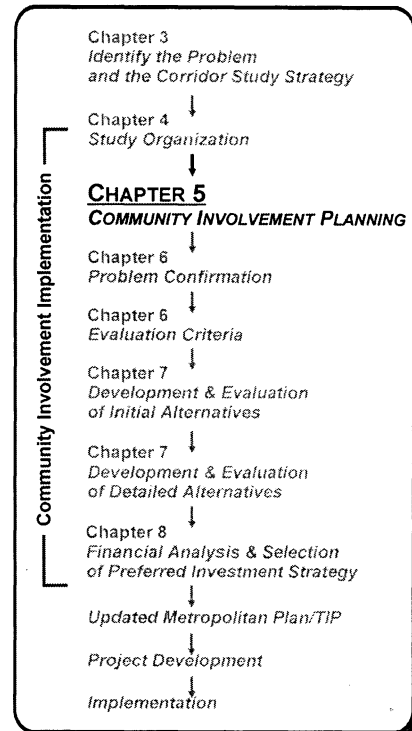
Chapter Topics in a Nutshell

- 5.1 Available resources on community involvement
- 5.2 Overview of community involvement and outreach
- 5.3 Public involvement
- 5.4 Elected official outreach
- 5.5 Media outreach
- 5.6 Resource agency outreach



Principles and Lessons Learned

1. Community involvement for a corridor study includes outreach to at least four elements of the broader community: the public, elected officials, media, and resource agencies.
2. How the involvement techniques are implemented is often more important than what specific techniques are used. This chapter provides many principles on good communication and how to's of working with stakeholders.
3. Helping the public, elected officials, and media to understand the process of decision-making and means of influencing those decisions is critical, but its importance is often overlooked.
4. Disseminating study information requires an array of approaches, not just a single approach. The Public Involvement Plan must be flexible and adaptable to issues that arise.
5. Elected officials need information that takes only a short time to absorb and is simple to understand. Voluminous information is counter-productive.
6. The media are often viewed to be foes, but they can also be strong allies and vehicles for conveying information. The media need to simplify information for their audiences. Packaging information for easy use by the media will increase the chances that the study team's message will come across effectively.
7. There are ways to obtain resource agency input even at the planning stage, but it usually requires a proactive, targeted effort by the study team. The study team must understand which issues are important for obtaining resource agency input, and when that input is needed.
8. Both resource agencies and transportation project proponents have said that more programmatic mitigation, as opposed to project-by-project mitigation, is essential to more effective transportation improvements. Programmatic approaches assist in planning-level decisions not just project development decisions.
9. Credibility of the process will largely rest on agencies being perceived as honest with and responsive to the public. Trust among agencies and the public takes time to gain and can be easily lost.
10. Involving the public does not mean that you will avoid difficult decisions, but a collaborative problem-solving effort with the public may make the decisions less difficult and more in the overall interest of the community.



5.1. Available Resources on Community Involvement

Throughout the *Guidebook*, the term “community involvement” is used. This term is used as a broader concept than “public involvement,” to make clear that coming to decisions on transportation strategies involves multiple outreach activities: the general public, advocacy groups, transportation and planning agencies, Federal, state and local resource agencies, the media, and so forth. Although public involvement is certainly an important element of corridor planning studies, the effective communication and coordination with all these groups is imperative.

Many resources are available nationally and at the state and metropolitan levels on public involvement and other outreach activities. **Chapter 5 is intended to point practitioners in the right direction to take advantage of these resources. It is not the intent of this chapter, nor would it be possible, to cover all the aspects of public involvement.** Rather, the intent is to

- Frame the discussion for structuring approaches to community involvement and outreach in the context of corridor transportation planning studies.
- Identify specific resources to which practitioners can refer in the process of community involvement and outreach.
- Focus on four critical areas of outreach: to the public (both the regional public and the corridor-specific public), to elected officials, to the media, and to resource agencies.

In addition, Chapter 5 identifies lessons learned and observations from practitioners on outreach to these stakeholder groups.

As indicated earlier, there is no shortage of resources or material covering the subject of community involvement. Chapter 1 identified some of the principal national resources. One of the places where agency staff should start, however, is the set of resources already available within their own state or region. Many states have public involvement handbooks or guidebooks, often associated with project development activities. Public involvement handbooks that are consistent with the collaborative, cooperative intent of NEPA should be equally applicable in corridor planning. MPOs are required to maintain public involvement plans as part of their ongoing regional planning processes.

Some of the state or regional public involvement manuals or handbooks are worth reviewing. The PennDOT *Public Involvement Handbook* is a particularly good one (contact: PennDOT, 717-783-6193). The PennDOT handbook is interesting because it covers not just the techniques involved but how those techniques are applied in real-life situations. It has practical how-to’s for avoiding problems and recovering from them when they occur. Exhibit 5-1 shows the table of contents of the *Handbook*.

5.2. Overview of Community Involvement and Outreach

Major transportation projects have always been a matter of controversy, particularly when they involve new or significantly expanded corridors. Citizens do not usually welcome major transportation facilities in their backyard, and the price tags for such projects tend to be large. The increased emphasis on collaborative planning fostered by FHWA/FTA planning regulations has not caused the “not in my back yard” (NIMBY) concerns and funding problems to disappear. But this emphasis has promoted collaborative planning, with the objective of balancing community objectives and concerns and of minimizing the impacts on the community and the environment.

Exhibit 5-1.**Table of Contents from the PennDOT *Public Involvement Handbook*****I. Introduction**

- Involving the public
- Reaching out
- Working together
- Avoiding trouble
- Public involvement, public relations, or both

II. Earning trust and credibility

- Communicating effectively
- Understanding the public
- Dealing with perceptions
- Responding to emotions

III. Managing conflict

- Planning ahead
- When trouble strikes
- Resolving disputes
- Reaching agreement
- Everyday conflicts

IV. Developing a program

- Assessing your needs
- Scoping the community
- Setting the agenda
- Determining levels of effort
- Considering your options
- Making it work

V. The Toolbox (an extensive list of involvement techniques)**Appendices**

- A. Laws, regulations and policies
- B. Press releases
- C. Advertisements
- D. Public hearing presentation
- E. Glossary
- F. Useful references
- G. Index

Top Ten Lists

- Ways to gain credibility
- Listening skills
- Principles of conflict management
- Scoping activities
- Objectives of a Citizen Advisory Committee
- Observations made about formal public hearings
- Observations made about open forum hearings

Checklists

The challenge is to make that involvement constructive and broad-based, so that decision-makers have the information needed to make prudent choices.

Communities are generally oblivious to the intent of Federal regulations. What matters to them are property values, safety, employment opportunities, ease of travel, livable neighborhoods, and other quality-of-life issues. When their expectations in these areas are threatened, many of them will become involved. The challenge is to make that involvement constructive and broad-based, so that decision-makers have the information needed to make prudent choices.

5.2.1. What Is Community Involvement?

The process of involving the community in deliberation over major transportation investments could be defined as

“a means of exchanging information and viewpoints with a broad cross-section of the community as part of the process of identifying problems, defining alternatives, evaluating impacts, and making decisions on alternative courses of action.”

This definition implies that contact is made with a wide range of interested parties and community representatives, not just a narrowly-defined group. The intent is to pursue the facts (not just opinions) behind the impacts, benefits, and costs of the various options. Both fact and opinion are important. But it should be recognized that facts should be used as a basis of opinion, they should not be manipulated to support a preconceived notion.

The above definition also implies that the community is provided with the information it needs to understand problems, benefits, and impacts and to formulate their positions on alternatives. It is through mutual understanding and learning by the community and agencies that consensus solutions can be formulated.

It is important to note that a community involvement process is a means to an end, it is not the end itself. The end, in the context of making major transportation investments, is to make decisions that are in the overall best interest of the region. The region’s elected officials are ultimately charged with making those decisions. They must be provided with timely information that is an accurate, clear representation of the facts, as best they can be known at that time.

The community involvement process must be constructed with an understanding of how it fits within the overall transportation decision-making framework.

It must also be recognized that decision-making is a dynamic process. There are many factors that enter into transportation decisions, and changes in the political environment, technology/construction innovations, financial situation, economic cycles, and competing projects can influence those decisions. The task of planning is not only to make decisions that are in the best interest of the region but to develop those decisions in a way that they can be sustained over time. It is one thing to have parties make a collaborative decision; it is quite another to have that decision stand

the test of time. The community involvement process must be constructed with an understanding of how it fits within the overall transportation decision-making framework. It should involve the public in the definition of the problem, as well as in the formulation and evaluation of alternatives. In addition, one of the essential ingredients of an effective community involvement process is commitment to the process on the part of all members of the study team, including local policy makers and the study managers.

5.2.2. Designing an Effective Community Involvement Process

One of the consistent observations from corridor studies and project development is that the requirements for community involvement can vary substantially, depending on the issues, the players, and the stage in the process. There is no cookie-cutter approach. **The circumstances must be understood so that the community involvement process can be designed, not just mass-produced.** An effective process must anticipate what is to come, not just react to what has occurred.

An effective process must anticipate what is to come, not just react to what has occurred.

Designing a community involvement plan for a specific corridor study must consider the following types of questions:

- What are the decisions to be made?
- Who will be making those decisions?
- What problems are being addressed, and what geographic areas do they cover?
- Who are the constituents that may benefit or be impacted?
- What are the specific key concerns that may exist?
- What are the views currently held by the stakeholders on these points?
- What level of interest will the general public have in these issues?
- What will need to be done to help them understand the decision-making process?
- What techniques have been used up to this point to engage the community?
- How well have these techniques worked?
- Which stakeholders may have been under-represented in prior efforts?
- Does the community have certain expectations, based on history, regarding how they will be dealt with by the agencies? What are these expectations?
- What are the prevailing images of the agencies, the process, or past decisions that should be taken into consideration?
- How much of an interest will the media have? How has the media portrayed the issues so far?

Agency staff should recognize that **people are sometimes in conflict because they do not fully understand the issues. The study team must be careful not to further polarize stakeholders by assuming that conflict exists.** Sometimes apparent conflicts will be diffused simply by clearly explaining the issues. People then discover that their fears are unfounded.

The community involvement process must be developed in the context of a broader understanding of issues, both technical and institutional. Discussion of the process, the decisions, and who will make those decisions is foundational to community involvement. If the community does not understand these things, the study may never get off the ground, particularly if the study is controversial. Designing the involvement process with community and advocacy groups at the table (subject to agencies' policies and procedures) can go a long way toward promoting this understanding.

Exhibit 5-2.

Sample Guidance to Stakeholder Group Representatives

Representatives of stakeholder groups should be able to carry out the following responsibilities:

- Be able to understand and constructively contribute to the study process. Views are likely to be more respected by the decision-makers if offered in constructive fashion.
- Have the ability to accurately articulate the stakeholder groups' concerns, not just represent their own personal views.
- Serve as the conduit for a two-way flow of information, both to and from the study team as well as to and from the stakeholders they represent. The stakeholders represented cannot formulate accurate judgments unless they are receiving accurate information.
- Schedule meetings with or obtain input from the stakeholder group so that input can be provided to decision-makers in a timely way. This will likely mean scheduling special meetings, making phone calls, sending e-mail requests for response, and so forth in advance of the meeting where input is to be provided.
- If meetings cannot be attended, arrange for an alternate and get him or her up to speed on the issues so that the group's points of view can be represented.

5.2.3. Building the Foundation with Sound Consensus-Building Principles

It is not necessarily the involvement techniques themselves that are most important, but how those techniques are carried out.

It is not necessarily the involvement techniques themselves that are most important but how those techniques are carried out. The same techniques can be implemented effectively by one group and ineffectively by another. Experience in consensus building indicates the following to be essential in how agencies implement the techniques. These principles are applicable not just for public involvement but for working with other agencies, elected officials, advocacy groups, and others.

- **Maintain a constructive tone.** Those who have problems with a particular course of action must be encouraged to offer feasible alternatives, not merely speak against the action. Points of view can be expressed with courtesy and respect, even though they may differ from the viewpoints of others.
- **The dialogue needs to include responsible representation of stakeholder groups as well as representation of the broader community interests.** Responsible representation means individuals who will fairly articulate the views of the group or groups they represent, not merely convey their own views. Exhibit 5-2 provides some simple criteria for selecting representatives of various stakeholder groups.
- Representation of broader community interests (i.e., not just those who are negatively impacted) can be difficult, but is essential to achieving balanced decisions. Opinion polling can be a useful tool here.

- **Avoid hidden agendas and give honest answers.** The public tends to recognize when project participants are being less than honest. It is better to correct a misstatement or mistake at the earliest possible point, rather than make excuses or hope that no one will remember.
- **Be sure to follow up, where promises have been made for information or answers to questions.** Credibility of the process will largely rest on agencies being perceived as responsive to their constituents. Where follow up cannot occur in the time frame originally stated, provide a revised date to the individuals who have an interest in the answer. In making promises, agencies should weigh the resources needed to provide the promised information. If the information cannot be provided, it should be identified as a resource issue, not as mere resistance on the part of agencies.
- **Do not make promises that cannot be kept and do not soft-pedal the difficulties inherent in a particular course of action.** There may be no way to mitigate the impacts on some parties or interest groups. Providing honest assessments, even though not necessarily popular, will make for long-term credibility and will protect good decisions from being overturned.
- **Do not downplay uncertainties, nor make more of them than necessary.** Uncertainties will exist. The best approach is normally to acknowledge the uncertainties and make them a part of the decision-making process. Sensitivity testing or risk analysis can be used to bound the limits of the uncertainties.
- **Maintain a balance between providing adequate time for input, while moving the process forward.** It may be best to delay a major decision where more input is needed, but decisions should not be delayed merely because they are difficult. Keep in mind that politicians making difficult decisions will need as much justification as possible.
- Where there are major differences in views among agencies or among segments of the community, **it is best to have the dissenting parties at the table, rather than exclude them from the process.** They may still dissent from the ultimate decision, but at least their input will have been a consideration in the decision.
- **Document all significant decisions.** Having clear documentation of decisions that already have been made can eliminate much misunderstanding.
- **Manage expectations by establishing public involvement goals and measures of achievement.** The study initiation meeting should include an opportunity for public representatives to contribute to the formulation of the public involvement and public information programs. This activity has several positive benefits. First, it establishes direction and focus for the public participation. Second, it provides mutually agreed upon parameters for assessing the success or failure of the involvement process. Third, it provides boundaries for the subsequent discussions and analyses.

Top ten ways to gain credibility (Source: PennDOT Public Involvement Handbook)

1. Involve people in decisions that will directly affect their lives.
2. Provide information that meets peoples' needs in a timely manner.
3. Listen to what people are telling you; respond to it.
4. Respect people's values and feelings.
5. Speak plain English.
6. Be open and candid; respond in a personal way, not as a bureaucrat.
7. Make only promises you can keep.
8. Be honest, admit when you don't have the answers or when you've made mistakes.
9. Act consistently trustworthy; don't get defensive.
10. Improve your interpersonal skills.

- **Provide access to data and information.** This access includes not only final analyses, but work-in-progress that is properly labeled, described, and reviewed by the agencies. One of the common complaints of stakeholders is that the methodologies and subsequent analyses are conducted without appropriate access and explanation of data and study methods. This will require the planning professionals to explain in simple language the key assumptions, methods, and procedures, given the state of the art and information available. Many stakeholders will be unfamiliar with the transportation planning process. A simple explanation of the process will help them understand how to convey their concerns and the appropriate time for doing so. This information can be handled cost-effectively through written materials (handouts at meetings, newsletters, pamphlets, resource papers, etc.).
- **Establish the scope and scale of the public involvement process based on the size and importance of the corridor study.** Often, a potentially large transportation investment will have greater impact and will attract more attention just because of its magnitude. Some efforts may justify opening a project office in the corridor.
- **Coordinate public involvement activities and events so that the public can actually influence the decisions.** The public involvement effort will appear shallow if the key public input comes after important decisions have already been made.

5.2.4. Overview of Techniques

As indicated earlier, a variety of techniques are typically appropriate in projects of this nature, and the techniques may vary by study phase. One way to think about these techniques is in the form of a matrix that correlates the techniques with the type of information, decision, or action contemplated.

Exhibit 5-3 lists the techniques for each group type against several categories or objectives of community involvement. The four categories include

- **Disseminating general information.** Getting factual information (or information on study status) out to a broad cross-section of stakeholders. This normally requires an array of approaches, not just a single approach. The media can be useful here, if properly engaged.
- **Collecting community and advocacy group feedback.** This category entails methods for obtaining specific feedback on specific issues (e.g., alternatives, significance of impacts, recommendations, etc.). Sometimes, the techniques used to get information out to the stakeholders can also be used to obtain their feedback, as shown in Exhibit 5-3.
- **Techniques that help to identify/resolve impacts.** This category focuses on the identification and resolution of impacts that may be associated with alternatives being considered. This most often involves advocacy groups, individuals negatively impacted by a possible action, and resource agencies. Mitigation of impacts is more often a project development issue, but it can sometimes come into play in working through planning decisions as well.
- **Techniques that provide direct input to key decisions.** The main target for information initiatives here will be the elected officials. Because of the many competing demands on their time, information for this group must be packaged simply, yet meaningfully. It should be noted that elected official support and popular support for actions go hand-in-hand. In fact, the community involvement process for all the above categories must be linked and must provide consistent messages.

Exhibit 5-3.

Community Involvement Techniques, Stratified by Applicable Stakeholders and Involvement Objectives

Group Types and Involvement Techniques	Provides General Information	Allows for Community Feedback	Helps Identify/Resolve Impacts	Provides Input to Key Decisions
Community in General				
- Business group meetings	X	X		
- Neighborhood meetings	X	X	X	
- Focus groups		X	X	X
- Citizen advisory committees	X	X	X	X
- Workshops	X	X	X	X
- Newsletter inserts	X			
- Documentation on Web	X			
- Hot line	X	X		
- Public area displays		X		
- Opinion polls	X	X		X
- Community access TV	X	X		
- Field tours	X	X	X	
- Open house		X	X	
- Planning		X	X	
- Community leadership	X			X
- Key interviews	X	X	X	
- Speakers bureau	X	X	X	
- Newcomer's packet	X			
- Resource areas	X			
Elected officials				
- Interviews	X	X	X	
- Information summaries	X			X
- Presentations	X	X	X	X
- Individual briefings	X	X	X	
- Resolutions	X	X	X	X
- Government cable TV	X	X		
Media				
- Editorial board	X			
- Info summaries/Fact sheets	X			
- Continuing education	X			
- Fact-based editorials	X			
- Public panel discussions	X	X		
- Press briefings	X			
Resource agencies				
- Strategic meetings	X	X	X	X
- Info summaries	X			
- Letters		X	X	X
- Interagency coordination procedures	X	X	X	X

Exhibit 5-4.**Observations from Practitioners on Public Involvement Program Design**

- Stakeholder involvement in PIP development is important to its successful implementation.
- Public involvement should be designed to suit the decision at hand. The public generally has had little interest in multimodal alternatives. We have been successful in using an initial broad public involvement effort followed by formation of a focus group composed of interested citizens.
- Define objectives early on. Develop plan and stay with it. The process is, however, dynamic and may involve special issues and controversies that may change courses of action. Plan should include strategies for how to deal with them.
- Insist on a public involvement plan that can be modified on the fly. The same techniques will not work for all stakeholders. For large projects, use a dedicated public involvement office.
- MPO's Citizen Advisory Committee can be an effective means of public input.
- Make sure everyone understands his or her role.
- Try and develop a general process with a schedule you can stick to for your critical public outreach program. This will build credibility with the community. Use newsletters to keep public updated.
- It is good to schedule "go where the people are" special events, attending neighborhood meetings, etc., rather than always have our own event. Informal face-to-face presentations to various interest groups generates the best exchange of ideas. We need to use opportunities to communicate with people when it is convenient to them, at times and places where they already gather. Be honest with the public. They can sense dishonesty. Take all suggestions seriously. Do not make the public involvement plan a checklist of tasks, but it should be responsive to goals and objectives of the study. Needs to be responsive to changing needs.
- This area needs specialists, if you are in a large, complex environment. We are realizing that in smaller areas, we need to get our team leaders better trained.
- Use a variety of techniques tailored to groups who should be involved. Meeting locations are important. Best to meet in study area.
- Have a "model" plan and stick to it. People learn what to expect.
- Involve the public during the entire process, but increase their involvement during the late stages, when specific projects are identified.
- Public involvement plan needs to be flexible. Conditions and interest change.
- Public involvement plan must be allowed to evolve during course of study, almost at direction of public by listening to how public wants to be involved.

Exhibit 5-5.**Observations from Practitioners on Public Involvement Plan Execution**

- Responsibility for implementing the plan should be clearly defined and public involvement practitioners empowered to conduct the process.
- Close coordination with other participating agencies prior to public involvement is essential.
- Prepare very clear and simple graphics. Expect surprises and be ready to adapt. Keep individuals and boards apprised of the public involvement plan and schedule.
- Use the technical and policy committees in planning and execution—keep them informed.
- Listen with an open mind. Obtain input across the demographic strata. Even an excellent plan involves only a minuscule portion of the citizens.
- Need to make clear that this is a study, not project design.
- Be flexible. Alter if something is not effective (example: we needed to hold meetings with Hispanic community on Sunday afternoons in church hall).
- Communicate in simple, understandable words. Public should know they have been listened to by words, action, follow-up,
- Proactive public involvement will consume more time than you budget for it.
- Quality control is paramount. Any miscommunication or misinformation can truly set back the project considerably.

5.3. Public Involvement

5.3.1. Overview of Approaches

As indicated earlier, success in community involvement is often more dependent on how the program is carried out than the specific techniques employed. However, the techniques are important in reaching the right groups and in providing an opportunity for success. Indeed, “success” in public involvement can be an elusive thing. Success is not necessarily defined in terms of numbers of people at public meetings, nor can it necessarily be defined as complete agreement in the outcome. Rather, success in public involvement should be defined as

“accurately obtaining the views of the public and working with them, based on that information, to design solutions that are in the overall best interest of the community.”

A failure to obtain complete agreement cannot be taken as a public involvement failure. Although complete agreement may be an objective, conditions may not allow for this to occur. In the eyes of the public, how an agency works with the public is very important if the public is to provide the kind of input that will allow the overall best interest of the community to be achieved. Portions of the public may not like the ultimate outcome, but it is the job of the elected officials to ultimately balance the needs and concerns of the community. **It is the job of the technical staff to help decision-makers make informed decisions.**

The public involvement process should provide information on how to plug into the decision-making process. Study committees and study workshops will provide some of the most direct opportunities. The public is provided a forum at other levels as well, including public comment periods at most city, county, and regional meetings of elected officials and other policy and advisory bodies. Direct communications with their elected representatives is also available.

5.3.2. Observations from Practitioners

The outreach conducted as part of NCHRP Project 8-34 identified a variety of lessons learned from practitioners in the field. Exhibit 5-4 lists their observations concerning public involvement program design. Exhibit 5-5 lists observations on public involvement program implementation. The observations are from staff within state DOTs, MPOs, and transit agencies who have had experience with corridor transportation studies.

5.3.3. Description of the Techniques

Exhibit 5-3 listed a variety of involvement techniques by target group. The following is a brief explanation of each of the techniques pertinent to public involvement. This is not intended to be an exhaustive list. Substantial additional information is available in the public involvement references cited in Chapter 1.

- **Business meetings/luncheons.** Presentations to business groups, such as chambers of commerce, development groups, and other local business associations. Timing needs to be such that it is convenient to fit into their typical agendas or readily accommodate their schedule. (e.g., brown bag lunch at key employers.)
- **Neighborhood meetings.** It is ideal when agencies can meet the public on their turf. Presentations should be made to organized groups at their normal meeting location on their normal meeting date. This can substantially increase participation among community groups. If properly timed, key input can be obtained on problem definition, alternatives, and other study milestones.

- **Focus groups.** The term “focus group” is used in a variety of ways, from a rigorously selected panel of participants that is used to react to specific concepts or situations to a less formal assembling of a cross-section of stakeholders to provide input on key issues or decisions. Normally, focus groups are used only at strategic points in the study. They are not advisory committees.
- **Citizen advisory committees.** Citizen advisory committees (CACs) are often used, but may not always be the best way to obtain citizen input. An existing CAC (e.g., constituted to advise an MPO) may be appropriate where it adequately represents the area being studied. A new CAC may be appropriate where the area is more focused. In either case, the expectations of CAC members must be fully understood. Agencies should determine how they expect to handle CAC recommendations. Balanced membership of the CAC is critical if its recommendations are to be seriously considered.
- **Workshops.** This is a traditional and much-used technique. Keys to success include holding workshops at convenient times and locations, putting substantive issues on the agenda, and designing mechanisms so that all individuals can provide input (verbal or written). Workshops provide a mechanism for obtaining community input on a full range of topics.
- **Newsletter articles/inserts.** A cost-effective method for disseminating information is providing articles for existing community, business, or agency newsletters. This often increases penetration and reduces production cost compared to a separate newsletter, depending on the quantity of information to be conveyed. The articles or inserts can also serve as stand-alone items for distribution or posting in public places. This can be an effective means of acquainting stakeholders with the study process and helping them to understand how they can provide input.
- **Documents posted on the World Wide Web.** This is becoming an increasingly popular method for disseminating larger quantities of information. It must usually be supplemented with alternative means of access for individuals without computers (e.g., availability at public libraries).
- **Hot line.** This has been a very useful device in many studies to convey the latest information on meetings and project status. It is also a mechanism for individuals to leave voice messages on issues or concerns.
- **Displays in malls or other places frequented by the public.** This is another means of “taking the message to where the people are.” Displays need not be elaborate, but should be professional and self-explanatory. A brief video can be used.
- **Field tours.** Seeing conditions first-hand, guided by those with a concern about the potential impacts, can be highly effective and informative for both the project staff and the public.
- **Live, community access TV with call-in capability.** Depending on the financial arrangement, a community access channel can be used to “simulate” a workshop presentation, with questions or comments called in, faxed in, or e-mailed in.
- **Opinion polls at key points.** On many corridor studies, only those who are negatively impacted tend to provide input. This input is important, but agencies must recognize that it does not involve a representative sampling of the community. Well-constructed opinion polls can help to provide a sense of what the broader community thinks. Telephone-based sampling techniques are usually the best ways to achieve this. Methods requiring respondents to call in are not statistically representative. Sometimes, the media are enthusiastic about and have sufficient resources to conduct polls themselves. If these efforts can be coordinated, or the media can be advised regarding procedures and content,

this may be an effective approach for all concerned. Alternatively, a special polling effort does not need to be expensive and can be very much worth the cost to confirm direction or provide input to decision-makers. However, **the results need to be viewed as one source of input, not as a public vote.**

- **Newcomer's packet.** Not all individuals participate in the process from the very beginning. Some join as the issues surface. This creates a problem of common understanding of the process and where agencies are in that process. A "newcomer's packet," periodically updated, can provide information to help individuals understand where the study has been and where it is going. This is merely a collection of materials prepared in the course of the project. Little new production is required.
- **Resource room or areas.** Citizens should be able to go to one or more locations to find information pertaining to the study. This can be designated in an area within the lead agency's offices or in the field near the corridor in question, where citizens can go to find all the relevant reports. Reports can be provided to the reference sections of public and university libraries and to city, county, and elected officials' citizen information offices.

Elements of an effective public involvement program (PennDOT)

1. **An open process which promotes involvement by**
 - A project team skilled in interacting with the public.
 - A diverse public representing a broad spectrum of interests.
2. **A fair process which enhances understanding through**
 - A project team which is informative and supportive of the public's need for understanding.
 - An interested process which works constructively towards common objectives.
3. **A responsive process which guides public debate by**
 - A project team which facilitates discussion and a focus on important issues.
 - A participating public which provides useful input.

5.3.4. How to Implement the Techniques

For corridor studies that are not particularly controversial, the public involvement program is relatively easy to implement. Conflicts are limited, and the public involvement effort is straightforward and probably not particularly costly. Controversial studies require another level of thinking and skill. Much of the public involvement effort involves creating a constructive atmosphere and managing potential conflict.

The PennDOT *Public Involvement Handbook* spends substantial time

on principles of communication, conflict management, and consensus-building. The *Handbook* provides some excellent, practical insights on these principles. The following pages present the highlights of these principles.

- **Reaching out.** Reaching out to the community will demonstrate that PennDOT is a concerned, cooperative agency committed to customer service. An effective program will enhance the public's image of PennDOT and strengthen the community's trust in what we are doing.
- **Avoiding trouble.** The development of transportation improvements, large-scale facilities in particular, can often generate a great deal of public controversy. Although unilateral decision-making may seem more efficient than a collaborative process, disregarding the public would ultimately undermine our work. Unless we work with the local community, we will spend more time dealing with angry people than improving their transportation.
- **Public involvement and public relations.** Public relations is never a substitute for public involvement, but public involvement is always good public relations. Public relations can be conducted without public involvement, but public involvement cannot be conducted

without public relations. Through each, we can build consensus for transportation improvements.

- **Communicating effectively.** Our credibility depends upon citizens' involvement and access to the information they need. We will achieve trust, in large part, by being honest, consistently competent, and communicating effectively. An effective program of public involvement will enhance a citizen's image of PennDOT and strengthen the community's trust in what we are doing.
- **Understanding the public.** When we understand the public's need for control, choice and fairness in their lives, we can reduce the potential for conflict. The community will form its reaction to our projects based on how responsive we are to basic human issues. We can also develop positive relations with the public by enhancing our credibility and understanding their need to be treated fairly.
- **The public's fear of loss.** Managing conflict is often about dealing with anger. Anger arises from fear, which is the result of a threat. The public feels threatened when confronted with a loss. With many proposed transportation projects, people may feel threatened by a loss of control, the loss of a valued resource, the loss of property, or a reduction in the quality of life.

Top ten listening skills (Source: PennDOT Public Involvement Handbook)

1. Stop talking.
2. Give full attention to speaker; wait to prepare responses.
3. Listen for emotional content.
4. Ask clarifying questions.
5. Focus on the main points.
6. Summarize the speaker's main points in your own words to make sure you heard correctly.
7. Make no assumptions.
8. Recognize your own feelings, then put them aside.
9. React to ideas, not to the person presenting them.
10. Be aware of the speaker's body language.

- **Taking time to understand.**

When you recognize people's need for a sense of control and choice, and understand the importance of trust and fairness in dealing with them, you will better understand issues raised by the public. Taking time to appreciate the community's perspective will benefit you, helping your project to run smoothly, efficiently, and on time.

- **Dealing with perceptions.**

When the public tells us there is a problem, there is a problem. We cannot just explain away the perception of a problem with technical data. However, we can acknowledge their perceptions and make an effort to build an

awareness of how and why we do things and of the reasonable steps we are taking to address their concerns.

- **Responding to emotions.** Proposals for new transportation projects often generate a great deal of emotion. When emotional issues are dismissed, they are likely to re-emerge as outrage and opposition. We can prevent this kind of downward spiral by dealing with the public's emotional issues head-on. When we acknowledge people's feelings and are consistently fair and accommodating, we can diffuse "hot" issues.
- **Addressing an emotional public.** When people are speaking emotionally, respond to their emotions:
 - Listen to the valuable insights into a situation which people's emotions can provide.
 - Do not discount their concerns.
 - Look for creative approaches to solutions which such exchanges can offer.
 - Acknowledge people's feelings to indicate that you have heard what is said.
 - Do not merely respond with data.
 - Use an impartial group to act as a buffer between the Department and the public.

- Recognize that a community's values are as legitimate as the Department's.
- Deal with people's feelings and they are more likely to trust you and take appropriate action when you recommend it.
- **Just part of the job.** It is a reality of our profession that we will have to work with people who are upset or angry. How we work with the public will determine the outcome of emotionally charged issues.
- **Planning ahead.** The goal of an open public involvement program should not be to develop a majority that will agree with a proposed decision. Instead, our goal should be to develop a widespread, shared sense of the long-term public interest.
- **When trouble strikes.** We can manage hot issues when they arise by taking the time to assess the controversy and to develop a strategy for dealing with it. Conflict cannot be assessed in a vacuum, but it can be understood by interviewing the parties who are involved. The information you gather will help you decide which conflict resolution techniques to use.

Top ten principles of conflict management
(Source: PennDOT Public Involvement Handbook)

1. Pay attention to emotional content. It is as important as the technical or procedural content of the issues that have been raised.
2. Take time to understand all aspects of a conflict.
3. Plan a careful strategy and give it a chance to work.
4. Any process to develop solutions should be flexible.
5. Work hard at establishing and maintaining communications with disputing parties.
6. Have parties agree on the problem before beginning to find a solution.
7. Work collaboratively to find a solution.
8. Solutions should be based on the underlying interests of the parties.
9. Think ahead and consider possible stumbling blocks to the creation of a workable solution.
10. Do not create more problems.

- **Resolving disputes.**

Transportation planners resolve most disputes without the use of attorneys. With experience, project managers and Department officials learn to practice diplomacy when dealing with elected officials, citizen's groups, and individuals.

- **Reaching agreement.** In everyday life, interests or needs motivate people. In the development of a transportation project, strong feelings about conflicting needs and interests can lead people into positions and arguments over their positions. When parties in a dispute can avoid locking themselves into positions from which it is difficult to retreat and understand each other's needs and interests, problems can be solved. Agreements can be reached collaboratively.

- **Tips on resolving disputes**

- Disagree with ideas, not with people.
- Identify and prioritize the issues that are central to the conflict.
- Avoid polarizing the conflicting positions.
- Avoid adopting a position that allows only one solution to meet your needs.
- Brainstorm to identify solutions in which both parties gain.

- **Tips on negotiating**

- At times, the best tool for construction conflict resolution is a little quiet time.
- It is important to let people express themselves, but if the atmosphere gets so argumentative that people are no longer listening to one another, take a break.
- Come back to the table after the break, summarize the earlier discussion and ask for solutions that can bridge the differences the parties expressed.

5.3.5. Developing the Public Involvement Program

Public involvement programs take on many shapes and sizes. Tailoring the program to the needs at hand requires

- **Knowing the community.** who the interested parties are, where they have stood on the issues previously, and how they like to be communicated with.
- **Knowing the study issues.** which issues are likely to rise to the surface as controversial and which ones are unlikely to evoke controversy.
- **Knowing the possible tools available.** having a repository of techniques that can be tailored to the unique setting of the study.
- **Knowing the study objectives and decisions to be made.** having an understanding of where agencies are trying to go with the study, not in terms of solutions but in terms of the problems they are trying to solve.

Exhibit 5-6 provides a sample of a generic public involvement program outline for corridor studies developed as part of the regional Public Involvement Program (PIP) by the Austin Transportation Study (ATS—the MPO for the Austin region). The intent is that the generic program be consulted as a starting point for the design of a PIP for a specific study. Obviously, the scope and scale of the PIP will vary with the nature of the issues, size of the study, level of controversy, and so forth. The public involvement program should be

- Specific, so that actions and responsibilities are clear.
- Flexible, to adjust to circumstances that inevitably arise.
- Cost-effective, not doing more than necessary and using existing resources and communication channels as much as possible.
- Continuous, obtaining input throughout the process, not just at pre-specified points.

5.3.6. Evaluating the Program

The PIP requires continued monitoring and refocusing as issues emerge and different players take on roles in shaping the direction of the study. There are a variety of techniques for maintaining this flexible, adaptable approach:

- Periodic reviews
- Public comment cards
- Elected official input
- Formal surveys
- Peer reviews

Exhibit 5-6.
Sample Public Involvement Program Outline
from the Austin Transportation Study Regional PIP

Phase 1—Scoping Meeting(s) and Review of Design Concept, Scope of Work and Start of Environmental Analysis

- 1. Notification and information dissemination for scoping meeting**
 - a. Mail ATS newsletter to entire mailing list
 - b. Place public notice advertisement in local newspapers
 - c. Send press release to all appropriate media
 - d. Post public meeting notice at City Hall(s), County Court House(s) in which the project is located and the Texas Register Section of the Office of the Secretary of State
 - e. Present/mail information packet or draft report to all potentially affected agencies
 - f. Hold scoping meeting(s) in the vicinity of the proposed study. The scoping meetings will be held after regular work hours for greater attendance and participation
 - g. Hold interest group discussions with existing organizations, as appropriate
 - h. Radio/cable TV interviews, as appropriate
 - i. Local newspaper articles, as appropriate
- 2. Citizen and agency feedback (information collection) regarding scoping meeting and availability of information packet**
 - a. Public communication period at ATS PAC meetings
 - b. Mail-in comment/question card in all information packets and reports available for the public
 - c. Comment/question cards available at all public meetings regarding the project
 - d. Information packets and draft reports available free of charge
 - e. Information packets and draft reports available at the following locations: all public libraries, ATS office, county offices in which project is located, and project sponsor office
 - f. Public review period will run at least 30 days

Phase 2—Review and circulation of Draft Corridor Study Report and Draft Environmental Assessment

- 1. Notification and information dissemination of the Draft Report/EA**
 - a. Measures (a-c, e, g-i) listed in section 1 above
- 2. Citizen and agency feedback (information collection) and availability of Draft Report/EA**
 - a. Measures (a-f) listed in section 2 above

Phase 3—Review of Draft EIS and Public Hearing

- 1. Notification and information dissemination of Draft EIS and Public Hearing**
 - a. Measures (a-e, g-i) listed in section 1 above
 - b. Send public hearing notice to all libraries within ATS study area
- 2. Citizen and agency feedback (information collection) and availability of Draft EIS**
 - a. Measures (a-c) listed in section 2 above
 - b. Executive summary of the Draft EIS available free of charge; Draft EIS available at cost of printing
 - c. Draft reports at the following locations: all public libraries, ATS office, county offices in which project is located, and project sponsor office
 - d. Public review periods will run at least 30 days

Exhibit 5-7. Sample Public Comment Card (source: Ohio River MIS, Louisville)

What Did You Think Of The Workshop?

The ORMIS Committee is committed to active public participation in this major investment study. We would like to know what you thought of today's workshop, so that we can provide you the best opportunity to participate in future events and in the formulation of issues and solutions ideas.

Place a (✓) in the appropriate box.	Yes	No
The location of today's workshop was convenient. If no, explain _____	<input type="checkbox"/>	<input type="checkbox"/>
Today's workshop was held at a convenient time. If no, explain _____	<input type="checkbox"/>	<input type="checkbox"/>
I understood the purpose of the workshop. If no, explain _____	<input type="checkbox"/>	<input type="checkbox"/>
The meeting encouraged active participation. If no, explain _____	<input type="checkbox"/>	<input type="checkbox"/>

Transportation & You

1) Circle the three (3) regional issues you feel are the Most important?

Employment	Transportation	Taxes
Controlled Growth	Crime	Air Quality
Health Care	Education	Other _____

2) On a scale of 1 to 10, with 1 being Horrible and 10 being Excellent, what number would you give to your overall feeling about the transportation situation in the metropolitan region?
Circle the appropriate number. 1 2 3 4 5 6 7 8 9 10

3) How long have you lived in the Kentuckiana area? *Circle One.*

1. Less than 5 years	3. Between 10 and 20 years	5. I don't live here
2. Between 5 and 10 years	4. Over 20 years	

Additional Outreach Considerations

The ORMIS Committee has identified a number of outreach approaches to keep you informed and to provide an opportunity to collect your input. Please indicate your preference for the following:

Opportunity to Participate	Level of Participation/Use				
Media	Least	←	→	Most	
1. TV/Radio programs with project updates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Telephone Hotline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Public displays (malls, high-use areas, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Special educational newspaper inserts at key project milestones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Exhibit 5-7 is a sample public comment card distributed at public workshops for a major corridor study in the Louisville region. The card solicited comments on specific issues addressed at each workshop as well as comments on the outreach process overall. Cards could be mailed in or handed in at the meetings. The cards, along with other verbal comments, were an important indicator to the study team of how the public involvement program was being viewed.

5.4. Elected Official Outreach

5.4.1. Overview of Approaches

Elected officials and upper agency management will ultimately render a decision on the alternative, alternatives, or strategies to be recommended. Some of the principles to remember in dealing with elected officials include

- **They do not like to be surprised.** Keeping them informed is crucial to maintaining study credibility. Once study credibility is lost, it is difficult to regain.
- **They do not like to be backed into a corner.** For as long as possible, help them by keeping options open. When final decisions must be made, help them to understand why a recommended course of action is in everyone's interest.
- **Help them with intermediate decisions.** Dealing with issues in bite-size chunks helps them with the ultimate decision.

- **Be sensitive to election cycles.** Certain decisions are best left until after elections take place.
- **Be sensitive to budgeting cycles.** In some cases, it may be important to time study decisions in advance of budgeting cycles. In other cases, avoiding the budgeting cycle will help elected officials with their decision.
- **Bring newcomers up to speed.** Players change frequently. Newly elected officials will usually need a personal briefing to provide them with the information on prior decisions and rationale, where the study is going, and so forth.
- **Be cognizant of established positions.** Major transportation projects may have been political issues in a recent campaign. If politicians need to be convinced that another option is best, they need to be given a “way out.”
- **Elected officials need information that takes only a short time to absorb and is simple to understand.** Decision-makers have many competing demands on their time. Voluminous information is counter-productive.
- **Develop good communication linkages with elected official aides.** Direct access to elected officials will often be limited, and their aides can be key to communicating crucial information.
- **Work with the town, city, or county clerks to understand their basic procedures for notification, and when information needs to be submitted for placement on their agendas.** For complex efforts, a comprehensive calendar of these dates should be maintained.

5.4.2. Observations from Practitioners

Exhibit 5-8 presents some observations from DOT, MPO, and transit agency staff regarding how to best deal with elected official concerns.

5.4.3. Elected Official Outreach Techniques

Exhibit 5-3 identified some techniques for working with elected officials. A brief explanation of each is provided below:

- **Information summaries.** Brief, “executive summary”-type documents, designed to give elected officials the essential information for making decisions. This allows them to quickly assess the situation, while reviewing more detailed information, where desired.
- **Status presentations.** Presentations at city council meetings, regional meetings, or workshops specifically for elected officials.
- **Individual briefings.** Sometimes, personal attention is needed to provide elected officials with both more detailed information on certain issues and an opportunity to provide input on concerns for consideration by project staff. Funding approaches may be one of the topics of greatest interest.
- **Leadership interviews.** Interviews with community leaders, civic association leaders, special interest groups.
- **Resolutions.** A resolution is a common way that elected bodies will express the views on a subject when the decision is not one they directly control. The study team can sometimes assist elected officials and the study by helping craft resolutions that contribute to progress. Be aware of the timing of the resolution, as this can be important.

- **Government cable TV programs.** Elected officials sometimes have access to a certain amount of air time or can influence what is covered. Study team access to cable TV can sometimes be obtained through elected officials.

Exhibit 5-8.

Observations from Practitioners on Working with Elected Officials

- Frequent, separate briefings are needed, as involvement in committee is difficult.
- Keep officials informed of key decision points. Give them a summary with an option to get the full document. Get their endorsement when screening alternatives.
- A clear, simple description of the study and how it fits into the planning and project development process is essential.
- Keep information flowing, particularly at milestone points. Involve them in the scoping process.
- Contact and offer to meet prior to conducting the initial public outreach program. They should be on project mailing list.
- Decision-making should focus on the public, but elected officials must know what the public is thinking so as not to be blind-sided. We have had success using the standing transportation committees of the MPO. We have had special events for the local electeds to try to keep them actively involved.
- Local officials should be on a study oversight committee.
- Keep them informed. They tend to make quick decisions without facts. Let them know the study will provide facts.
- We have recommended that some elected officials who are part of the MPO Policy Advisory Committee also be part of the study steering committees. This helps to get local buy-in to the study from the beginning.
- Communicate with elected officials early in the process and establish a method for ongoing dialogue.
- Explain the process and do not raise expectations beyond what can be accomplished
- Inform them of any recommendations before taking recommendations to the public.
- Difficult to get involved and stay involved especially if study is lengthy. Try to have a key decision that needs to be made at regular intervals.
- The Corridor Elected Officials (CEO) group brought the elected officials from the seven corridor cities together. The CEO allowed officials from each of the cities to have a better understanding of what other cities wanted or expected.

5.5. Media Outreach/Interface

5.5.1. Overview of Approaches

The media are often viewed to be foes, but they can also be strong allies. They can even help reduce the cost of a public involvement program by providing ready-made outlets for information. But to take advantage of these opportunities, agency staff need to be one step ahead of the game. Some of the general principles for dealing with the media include

- **Help them understand the process, where it has been and where it is going.** Their articles will be more helpful to the public if they understand this.
- **Be as open and honest with them as you are with other groups.** Hiding information or even the appearance of hiding information usually spells trouble with the media.
- **Be proactive in giving them information to shape their story.** If they have to drag out the details, it is more likely that the story will be shaped according to their preconceived notions. Be aware of when reporters may be trying to put words in your mouth, and come back with straightforward, factual information that will be useful to the public.

- **Be constructive, not critical, in helping them correct misinformation.** Reporters are being evaluated on how well they do their job. If you help them do their job, they are more likely to become your ally. Reporters have pressure too.
- **Convey technical issues in simple, straightforward language.** Reporters need to convey ideas to the public. If you do not simplify it for them, they will do it themselves, and their interpretation may not be correct.
- **Provide one point of contact or spokesperson on the study team to interface with the media and make sure that person is consistently available.**
- **Just as the corridor study has a budget, establish a budget for media outreach.** Given that mass media is still the main way people obtain information for these studies, the study team should not shortchange the use of these outlets.

5.5.2. Observations from Practitioners on Media Relations

Exhibit 5-9 presents some observations from DOT, MPO, and transit agency staff regarding how to best deal with the media.

5.5.3. Media Outreach Techniques

Exhibit 5-3 identified some techniques for working with the media. A brief explanation of each is provided below:

- **Meetings with editorial boards.** The purpose is to acquaint the media with the process being undertaken. The reporting is typically better if they understand the big picture.
- **Continuing education.** There is often rotation in beat reporters, and a continuing educational process is needed. Time taken to keep the reporters educated is well worth the effort.
- **Information summaries.** The same condensed information provided for elected officials is usually also a good format for the media. Providing written information makes it less likely that facts will be misrepresented. The media can ask more detailed questions, if desired.
- **Fact-based editorials.** Newspapers may provide an opportunity for the study team to write an editorial or op. ed. piece explaining a particular aspect of the study. The study team should be clear on style and length. But save these opportunities for strategic points in the project. The number of opportunities will be limited.
- **Public panel meetings.** The media may find it advantageous to have key players involved in a question-answer panel on either the radio or on community access TV. Again, these opportunities should be reserved for strategic points in the project.
- **Press briefings.** When major decisions are being made, the media may want to have an opportunity to hear directly from the study team and to ask questions. A press briefing is a structured way to get breaking information out to the media quickly.

Exhibit 5-9.**Observations from Practitioners on Media Relations**

- Information must be timely and presented in an interesting manner to ensure coverage. In large scale projects, use media kick-off sessions and frequent briefings.
- Involve media early in the process.
- Seek briefings with editorial boards to help their understanding. Work into a factual relationship with key reporters. Provide a single point for media contact to maintain consistent coverage.
- Media is extremely useful in disseminating results of alternative identification and screening process.
- Answer their questions. It is difficult to slow media speculation to the pace of a thorough study.
- Be proactive by accepting interviews, sharing public information when requested.
- Openness and honesty is the key. Educate the media on study process. The media can be a great asset to the study, or your worst nightmare.
- Media should be invited to all events, with additional meetings possibly needed to educate them on the study process.
- Invite media to committee meetings so they can see the process in action.
- Use a variety of media forums. Make the media a partner.
- Early contact, efforts to educate and ongoing participation are important.
- Use media kick-off meetings; press releases at major milestones; do not let media coverage get ahead of study process.
- Explain the FACTS. The media do not necessarily want to know about the process, but they need to understand.
- Unfortunately, media typically deal with such studies via general assignment reporters. Every time you talk to them you end up going back to square one. Project newsletters were useful in getting “latecomers” up to speed.
- Include special events in public involvement program in which media can participate. Inform the media about survey results.
- Always be available to the media. No hype. Do not over promise and under deliver. Do not let media fixate on “glamour” or “popular” fixed-guideway solution.
- Do not respond to every issue that comes up in the press. It may just exacerbate things that are controversial.

5.6. Resource Agency Outreach**5.6.1. Overview of Approaches**

Involving resource agencies has been one of the great difficulties in conducting planning-level studies. Their involvement is not always necessary at this stage, but if agencies are trying to make key decisions that could significantly affect cultural, environmental, or other community resources, the decisions coming from a corridor study are more likely to endure if resource agency input is obtained. If a decision hinges on the views of a certain resource agency, it is imperative that contact be made to identify its perspectives.

If a decision hinges on the views of a certain resource agency, it is imperative that contact be made to identify its perspectives.

Resource agencies are typically accustomed to dealing with specific project proposals, not planning-level alternatives. It is difficult for them to voice their concerns on proposals that are too abstract. Yet their early input and direction can be critical to avoid embarrassing situations, retracing of steps, or unnecessary conflicts. There are ways to obtain resource agency input even at the planning stage, but it must be done in a way that the agencies can understand it and deal with it. The following are observations on resource agency involvement:

- **Protecting resources is their job.** It is not their job to present the case supporting a new transportation improvement. However, they can be given information to understand why an improvement is important to the community, which is key to helping them see why working out resource agency impacts is important.
- **Resource agencies have limited time to deal with all the issues.** Making their life as easy as possible by going to their turf and making the issues easy to understand is more likely to elicit a response.
- **A viewpoint expressed by a resource agency is not a commitment.** Federal, state, and local regulations spell out what is required to obtain a commitment. **If a commitment from a resource agency is needed to make a key decision, it should be obtained in writing.**
- **Understand “who calls the shots.”** The viewpoint of a lower level staff person may not necessarily be the viewpoint of the agency. If it is a critical issue, bring the real decision-maker into the picture, but do not go around the protocol. A written request may force the issue if oral communication does not.
- **If leadership at the resource agency changes, bring the new staff up to speed.** Response by the new leadership may not be the same as for the previous leadership.

5.6.2 Observations from Practitioners on Resource Agency Outreach

Exhibit 5-10 presents some observations from DOT, MPO, and transit agency staff regarding resource agency outreach.

5.6.3. Resource Agency Outreach Techniques

Exhibit 5-3 identified some techniques for working with the resource agencies. A brief explanation of each is provided below:

- **Strategic meetings.** A major complaint among many transportation agencies is the inability to get the attention of resource agencies, who may bring issues to light at a later date, possibly affecting decisions that have already been made. This is not normally an intended neglect, but a result of limited time and resources in resource agency staff. Targeted contacts with resource agencies at key points can be very cost-effective. Strategic meetings or phone calls are one way to achieve this. The lead agency needs to take the initiative. Do not wait for the resource agency to come to you. Going to resource agency not only helps to provide the information that is needed, but shows the resource agency that you are aware of the possible impacts and are concerned.
- **Information summaries.** The same information as provided to the elected officials and the media can be used, but additional backup information related to the specific resources of interest should be provided, when available.
- **Letters requesting a response on specific issues.** Resource agencies may be willing to provide their views in writing, but whether they are able or willing to do so will depend on statutory requirements and time availability.
- **Letters from the study team indicating agency understanding of impacts.** For critical issues where a response is not expected from the resource agency, an alternative would be to craft a letter stating the study team’s understanding of the issue. The resource agency may be able to respond verbally or briefly in writing with concurrence or clarification.

- **Existing or improved interagency coordination mechanisms.** This is one area where there is substantial potential for increasing participation with resource agencies. For example, some states are developing more systematic approaches to coordination with resource agencies. The State of Pennsylvania has one of the more intriguing, comprehensive programs, described in the next section.

Exhibit 5-10

Observations from Practitioners on Resource Agency Outreach

- Make coordination as easy as possible for resource agencies. Send summaries of meeting minutes. Write letters requesting or asking for input. Deal only with major resource agencies, but keep all resource agencies informed.
- This is sometimes difficult; they are at times reluctant to participate until impacts are more fully identified.
- Work hard to keep them involved. If they do not attend meetings (budget, constraints, lack of human resources), go to them.
- They should be on mailing list and receive drafts of reports for review, when their discipline is involved.
- Publishing NEPA “Notice of Intent” has been the most successful way to get their participation. Do not recommend their participation in voting.
- Try to keep involved through the technical committee.
- Generally maintaining good, open relationships with them all the time pays off when you need their participation for a particular effort.
- Involvement is very important if fatal flaws or mistakes are to be avoided.
- Develop ongoing relationships with resource agencies so their processes/requirements do not have to be re-learned for every study.
- Can be helpful in keeping the study out of trouble by identifying problems early.
- Establish a regular meeting schedule with the resource agencies.
- Could not involve resource agencies. However, they were willing to say that there were no “fatal” issues early in the process for the most likely alternatives.

5.6.4. Example Outreach Programs to Resource Agencies

The FHWA document “Interagency Coordination with Federal Agencies during the FHWA Project Planning and NEPA Processes” provides an excellent summary of techniques and approaches for coordinating with resource agencies. The report was based on a series of interviews with state and regional agencies dealing with transportation improvements.

The report identifies the following common key ingredients to successful interagency coordination:

- Support by top management
- Approach tailored to the agencies involved
- Focus on balanced decisions
- Trust, mutual respect, understanding and positive working relationships
- Open and continuous communication
- Programmatic approaches
- Early agency involvement
- Integrity of the process
- Creative thinking
- Information sharing and education
- Results-oriented approach

Exhibit 5-11 provides a summary of some of the major obstacles to effective interagency coordination uncovered during those interviews and some of the techniques that have been used to address those problems. Both resource agencies and transportation project proponents have said that more programmatic mitigation, as opposed to project-by-project mitigation, is essential to moving forward. This approach is more comprehensive and overcomes some of the staffing problems resource agencies have in dealing with project-by-project issues.

More programmatic mitigation, as opposed to project-by-project mitigation, is essential to moving forward.

Exhibit 5-11. Obstacles to Effective Interagency Coordination and Possible Solutions (Source: FHWA, Interagency Coordination with Federal Agencies during the FHWA Project Planning and NEPA Processes, January 1997.

Major obstacles to effective interagency coordination	Activities that have been used to overcome these major obstacles
A lack of trust among stakeholders	<ul style="list-style-type: none"> • Open, honest and continuous communication • Active involvement of FHWA and State DOT top management • Stakeholders actively involved in decision-making • Federal agency participation in process reviews • Partnering sessions • Periodic meetings to discuss programmatic issues • Participation in professional organizations • Social get togethers • Car pooling to meetings and reviews
Agencies have different priorities than the DOTs	<ul style="list-style-type: none"> • Partnering sessions to identify common goals and needs • Coordination procedures jointly developed by the stakeholders • Active FHWA leadership in reaching balanced transportation decisions • Jointly pursue alternative mitigation
Local offices of the same agency have differing procedural and mitigation requirements or different interpretations of those requirements	<ul style="list-style-type: none"> • Periodic meetings to discuss and clarify agency policy issues • Procedural MOAs/MOUs • Partnering sessions to identify common areas • Jointly developed manual of best design practices • Jointly developed best mitigation practices
A lack of expertise among some of the stakeholders	<ul style="list-style-type: none"> • Sharing technical expertise • Sharing burdens among Agencies • Sharing training courses
Agency offices are located in different cities from DOT offices	<ul style="list-style-type: none"> • Teleconferencing • Use of E-mail and the Internet • Sharing burdens among Agencies
A lack of understanding of the stakeholders' roles/requirements/processes/initiatives	<ul style="list-style-type: none"> • Periodic meetings to discuss Agency initiatives and policy issues • Procedural MOAs/MOUs • Joint training courses • Partnering sessions/agreements • Jointly developed manual of best mitigation practices
Individual preferences and personalities interfere with the process	<ul style="list-style-type: none"> • Commitment and involvement of stakeholders' top management • Stakeholders actively involved in decision-making • Formal sign off points during project development • Programmatic agreements • Periodic meetings to discuss programmatic issues

Major obstacles to effective interagency coordination	Activities that have been used to overcome these major obstacles
State DOTs do not send the individual Agencies the information they want when they want it or in a user friendly format	<ul style="list-style-type: none"> • Tailor made approach vs. one size fits all • Stakeholders actively involved in decision-making • Procedural MOAs/MOUs • Open, honest and continuous communication
State DOTs do not involve agencies until major project decisions have been made	<ul style="list-style-type: none"> • Formal scoping meetings/reviews • Commitment and involvement of State DOT and FHWA top management • Periodic meetings with Agencies to discuss State DOT program • Procedural MOAs/MOUs • Formal coordination/project development procedures
Agencies do not have available staff to be involved throughout the project development phase	<ul style="list-style-type: none"> • Programmatic MOAs/MOUs • MOAs/MOUs to identify thresholds for Agency involvement in projects • Use of project funds to hire technical expertise from Agencies • Sharing burdens among Agencies
Agencies do not have sufficient travel funds to attend all of the key meetings/reviews	<ul style="list-style-type: none"> • Video of field reviews sent to Agencies • Sharing burdens among Agencies • Use of project funds to pay travel expenses of key personnel to attend critical meetings/reviews • Combining reviews • Gatekeeping by FHWA and State DOTs

Some of the specific concepts for increasing coordination with resource agencies include

- **Making presentations at regular resource agency meetings.** For example, many U.S. Army Corp of Engineers’ districts sponsor periodic meetings where agencies can come to present their project concepts to obtain early feedback. In many cases, multiple resource agencies are invited to view the presentations and offer their comments. In California, Caltrans has been using this venue to obtain earlier feedback than might have otherwise occurred. This is not a substitute for other contacts, but it is a way to gain an audience at the planning stage. Follow-up conversations are often necessary, particularly if the right people from the resource agencies were not in attendance.
- **Agency coordination meetings hosted by the transportation agency.** PennDOT has made the agency coordination meetings a regular part of their project development process for a number of years now. Key Federal and state resource agencies are invited to attend on a monthly basis and must be prepared to express their concurrence (or lack of concurrence) at well-defined points in PennDOT’s 10-step process. A description of the process and of other related PennDOT initiatives is provided in Appendix B.
- **Regional mapping of resources.** The locations and nature of resources are sometimes difficult to obtain. Having access to biologists, historians, geologists, archaeologists, and so forth who know the local resources will help to avoid the problem of missing key resources. States and MPOs can foster more environmentally-sensitive planning at an earlier stage by moving toward regional mapping systems for resources. These GIS-based efforts can be expensive, but can save time and money for the planning of individual projects. SCAG paid the U.S. Fish and Wildlife Service to come into their offices and plot the location of sensitive biological resources as one of SCAG’s GIS coverages. This information can be useful not only for corridor-level planning but for developing programmatic mitigations as well.

CHAPTER 6

CONFIRMING THE PROBLEM AND DEVELOPING EVALUATION CRITERIA



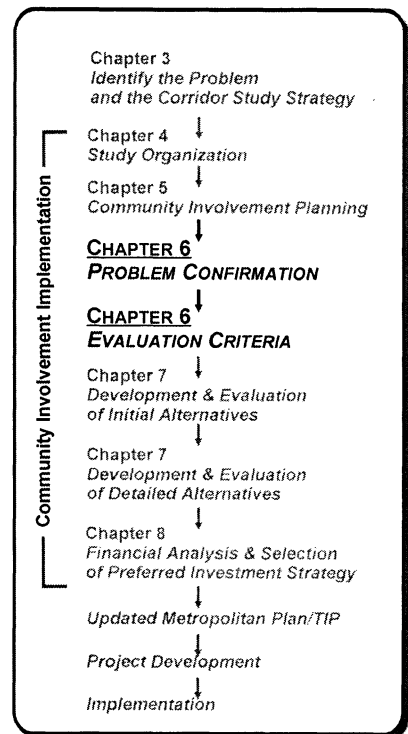
Chapter Topics in a Nutshell

- 6.1. Confirming and Expanding on the Problems
- 6.2. Developing an Evaluation Framework
- 6.3. Developing Evaluation Criteria



Principles and Lessons Learned

1. Problem identification is foundational to a corridor study. The problems should be clearly stated, agreed to by as many participants as possible, and, especially for controversial studies, approved by the study policy committee. They should be documented in a format that will be consistent with the intent of NEPA.
2. Study participants should think through how the criteria are to be used, not just which criteria are to be used. That is the purpose of an evaluation framework.
3. Evaluation criteria should be clearly tied to the problems that the alternatives are being designed to address.
4. There are a number of other sources from which evaluation criteria can be drawn, including regional goals, objectives and policies, project selection and prioritization criteria, potential impacts of alternatives, and state or national funding eligibility criteria.
5. Evaluation criteria are among the most direct determinants of the level of detail to be undertaken in the corridor study analysis. Care must therefore be exercised to choose the criteria to balance the expected cost against the information needs.
6. One of the main objectives of a corridor study is to provide meaningful information to decision-makers. Practitioners should be careful not to present so much information to decision-makers and the public that the essential messages are lost.
7. Criteria weighting and numerical ranking systems are only occasionally used, but if used, should be one consideration in the decision, not the determining factor in the decision.
8. Decision-makers will be able to make better sense of the results of a corridor study in regional decision-making if there is regional consistency in how evaluation is to take place. A structured regional evaluation framework can help create this consistency without hampering the flexibility needed within each individual corridor study.
9. Multimodal performance measures and evaluation criteria continue to be an area where agencies have questions. Agencies should recognize that there is no single evaluation criterion that will tell the whole story of how multimodal alternatives compare with one another. Multiple criteria are needed to provide an adequate picture.
10. The assessment of environmental impacts is equally applicable across all modes. Alternatives that are less capital-intensive usually tend to have fewer impacts, which can weigh in favor of those alternatives. But many of these alternatives do not go far enough in addressing the defined problems.



6.1. Confirming and Expanding on the Problems

The importance of clearly identifying the problems to be addressed was highlighted in Chapter 3. The discussion in Chapter 3 focused on identifying the problems in the context of deciding to initiate a corridor study. Section 6.1 refers to the confirmation and expansion of those problem statements once the study is initiated and the broad range of stakeholders are brought into the study.

The development of and consensus on a statement of problems should be one of the earliest activities within a corridor study. Several efforts would normally be expected:

- **Open discussion of problems among agency stakeholders.** A simple listing of the problems at one or more technical and/or policy committee meetings will usually suffice. It may be desirable to wait until technical data are available to focus the discussion as much as possible on the facts, rather than merely perception. However, perception is important and may point out valid concerns that the technical data cannot.
- **Identification of problems and concerns from the perspective of the public.** The identification of problems is often a good opportunity for the first public meeting or for the first discussions held with neighborhood and business groups. It is a good way to help the public open up to the process and provide constructive feedback. It helps them see why an action may be necessary. Small discussion groups, comment cards, telephone hot lines, e-mail, and letters from community groups are good ways to obtain input. It is easy for the conversation to drift into solutions, but the focus should clearly remain on problems at this point. The study team should provide a structure that makes it easy for the public and other stakeholders to provide input. See Chapter 3 for guidance on how to characterize problems.
- **Technical analysis and quantification of the problems, both existing and future.** Existing data on traffic volumes, transit ridership, speed and delays, accident rates, and so forth are usually compiled at an early stage. A future no-build travel demand forecast is typically important as well. It is important that the travel demand model be ready for use immediately as the study is initiated, so that the future no-build forecast can be generated in a timely fashion. Generating some of this information even prior to study initiation could expedite the discussion of problems. Understanding travel patterns in the corridor can be as important as understanding the amount of travel. In some cases, special O-D surveys have been used to establish travel patterns. Normally, O-D data from the travel demand model are adequate, as long as there is confidence that the trip O-D patterns in the model are reasonable representations of reality. A factual basis for the problems is essential to clearly determine that the problems are real and are not merely a perception.
- **Distillation of all the information into a statement of problems.** Samples are provided in Chapter 3.
- **Consensus on the statement of problems.** The documentation of existing conditions and statement of problems should not be glossed over. Normally, explicit approval of or concurrence on the problem statement is advisable. Ideally, this should include resource agency concurrence as well as concurrence of the transportation and planning agencies involved. This will be foundational to all the subsequent work on the study.

6.2. Developing an Evaluation Framework

Prior to identifying the criteria to be used for evaluation, study managers should consider the overall evaluation approach or “evaluation framework.” There are several fundamental questions that should be asked:

- What type of decision is being made? Is the study to recommend a preferred alternative? Narrow down the alternatives? Address corridor preservation? The evaluation approach may vary depending on the types of decisions anticipated (see the discussion of corridor study strategy in Chapter 3).
- What information is important to the type of decision being made? This should have been determined as part of study initiation when key issue areas were discussed (see Chapter 4). These issues will directly influence the range and type of evaluation criteria.
- Who will be making the decision and providing input to that decision? The evaluation approach will need to be designed in a way that provides information that allows decision-makers and the involved stakeholders to understand the differences among the alternatives. The presentation of the information is often as important as the information itself.

There are many variations of evaluation frameworks. Some examples include

- Identification of how each of the alternatives addresses the identified problems. Alternatives that are more effective in addressing the problems would be valued more highly, but their costs would need to be considered as well. The alternative that best addresses the problems may not be affordable.
- Matrices that array each alternative against the evaluation criteria. The cells would show the benefits, impacts, and costs associated with each alternative. Alternatives could then be compared side-by-side for each criterion. Some cell entries may have quantitative values (e.g., change in estimated vehicle hours against the future base condition), while others may have qualitative information (e.g., potential visual impacts). The decision-makers would come to conclusions based on their comparison of the information for each alternative. Separate tables or graphics could supplement the tabular information. This is a commonly used approach.
- A system that places heavy emphasis on cost-effectiveness or cost-benefit. In this approach, an effectiveness value is developed based on the analysis and compared with the costs (capital and operating). In a pure cost-benefit approach, as many of the criteria as possible are converted into dollars of benefit and compared with the costs in typically one of three ways: a ratio of benefits to costs, a net present value (present dollar value of all benefits minus present dollar value of all costs), or an internal rate of return (a calculation similar to an interest rate one earns on an investment). Although methods exist for converting a variety of benefits into dollars (e.g., delay savings, accident savings, or emissions), many benefits and impacts cannot be converted to a dollar scale, so that cost-benefit alone offers an incomplete evaluation. Other forms of cost-effectiveness can convert benefits and impacts into a point scale, which can then be compared with costs, but this assumes that a relative importance can be placed on each benefit and impact.
- A criteria weighting system. This approach converts all the benefits, costs, and impacts into a point system that results in each alternative being assigned a single numerical value. Alternatives with the better point scores would be selected or preferred. For example, a point value (or weight) could be provided as to the importance of particular criteria to the decision being made, and a point score assigned to each alternative for each criterion. The sum of the point scores times the weights would provide a total point score for each alternative. While such a system can help evaluators wrestle with the relative importance or value of the various criteria, weighting systems are not generally recommended, because they can actually make it more difficult to understand the relationship among alternatives. It tends to hide individual attributes of the

... the study participants must understand how the criteria will be used, not just which criteria will be used.

alternatives. It can also limit options and consensus-building in a way that is not good for the decision-making process. In some cases, it has been used successfully as part of a broader overall decision-making framework, but it needs to be done with the full concurrence of the decision-makers. Criteria weighting is discussed in more detail in Section 6.3.

Often, an evaluation framework will be composed of several evaluation approaches. For example, it is important to relate the alternatives back to the problems that were originally identified at the outset of the study. In addition, a matrix display of all the alternatives against all the criteria would also be prepared. This matrix could contain a cost-effectiveness measure as one of the criteria. The primary point of the evaluation framework is that the study participants must understand how the criteria will be used, not just which criteria will be used.

6.3. Developing Evaluation Criteria

The concept of “evaluation criteria” is integrally related to the identification of problems. Evaluation criteria express the basis by which alternatives will be judged against one another. Criteria should be designed to measure the extent to which alternatives address the identified problems. But evaluation criteria need to address more than just the problems. Criteria need to include all the considerations necessary to make a decision, such as how the alternatives impact community resources, either positively or negatively.

6.3.1. Observations from Practitioners on Evaluation Criteria

Criteria are essential to the objective, thorough consideration of information that may have a bearing on a transportation decision. The survey conducted as part of NCHRP Project 8-34 identified lessons learned by practitioners in the area of evaluation criteria. Exhibit 6-1 indicates some of these lessons identified by state DOT, MPO, and transit agency personnel.

6.3.2. Evaluation Criteria Sources and Limiting Factors

The selection of evaluation criteria for a corridor study requires balance between having enough criteria to distinguish among the alternatives, while not generating so much information that the key distinguishing features are lost. Some of the potential sources of criteria include

- **Identified problems.** The problems describe the reasons that improvements are being considered. It is essential that evaluation criteria be included to measure the extent to which alternatives address the identified problems.
- **Regional or local goals, objectives and policies.** Goals, objectives, and policies define what is important to the community. Criteria should be generated to determine the extent to which these goals, objectives, and policies are addressed by the alternatives.
- **Impacts.** Alternatives will create impacts of varying degrees of severity. Those impacts that are likely to distinguish the alternatives or provide information on the overall viability of any alternative should be reflected in evaluation criteria. The number of these criteria usually increases with the level of controversy associated with the study.
- **Regional project selection criteria.** The region may have established a system for choosing among alternative projects for the MTP or TIP. If any preferred alternative is to be competing for funding, the criteria used for selection should be considered as candidate criteria in the corridor study. However, it will probably not be appropriate to consider these criteria if they tend to focus on specific travel modes or improvement types.
- **State or national funding eligibility.** Certain information may be important for obtaining funding from state or Federal governments. An example would be the FTA’s “New Start”

criteria for discretionary transit funding. This is not to say that these criteria will necessarily be discriminators among alternatives in any single corridor, but in the course of performing a corridor study that could result in a transit project eligible for such funding, agencies will usually want to know how the transit alternative(s) will “stack up” against those criteria. Such funding criteria should be considered as candidate evaluation criteria, but there is no requirement to do so.

Often, one evaluation criterion can address both a problem and an objective and sometimes even an impact or project selection criterion. For example, safety might have been mentioned as a specific problem for the corridor in question. Improving safety may also be a regional objective and a project selection criterion. Criteria that address multiple functions will usually have a strong probability of being useful in the corridor study.

**Exhibit 6-1.
Observations from Practitioners on Evaluation Criteria**

- This is difficult, as everyone does not have the same technical knowledge. Technical members need to take the lead.
- Criteria need to be structured to permit intermodal analysis and tradeoffs. Policy committee needs to understand and agree with evaluation method early in the process.
- Evaluation criteria should be limited to those essential to the decision process. They need to be easily understood by the public and elected officials, yet meaningful.
- They must be relevant, measurable, and understandable.
- Criteria should be related to problems. Solutions should be evaluated on how well they address the problems.
- The MPO should identify evaluation criteria in the long range transportation plan corridor analysis phase.
- Creating a level playing field between strategies is difficult. Criteria weighting is difficult. Make sure you can get the data to support all the criteria.
- Criteria should fit local concerns. Allow comment/input from local community and elected officials.
- Do not leave it up to the consultant. Make it come from the problem statement.
- The evaluation criteria should be subject to modifications.
- Public will always find things that were not analyzed. A major concern is the level of detail of analysis versus level of expected answer (design concept and scope).
- Trying to define quality of life issues is difficult, but must be tackled.
- How to rate (methodology used) is just as important as the criteria you use.
- Evaluation criteria must be consistent throughout the corridor study process. Better multimodal criteria are needed.
- Consistency with adopted state, regional, and local policies should be a “fatal flaw” screening criteria or be given more weight than other criteria.
- Should be as few criteria as possible.

Some of the factors that may limit the criteria used for any particular corridor study could include

- **Focus information on key issues.** This is an important, but often neglected, consideration. Those performing corridor studies should not live by the adage “more is better.” More is not necessarily better if the sheer volume of information clouds the issues that are most important to making a decision. Decision-makers and the public need the right information, in consolidated form, to weigh criteria against one another. In a corridor study, limitations may need to be imposed to include those criteria that will be able to best distinguish among the alternatives.

More is not necessarily better if the sheer volume of information clouds the issues that are most important to making a decision.

- **Cost.** Resources are limited, and judgments need to be made as to how much data collection and analysis can be afforded to support the evaluation effort.
- **Schedule.** While usually not as constraining as cost, schedules can be a limiting factor.
- **Capability of the analysis tools.** Although analysis tools are constantly improving, they also have limitations. There are also cost implications for applying some of the more sophisticated tools. **The evaluation criteria cannot go beyond the ability of the tools to generate the information.**
- **Selection of independent criteria.** To the extent possible, the evaluation criteria should be independent of one another. They should provide new information, not just overlap with information provided already.

As with other elements of the corridor study, there is no one-size-fits-all to the selection of evaluation criteria. Participants must weigh the need for information against the limiting factors listed above. However, it is **important not to merely generate information because the standard tools are available while ignoring issues more germane to the decision because they are more difficult to analyze.**

Some good questions to ask in cutting down the criteria to a manageable level include

- Is the information likely to be a major factor in the decision?
- Is it likely that a different decision would be made if the information is not provided?
- Is the information critical to certain stakeholder groups' support of a decision?
- Can we actually generate the information to support the criterion within the available budget?

The **budget limitation** is sometimes a difficult subject and requires substantial judgment. If an issue is likely to be crucial to a decision, but budget is not available, agencies have several options. They **can pull budget from other less necessary criteria**; they **can find ways to simplify the methodology** (e.g., by identifying acceptable surrogate measures for factors that are difficult or costly to evaluate); they **can increase the budget to cover the needed data**; or they **can take a chance and eliminate the criterion**. The latter is usually not the most prudent choice, but there is no simple answer. The additional cost should be considered against costs that may be incurred from failing to provide the information. **The cost of recovering from lost credibility can be large. This is why it is best to make these mid-course scoping decisions in consultation with agency partners and, when appropriate, with full public input.**

6.3.3. Consideration of the Sources of Evaluation Criteria

The previous section listed possible sources for generating evaluation criteria. One of the main starting points for generating criteria is the identification of problems that make an improvement necessary. The importance of this linkage is clear. Chapter 3 discussed the identification of problems. This section briefly covers how other sources of criteria should be considered.

6.3.3.1. Consideration of Areawide or Corridor Goals, Objectives, and Policies in Criteria Development

Transportation-related goals, objectives, and policies are usually reflected in state, regional, and local transportation plans. In some cases the objectives and policies are at the “motherhood and apple pie” level. In other cases they clearly and specifically state the direction the state, region, or locality desires to pursue. Goals and objectives may also be specified at the corridor level as part of the corridor study process. There should be a clear relationship between goals and objectives that are specified at either the areawide or corridor level and the evaluation criteria. **The criteria should be**

indicators of the degree to which the transportation alternatives will achieve the goals and objectives.

A corridor study needs to pay particular attention to goals, objectives, and policies that could directly affect the inclusion or exclusion of alternatives. A good example is reflected in comments on evaluation criteria received from the Puget Sound Regional Council (PSRC):

“Consistency with adopted state, regional, and local policies should be a “fatal flaw” screening criterion or be given more weight than other criteria. Elected officials and staff spend considerable time developing, reviewing, and adopting these policies, and they receive considerable public involvement and scrutiny. An alternative that is inconsistent with adopted policies should be eliminated early in the process unless highly unique circumstances warrant further review.”

Specific action taken by the PSRC included the following guidance given to project sponsors:

1. “Recognize the unique role and importance of the Growth Management Act within the State of Washington, particularly with regard to its requirements to balance and integrate development goals, policies and objectives with transportation system investments; therefore, significantly greater weight or priority should be given to criteria which evaluate consistency or compatibility with regional policies describing intended regional growth and transportation strategies that were adopted consistent with countywide and local growth management policies.
2. In keeping with ISTEAs emphasis on efficiency, study sponsors should make wise use of scarce financial resources in their planning efforts and use responsible professional planning judgments to apply “common sense tests” in the early stages of a study to determine if an alternative is consistent or inconsistent with adopted regional, countywide and local policies.
3. In the scoping or preliminary screening (pre-EIS) stages of a study, the review of alternatives should assess whether the potential implementation of a given alternative would be compatible with adopted regional policies and/or adopted countywide and local GMA plans and policies which address intended growth strategies and development patterns within the region. If such an alternative is incompatible or inconsistent with such plans or policies, that alternative should be dropped from further consideration. Further consideration of any such incompatible alternative should be extremely rare and should carry strong rationale for its exceptional circumstances, describing its unique benefits that are thought to warrant its further consideration in the corridor study process.”
(Source: January 14, 1997, memorandum to PSRC Executive Board)

State DOTs and local governments sometimes have policies that govern the types of alternatives they will consider. In some cases, they have included limits to the number of lanes that can be considered for a roadway cross section. In other cases, there may have been limits on any further widening in certain corridors. Obviously, these will have a strong bearing on alternatives to be considered, if the policies are considered to be hard and fast. Policies, goals, and objectives in state, metropolitan, and local plans may also be a good source for evaluation criteria in general. Inclusion of key criteria from these sources will help selected alternatives to be consistent with the visions established in these plans.

6.3.3.2. Consideration of Impacts in Criteria Development

Major transportation investments will have a wide range of impacts on the natural and social environment. These potential impacts need to be reflected in the type of criteria selected to illustrate the differences among the alternatives.

A corridor study does not need to include an analysis of every possible impact. As stated earlier in the *Guidebook*, the level of detail must be tailored to the decision at hand. The level of detail is perhaps most directly determined by the selection of evaluation criteria. The number of criteria chosen for use on large, controversial projects and on projects requiring NEPA approval will undoubtedly be larger than for smaller, less controversial projects.

Many types of impacts to be reflected in the evaluation criteria will be readily apparent. If new highway or transit alignments through developed areas are likely to be considered as alternatives, then displacements, noise, and visual impacts will be likely candidates. However, some impacts, or the significance of those impacts, may not be known until later in the study. The following principles should be considered in developing impact-related criteria:

- **Encourage the identification of potential impacts at the project initiation meeting(s) or at other early stages.** The issues area checklist (Exhibit 4-3) is a useful tool for identifying impacts that may need to be considered as criteria.
- **Listen carefully to what people are saying in all phases of the outreach.** One of the purposes of public involvement is to ensure that all significant issues are brought into the open. If an important issue is not brought into the open, the corridor study becomes vulnerable to potentially costly delays and possible difficulties in reaching a decision.
- When the study team believes a potential impact of concern to the public does not need to be reflected in the evaluation criteria, one of two actions will be necessary: (1) explain to the public why it will not be significant or (2) include it as a criterion anyway, so that the concern does not become a more difficult or embarrassing issue later in the study.
- **Be willing to add a criterion mid-way through a study if it proves to be a factor that could influence the decision.** It is best to address the issue head on, not ignore it. In addition, a criterion can also be dropped, if it proves not to be an issue. But the reason for and process of its elimination should be documented.

6.3.3.3. Consideration of Regional Project Selection Criteria in Criteria Development

Project selection criteria are another potential source of corridor study evaluation criteria. Project selection criteria may be contained in state or regional planning and programming processes. They could be associated with particular funding pools or could be used in selection and prioritization of projects in general. Corridor study sponsors may want to include certain project selection criteria as corridor study evaluation criteria for two primary reasons:

The level of detail is perhaps most directly determined by the selection of evaluation criteria.

- It will ensure the generation of the information needed by decision-makers responsible for state and regional planning and programming.
- Participants in the corridor study will be able to see how the alternatives rate against the ultimate project selection and funding criteria. The preferred alternative will not be selected on the basis of those criteria alone, but the project selection criteria may be a consideration in selecting the preferred alternative.

Before considering established project selection criteria as a source for study evaluation criteria, the study team should ensure that the criteria will not bias the outcome toward any particular type of

strategy. This could happen, for example, if the project selection criteria are oriented toward particular types of improvements. The burden is on the study team to ensure that the study evaluation criteria are well balanced and applicable to the range of alternatives being considered.

The existence and nature of project selection criteria vary widely. Some states and regions have no set selection criteria, while others have very rigid sets of criteria. Exhibit 6-2 shows an example set of criteria categories for the prioritization of roadway projects eligible for regional funding in the regional TIP by the Pima Association of Governments (Tucson Arizona region). A number of the 14 categories listed would likely be represented in some form by evaluation criteria in a corridor study, even if the prioritization criteria did not exist. Even though the Tucson criteria focus on the roadway system, there is a multimodal emphasis apparent from the inclusion of criteria for air quality, land use, and use of alternate modes. Within each category, one or more measures are identified.

Exhibit 6-2.

TIP Project Prioritization Criteria for the Tucson Region

The TIP prioritization procedure is used as one element of the decision-making process for the distribution of regional funds for roadway system improvements. The procedure uses a three-step process that initially screens projects for consistency with the MTP and adopted land use plans. Projects that pass the initial screen are evaluated based on criteria in 14 different categories:

- Improves air quality
- Preserves existing facilities
- Promotes compact urban form
- Improves safety
- Promotes the use of alternate modes
- Relieves congestion
- Improves drainage and supports other infrastructure
- Improves accessibility
- Enhances economic development
- Improves system connectivity
- Promotes corridor preservation
- Other social, cultural, energy, or environmental impacts
- Transportation enhancement activities
- Project readiness

Points are awarded to a project in each of the criteria categories and then combined into a single overall score with a weighting for each criteria category. Projects are then ranked based on a cost-effectiveness index, the average daily utilization of the facility (including auto, transit, bicycle, pedestrian and truck usage), anticipated project service life, and the life-cycle cost of the project. The final step in the ranking is an assessment of the geographic and modal balance of the TIP based on additional criteria established by the TIP subcommittee.

6.3.3.4. Consideration of State or National Funding Eligibility in Development of Criteria

Sponsoring agencies should consider how the corridor study evaluation criteria may relate to certain national or state criteria for funding certain types of projects. At the national level, one of the most significant sets of these types of criteria is the FTA “New Starts” criteria. The Section 5309 New Starts criteria provide FTA with a consistent framework for evaluating major transit investments for Federal discretionary funding under the Section 5309 New Starts program. Such a framework is needed to help ensure that available discretionary resources are directed to candidate projects that offer the greatest return on the Federal investment. *Technical Guidance on Section 5309 New Starts*

Criteria (September 1997) describes the criteria and how the associated measures are calculated. The document is explicit in stating:

“It is important to recognize that FTA's revised Section 5309 New Starts criteria for rating potential transit projects are distinct from the local evaluation criteria used to select preferred investment strategies. At the local level, evaluation criteria, or measures of effectiveness, are related to the goals and objectives established for a particular corridor or subarea of study. These goals and objectives reflect the specific transportation problems a local agency is attempting to solve, and the measures of effectiveness are used to evaluate the extent to which each transportation improvement alternative under study can achieve the established goals and objectives.... In contrast, the Section 5309 New Starts criteria are used by FTA to rate potential transit projects and to make recommendations for Section 5309 discretionary funding. **The criteria are intended to provide a means of comparing the relative merits of the many worthy projects at the national level. They are not intended to compare among various alternatives at the local level.**”

The Section 5309 criteria reflect a comprehensive set of quantitative and qualitative measures:

- Mobility improvements
- Environmental benefits
- Operating efficiencies
- Cost-effectiveness
- Transit supportive existing land use and future patterns
- Other factors
- Local financial commitment

Each of the above categories is treated in greater detail in *Technical Guidance on Section 5309 New Starts Criteria*. Exhibit 6-3 shows the full set of criteria.

Although the New Starts criteria are not necessarily intended for use as evaluation criteria in a corridor study, there are several reasons why the criteria should at least be considered for use in a corridor study:

- The New Starts criteria have generally been developed because they prove to be discriminators for success of higher capacity transit systems. Success factors should certainly be given consideration in local decision-making.
- The methodologies are straightforward and consistent. This can help to maintain regional methodological consistency (e.g., among different corridor studies in the same region) as well as national consistency.
- Corridor study sponsors will be able to gauge how alternatives might be structured or improved to generate more benefit to the public.

Applicable New Starts criteria should be considered as candidate criteria at the same level as the other criteria. In most cases, the criteria will be considered on a selective basis. It should be noted that the FTA Technical Guidance document not only contains criteria, but the methodologies and/or guidelines for calculating performance measures associated with the criteria. These methodologies have been developed over many years of lessons learned and should be taken seriously.

6.3.4. Screening Criteria Versus Detailed Evaluation Criteria

Ordinarily, selection of alternatives will be conducted in stages. An initial listing of alternatives will be developed, from which several will be identified through a screening process for more detailed evaluation. To conduct the corridor study efficiently, screening criteria are developed that require a less intensive effort than the subsequent more detailed evaluation. The screening criteria may not only be less detailed but also be fewer in number. If the study participants can agree on a more limited number of alternatives initially, a one-stage process may be appropriate.

**Exhibit 6-3.
FTA “New Starts” Criteria**

Criteria	Performance	Measurement
1. Mobility Improvements	Travel time savings	New Start compared with No-Build and transportation system management (TSM)
	Low income households served	Number within ½ mile of boarding points
2. Environmental Benefits	Change in pollutant emissions	New Start compared with No-Build and TSM
	Change in regional energy consumption, expressed in BTUs	New Start compared with No-Build and TSM
	EPA air quality designation for region	Current EPA designation
3. Operating Efficiencies	Operating cost per passenger in forecast year	New Start compared with No-Build and TSM
4. Cost-Effectiveness	Incremental cost per incremental passenger in forecast year	New Start compared with No-Build and TSM
5. Transit Oriented Land Use	Rating on transit supportive existing land use and future patterns	Combined rating on a set of factors: <ul style="list-style-type: none"> ▪ Existing land use ▪ Containment of sprawl ▪ Transit supportive corridor policies ▪ Supportive zoning regulations ▪ Tools to implement land use policies ▪ Performance of land use policies
6. Other Factors	Optional consideration of other factors	Local policies programs, and factors relevant to success of the project
7. Local Financial Commitment	Proposed local share of project costs	Percent of capital funds from non-Federal (non-Section 5309) sources
	Stability and reliability of capital financing	High, medium, low ranking
	Stability and reliability of operating funds	High, medium, low ranking

There are many ways in which the screening and detailed levels of criteria can be organized. Each set needs to be designed for the conditions at hand. One good example of screening and detailed criteria comes from the Denver region. In that region, three corridor studies were initiated simultaneously. It

was recognized that the results of the three studies would need to be brought back to the regional decision-making process to resolve funding issues and priorities among the corridors. A set of guidelines was developed for coordinating the conduct of the studies.

One of the guideline areas in Denver had to do with evaluation criteria at three levels: pre-screening, screening, and detailed analysis of alternatives. The criteria were considered to be minimum criteria, in that any individual corridor study could add other criteria believed to be pertinent to the issues at hand. The criteria were developed jointly by the lead agencies of the three studies, and their consultants. The three levels of criteria are identified in Exhibit 6-4. Each of the criteria were defined in the corridor study guidelines document. The three levels of criteria show a progression from fewer, less detailed, more qualitative criteria to the more detailed criteria.

Exhibit 6-4.
Evaluation Criteria from the MIS Guidelines in Denver, Colorado

<p>Pre-screening criteria (unsuitability/fatal flaw analysis):</p> <ul style="list-style-type: none"> • Is the alternative consistent with regional goals and policies? • Is the alternative affordable? • Does the alternative have an irresolvable environmental impact? • Does the alternative have irresolvable community or agency opposition? • Is the technology proven in revenue service?
<p>Screening criteria:</p> <ul style="list-style-type: none"> • How consistent is the alternative with regional goals/policies? • How affordable is the alternative? • What are the primary environmental impacts of the alternative? • How well does the alternative address the corridor's mobility problems?
<p>Detailed level evaluation:</p> <p>Effectiveness criteria</p> <ul style="list-style-type: none"> • Project person-carrying capacity • Potential person-carrying capacity • Maximum link utilization • Number of users • System utilization (regional basis) • Corridor congestion • Travel times • Delay (regional) • Travel time reliability • Impact to goods movement <p>Impact criteria</p> <ul style="list-style-type: none"> • Wetlands • Section 4(f) resources: parks, historic properties, wildlife refuges • Air quality • Endangered species • Environmental justice • Displacements • Neighborhood disruption/community cohesion • Hazardous materials

The term “fatal flaw” analysis is sometimes applied in the context of a corridor study. It implies a screening out of alternatives that have one or more impacts or flaws that are so serious that they essentially rule out an alternative's feasibility. Some would argue that the concept of fatal flaw is not entirely appropriate, as some of these impacts, though severe, can be overcome, mitigated to a degree, or tolerated by the community to achieve broader objectives. The main precaution in using a fatal

flaw analysis is to carefully consider the impacts that one would consider potentially fatal. Major investments often have significant impacts, and the community will need to work through the issues, including the tough ones. Agencies should not prematurely dismiss an otherwise promising alternative before assuring themselves that the severity of the impacts will, indeed, render it infeasible. This is a judgment call that requires an understanding of both political and technical issues (e.g., experience with a permitting agency's willingness to approve a project).

Agencies should not prematurely dismiss an otherwise promising alternative before assuring themselves that the severity of the impacts will, indeed, render it infeasible.

6.3.5. Principles for Selecting Evaluation Criteria, Performance Measures, and Measures of Effectiveness

There are several terms that are closely associated with evaluation criteria. The terms “performance measures” and “measures of effectiveness” (MOEs) are often used interchangeably to convey how individual evaluation criteria will be quantified or rated. Sometimes, these terms are even used synonymously with evaluation criteria. The point is that **evaluation criteria need to be measurable, using reliable, repeatable techniques and tools.** The ways in which criteria are measured are usually expressed as performance measures or MOEs.

Measures of Effectiveness for Major Investment Studies, a Texas Transportation Institute (TTI) report, included a national evaluation of MOEs applicable to corridor studies (in the context of the MIS terminology). The study developed a catalog of possible MOEs that could be used as evaluation criteria and recommended a list of preferred measures for evaluating the performance and impact of transportation improvements. In the process of developing the recommendations, several characteristics were determined to be important. These characteristics would be important for the selection of evaluation criteria for any individual corridor study as well:

- Applicability to individual and aggregate transportation modes (also, applicability across modes)
- Ease of measure calculation and analysis
- Accuracy of measure results
- Clear and consistent interpretation of results
- Clarity and simplicity

The same study listed several other considerations in developing MOEs, adapted and expanded from the *MIS Desk Reference*:

- **Match the MOEs with the goals and objectives of the corridor study.** For example, if the corridor study is being performed for a freight corridor, consider using freight quantities for transportation performance measures.
- **Develop and select MOEs early in the study with key input from local decision-makers.** With buy-in from decision-makers at the start, study conclusions are less likely to be questioned. This practice also promotes a sense of fairness and teamwork among cooperating agencies.
- **Use a comprehensive set of measures, but do not substantially duplicate or restate benefits or impacts.** Many of the cost-effectiveness MOEs are derived from transportation performance or other impacts, but provide a different perspective on the magnitude of impact.
- **When possible, quantify impacts and do not simply use subjective judgment.** Many of the preferred MOEs (in the TTI report) are quantitative and can be calculated or estimated

using standard procedures. Other MOEs are clearly subjective and should be presented as such.

- **Provide perspective on the magnitude of the impacts.** Make an interpretation of the MOE values and their significance on a subarea or regional basis. Although some MOE values may seem large, their overall significance in the urban area may be small.
- **Identify the error levels of calculations in relation to the measure values.** Provide perspective when measure values have been estimated or modeled using computer programs. Consider whether differences in measure values between alternatives could be due to estimation error.

The process of developing evaluation criteria will be based on the above considerations and typically follow these steps:

- **Identification of an initial “pool” or “long list” of criteria.** These would be based on the possible sources discussed earlier, on past studies that have worked well, and on input from agencies and the public.
- **Development of an initial set of “working criteria” and MOEs based on the significance of issues (e.g., as identified in project initiation).** Both screening-level and detailed-level criteria, if used, should be developed at the same time. The MOEs should be developed at the same time as well, so that implications on the cost of analysis can be understood. The available budget and resources will usually be a major input to the selection of criteria. Balancing the criteria and study cost is part of the “art” of designing the corridor study to fit the circumstances. If it is found that the study budget is unable to accommodate the desired criteria, tradeoffs will need to be made. The study team will need to determine whether limiting the criteria will threaten the acceptability of the results.
- **Review of the initial set of criteria by appropriate parties (at least the technical committee, and, where possible, the public and the policy committee).**
- **Approval of the evaluation criteria.** For more controversial studies, approval at the policy committee level is strongly recommended.
- **Mid-course adjustments to the criteria.** This would mainly include the addition of criteria where unanticipated impacts surface in the course of the study. Obviously, the purpose of adjustments is not merely to tilt preferences for alternatives in a particular direction.

6.3.6. Criteria Weighting Systems

The importance of different evaluation criteria varies with respect to any given corridor decision. In certain cases, the mobility concerns may be viewed to be most important, whereas certain environmental concerns may dominate in other cases. The fact is that **criteria are virtually always weighted in the minds of the decision-makers**. Each decision-maker may have a slightly different perception of the importance of each criterion, depending on the interests he or she represents. This introduces the question of whether a formalized numerical weighting scheme should be used.

A review of a number of corridor studies indicates that most studies are conducted without a formalized criteria weighting scheme. Rather, the information is prepared in such a way that participants can see the differences in the alternatives for each criterion, and take all of that information into account in making a decision. One of the advantages of this approach is that it allows the political process, which should reflect overall community values, to run its natural course. Also, there are elements that may come into play in the decision that cannot be directly accommodated within the criteria. **Most decision-makers prefer the flexibility of coming to their**

own conclusions on the proper course of action based on a set of information, rather than having a preferred outcome pre-determined for them (as in the case of a numerical rating).

Nevertheless, there may be occasions when a formalized weighting scheme is appropriate. It can help to clarify thinking on certain study issues and impacts. In some cases, it may also make the process less susceptible to political “whims.” But the decision-makers must have bought into such an approach. Good communication between technical staff and elected officials or agency managers is essential to choosing an approach that best fits the political setting. More often than not, most decision-makers will want to retain the flexibility to make a decision based on a non-weighted presentation of information; a weighting scheme may be viewed as unnecessarily boxing them in.

If used, a criteria weighting scheme better serves as input to a decision, not as the ultimate basis for making the decision (i.e., not by merely choosing the highest point score as the preferred alternative). Particularly for controversial projects, if the formalized weighting scheme is used to determine the outcome, challenges to the decision will likely focus on the validity of the process used, and the procedures could be a point of vulnerability in sustaining the decision. Some of the benefits of a formalized weighting scheme may include

If used, a criteria weighting scheme better serves as input to a decision, not as the ultimate basis for making the decision.

- It may be useful as a screening tool for identifying alternatives that gravitate to the top of the list for further consideration.
- It may help identify where some of the major barriers exist in the group decision-making process. It can help to clarify how various agencies and individuals are thinking, allowing the group to more directly address those issues that hold the key to the decision. For example, some individuals may weight a certain environmental factor highly. This factor is then an obvious area for further discussion on how to reduce the impact.
- It may indicate the sensitivity of the decision to certain factors. If the outcome is basically the same, regardless of how much weight is placed on certain factors, this increases confidence in the ultimate decision. A sensitivity analysis may also indicate the factors that hold the key to making the decision, allowing more of the discussion to revolve around those key criteria.

If it is determined to use a criteria weighting approach, there are a number of ways to go about the process. In the North Pocatello/Chubbuck Transportation Study in Southeastern Idaho, a criteria weighting approach was used. Two sets of weights were developed, one by the study team, and the other by the CAC and the technical advisory committee (TAC) of the Bannock Planning Organization (the MPO for the area). Exhibit 6-5 shows the set of weights from each group. Each member of the above groups then ranked each alternative by criterion. For each criterion, the four final alternatives were ranked 1-4. For example, for the mobility criterion, the alternative believed to be best for mobility was ranked 1, the second best was ranked 2, and so forth by each individual. The same was done for each of the other 10 criteria. The weighting factors were then applied to each ranking, and a weighted average ranking for each alternative was developed.

The weighted average rankings are shown in Exhibit 6-5. A lower number is considered a better ranking. The weighting approach was used as information to assist in the decision; the results did not determine the decision directly. However, the information was believed to play a major role in helping decision-makers through the process of determining the most appropriate course of action. The following benefits were cited for the weighting/ranking process:

- It forced all study participants to think through the pros and cons of various alternatives, not just as the total package, but for the individual elements that were viewed to be important to the decision.
- Deriving essentially the same conclusion from two different panels tended to confirm the direction toward a particular concept, from at least a technical perspective (not necessarily a political one).
- It forced other reasons to surface as to why an alternative should be selected other than the one that proved to be technically superior. There were some political/funding factors that were also pertinent to the decision.
- It was believed that the information helped to resolve a difficult issue and move a concept forward into project development.

Exhibit 6-5.
Weighting Factors Developed
for the North Pocatello/Chubbuck Transportation Study

Evaluation Criteria	Study Team Weighting Factors	CAC/TAC Weighting Factors
Mobility	21.50%	14.30%
Socioeconomic Effects	10.75%	14.60%
Environmental Effects	6.25%	11.20%
Safety	5.50%	6.80%
Operating Efficiency	13.00%	6.00%
Land Use	14.75%	22.50%
Economic Development	7.00%	5.70%
Energy Consumption	3.75%	3.20%
Freight Movement	3.25%	4.00%
Financing	5.75%	2.40%
Cost-Effectiveness	8.50%	9.30%
Totals	100.00%	100.00%

The weights were developed early in the project, prior to the development of the final alternatives. Each criterion was defined so that participants understood what was being weighted and evaluated.

The experience from the North Pocatello/Chubbuck Transportation Study is provided as an example of a weighting scheme that contributed to the decision-making process. However, discussions with various agencies during the outreach phase of NCHRP Project 8-34 suggest that the dominant view is that there should not be a point-based rating scheme. This does not mean that it is assumed that all the criteria have equal weights. Rather, each individual involved in the decision would take into account his or her view of the relative importance of the criteria to the decision at hand. **The consideration to use a weighting scheme should be discussed during project initiation and methodology discussions.**

6.3.7. Examples and Sources of Evaluation Criteria

The number of ways of quantifying performance and impacts is virtually endless. However, recent research has focused on performance measures that are appropriate for typical corridor studies. Exhibit 6-6 is a table of preferred measures from the TTI report *Measures of Effectiveness for Major Investment Studies*. The list of measures has a strong emphasis on time-based MOEs, as well as those that are person-based, representing a multimodal view. It is not implied that the measures in Exhibit 6-6 should be employed in most studies. Rather, each study team will need to consider these and others as candidates, but make the decision based on the key issues specific to the study and on the tools and resources available.

Although this may at first seem appealing from the perspective of transit, the full appreciation of the role of transit must extend beyond the time benefits. In fact, it is not unusual for most transit-oriented options to produce lower person-based speeds than highway-oriented options. The extent to which this is true will depend on the level of highway congestion and a number of other factors. Typically, transit does not compare well to highway alternatives in terms of time. However, there are other factors that can more fully account for the benefits of transit. NCHRP Project 8-32(2), *Multimodal Transportation: Development of a Performance-Based Planning Process*, has developed a library of performance measures. This is a long listing of performance measures with definitions, from which practitioners can draw in developing a set of evaluation criteria that is appropriate for any given set of conditions.

6.3.8. Making Multimodal Comparisons

One of the significant challenges in multimodal corridor studies is how to make fair comparisons between modes of travel. In many past studies, evaluation schemes were established to compare among transit alternatives or to compare among highway alternatives, but not between highway and transit alternatives. “Cost per new trip” was used as a key performance measure for transit projects. Volume/capacity ratios and levels of service were used for comparing many highway projects.

Researchers and practitioners have been questioning whether there is a measure or set of measures by which they can compare highway, transit, and other alternatives on an apples-to-apples basis. The answer to the question is both yes and no. Yes, there are measures that allow direct comparison of certain elements of the performance of highway and transit improvements. On the other hand, these measures do not paint the entire picture. Agencies should not attempt to base multimodal comparisons on one or two measures. One or two measures cannot tell the full story of how modes compare.

For example, some transportation agencies are moving more toward the use of time as a key performance measure. Time is clearly at the top of the list in the way that travelers and shippers think about travel. A recent survey conducted by the Metropolitan Transportation Commission in the San Francisco Bay Area reinforced the desirability of using travel time.

Exhibit 6-7 summarizes some of the performance measures that have potential for generating comparisons among modes. It identifies the performance measure, possible sources of the information, and pros and cons for using the performance measure. It should be noted that several of the measures are time-based. It should also be noted that transit alternatives will usually be competitive in terms of

Agencies should not attempt to base multimodal comparisons on one or two measures. One or two measures cannot tell the full story of how modes compare.

travel time only in the more highly congested environments. However, there are other benefits of both transit travel and auto travel that tend to be intangible: the ability to use travel time for productive purposes (e.g., reading on the train, listening to the news or making phone calls in the car, and so forth). These are convenience factors that can weigh in favor of one mode or another.

Exhibit 6-6.
Preferred Measures from the TTI Report
Measures of Effectiveness for Major Investment Studies

<p>Transportation Performance</p> <ul style="list-style-type: none"> • Average travel time • Total delay (vehicle, person or ton-hours) • Average travel rate • Person-miles of travel (PMT), or PMT in congested ranges • Person movement • Person-hours of travel (PHT), or PHT in congested ranges • Person movement speed • Accident reduction
<p>Financial/Economic Performance</p> <ul style="list-style-type: none"> • Benefit-to-cost ratio (using total or full cost analysis) • Financial feasibility • Cost per new person-trip
<p>Social Impacts</p> <ul style="list-style-type: none"> • Number of displaced persons • Number and value of displaced homes • Accessibility to community services • Neighborhood cohesion
<p>Land Use/Economic Development Impacts</p> <ul style="list-style-type: none"> • Number and value of displaced businesses • Accessibility to employment • Accessibility to retail shopping • Accessibility to new/planned development sites
<p>Environmental Impacts</p> <ul style="list-style-type: none"> • Noise levels • Mobile source emissions (NO_x, HC, CO, and PM-10) • Energy consumption • Visual quality/aesthetics • Water resources • Wildlife/vegetative habitat • Parkland/open space/green space • Agricultural/forest resources • Cultural resources • Geologic resources • Hazardous wastes • Vibration

Exhibit 6-7.

Performance Measures with Highest Potential for Multimodal Comparisons

Performance Measure	Possible Methods of Generating Measure	Advantages	Disadvantages
Change in person hours of travel	Should come from transportation model, but some models not well-equipped to generate info. Need good mode choice model.	Provides information on a person basis. Uses time as core comparative factor.	Does not account for some of the intangibles. Time is important, but not everything. Calculation of PHT can be difficult.
Change in vehicle miles of travel (VMT)	Standard output of transportation model, but need good mode choice model to estimate transit impact. Transportation demand management (TDM) impact may need to be approximated.	Good measure of impact on vehicle usage, which also relates to air quality and energy.	Need to estimate transit VMT to provide a complete analysis.
Change in mode split to specified zones or on a regional basis	Regional trips by mode is normally available from mode choice model. Zone-specific mode split can be estimated with special runs.	Measure is easy to understand.	Often, differences are relatively small.
Percentage of employees or residents accessible to transit	Requires more of a GIS approach, rather than a travel demand model.	Relatively easy to calculate if GIS coverages are available of transit lines, population and employment. Otherwise can be tedious.	Does not factor in accessibility to destinations. Highway improvements can affect measure, but usually only by small amount.
Economic measures (e.g., benefit/cost ratio or net present value)	Derived from PHT and cost data	Brings both benefit and cost data together into a single measure. Incorporates differential values of time (e.g., trucks vs. cars).	Does not take non-quantifiable benefits into account. May oversimplify the situation.
VMT per capita	Derived from VMT and population	Is becoming a benchmark for comparing interaction of land use and transportation system.	Essentially provides same information as VMT, assuming constant population for all alternatives.

There are also community factors that come into play, such as the community stature often associated with the presence of a rail line. Communities often look to a rail line as a symbol of “arrival” as a major city. It is perceived to have marketing and image value, even over a bus strategy which can often be as efficient or more so. There are also issues regarding what elements of transit travel time should be counted, particularly how wait time should be valued. It is not the purpose of this chapter to cover methodologies for analysis of alternatives. That is one of the main subjects of Chapter 7.

6.3.8. The Bigger Picture: A Regional Evaluation Framework

6.3.8.1. Why a Regional Evaluation Framework?

Decisions on transportation infrastructure and operations are made at multiple levels not just at a single level. Decisions are often a result of interaction among those levels. For example, decisions or recommendations made at a corridor level may be confirmed or modified for inclusion in the financially constrained transportation plan. Decisions may be further refined when specific funding is identified and projects are included in the TIP.

This interaction is more effective if there is a consistent and well-understood evaluation framework that ties all the levels together. This does not mean that evaluation criteria for a corridor should be dictated from a rigid set of criteria developed at the regional level. However, it does mean that evaluation in a particular corridor recognizes the need to compare recommendations and financial needs in that corridor with similar recommendations and needs in other corridors.

The implication of this linkage is that some thought needs to be given to evaluation at the regional level. A number of states and metropolitan areas do this now, particularly in the selection of projects for the TIP. The example of project selection criteria for the TIP in the Tucson region was given previously. The point of the Tucson example was to indicate that corridor studies should consider criteria already established at the regional level. The point of this section is to suggest that agencies that have a regional evaluation framework will be in a better position to make sense out of all the various studies when they are brought together for regional decision-making. Therefore, it is suggested that **transportation agencies think through evaluation criteria from a regional perspective, not to dictate what individual corridor studies must do, but to better set the stage for those studies**. The Denver approach to evaluation criteria, which created a core set of criteria for three separate corridor studies, was a good example of this approach on a smaller scale.

... agencies that have a regional evaluation framework will be in a better position to make sense out of all the various studies when they are brought together for regional decision-making.

There are a number of compelling reasons why agencies should consider a regional evaluation framework:

- **It allows for better comparisons of projects in a financially constrained environment.** This does not mean that all regional decision-making should be governed by quantitative analysis and point systems.

However, it does mean that certain criteria can be provided on a common basis, in addition to criteria that may be unique to individual corridors, to assist decision-makers in weighing the choices they need to make among multiple corridors.

- **It promotes consistency of methodology, which is as important as the selection of the criteria themselves.** In fact, agencies should consider extending the framework beyond just common criteria to include guidelines for consistent methodology. This will promote apples-to-apples comparisons.
- **It can simplify the selection of evaluation criteria for a corridor study in a given corridor.**
- **It reduces the likelihood that important evaluation criteria will be missed.**
- **The public and decision-makers become used to similar criteria being used in all studies, thus increasing their comfort level with the decisions.**

A foundation can be laid in regional planning that makes the job of corridor planning easier. This is true in many dimensions of planning, but is particularly true with the development of performance measurement and evaluation criteria.

6.3.8.2. Elements of a Regional Evaluation Framework

Several key activities will be involved in developing the evaluation framework for a region:

- **Confirm the functions that the evaluation framework should be designed to support.** Possible functions include decision-making in the MTP, the metropolitan TIP, the state TIP, the CMS (if it exists), other system planning studies, and corridor studies. The evaluation framework would allow consistent information to be shared among the functions.
- **Establish an evaluation criteria pool.** The pool would consist of a broad array of criteria that could conceivably be used.
- **Establish “core” criteria.** The core criteria would serve as a common thread among the various functions. The core criteria would likely constitute “required information” for all corridor studies performed in the region. The core criteria would be applicable to all functions. Each function could then include additional criteria tailored to that function. The number of core criteria would normally be small, perhaps 6 to 8 in number, and focus mainly on transportation system performance.

The closest structure many agencies may have to core criteria is their project selection or prioritization criteria (e.g., for the TIP or the MTP). This would make sense, because all planning activities essentially revolve around the selection and prioritization of projects. **Criteria deemed to be important for project selection and prioritization would logically also be important to planning studies that feed the selection process.** However, these criteria are often not multimodal and may focus on specific funding pools. Thus, the concept of core criteria may not be new to many agencies, but may be a way of thinking about evaluation that better integrates the project selection and prioritization process with other planning activities.

Some of the leading candidates for core criteria would likely include the following:

- Change in vehicle miles of travel (VMT)
- Change in vehicle hours of travel (VHT)
- Change in person hours of travel (PHT)
- Weighted average vehicle speed (VMT/VHT)
- Change in total accidents
- Change in injury accidents
- Change in total emissions
- Change in total energy consumption
- Cost-effectiveness measures (e.g., benefit/cost ratio, net present value, or rate of return)
- Change in mode split
- Change in vehicle trips
- Change in total and per-capita income
- Change in volume, volume/capacity ratio, or load factor on specific facilities/routes
- Change in population accessible to (e.g., within one-quarter of) transit

For corridor studies, additional criteria would draw on factors that captured the uniqueness of each situation and the individual concerns of the corridor stakeholders. A key determination of the selection of this “second tier” of criteria would be the definition of the problems. Clearly, the criteria should identify the extent to which the various alternatives address the identified problems. In addition, there may also be environmental and community resources that warrant special attention, bringing in additional criteria. Each corridor study would draw from the comprehensive pool of criteria to establish the specific evaluation criteria to be used for each corridor study.

Ideally, once projects are implemented, the core criteria could be used to evaluate the effectiveness of those projects as well. In reality, however, many of the core criteria that are practical for use in alternatives evaluation are impractical for use in post-implementation effectiveness evaluation. Often, the data would be too costly and difficult to collect. Therefore, post-implementation effectiveness evaluations often must be conducted with measures that are specifically targeted to the application and circumstances.

6.3.8.3. A Note About Performance-Based Planning Processes

The term “performance-based planning” has been popularized over the last several years, but is still not well understood. NCHRP Project 8-32(2), *Multimodal Transportation, Development of a Performance-Based Planning Process*, is conducting research on experience with performance-based planning. The Final Report for Phase I of that project describes performance-based planning as follows:

“In one form or another, the elements above—goals and objectives, performance measures, data, and analytical methods—are all part of the existing planning process as it is carried out in most jurisdictions. Although the range of performance measures in use in most cases is quite narrow, they are nonetheless part of an existing process. What is new about the performance-based methodology is the organization of these elements, the linkages between elements in the process, and the presence of an ongoing monitoring process that provides feedback on the progress towards goals and objectives.” (Final Report, NCHRP Project 8-32(2), August 29, 1996.)

The report also describes the difference between performance measures and evaluation criteria:

“... alternative strategies may be assessed with evaluation criteria that are in fact distinct from the performance measures. This accommodates the fact that there can be many more consequences of actions than there are system performance measures. These evaluation criteria will likely cover a large variety of impacts of concern to local decision makers. The evaluation criteria should, however, be closely related to the defined performance measures. By so doing, there is a stronger connection between project-level evaluation/selection and system performance measurement.”

In general, then, evaluation criteria tend to be broader than performance measures, bringing in other dimensions outside the performance of the system that may be relevant to decision-making. Performance measures will likely be strong candidates for evaluation criteria that are used to describe the benefits of transportation strategies to users of the system: travelers, transporters, and shippers. **Like evaluation criteria, performance-based planning is not intended to take over the decision-making process, but to provide better information to the decision-making process.**

A subsequent interim report on Phase II of that project made the following observations concerning the actual application of performance-based planning:

- **Implementation of performance-based planning methodology in the transportation planning context is an evolutionary process.** Most agencies that have implemented a performance-based approach have made many changes along the way, including fundamental changes in the structure of their processes and in the way performance measures are used.
- **Performance measures are being applied in a variety of contexts, including systems planning, program prioritization, and organizational accountability....** It is unlikely that this research will result in either a strong endorsement or refined methodologies for using

performance measures as a way of replacing the current project prioritization and selection processes with a purely analytical, quantitative method.

- **In most transportation agency applications, performance-based approaches have not yet had a significant impact on the ultimate outcome of decisions....** At present, most practitioners seem to agree that the most they can expect to accomplish in the near term is to provide better-quality, more goal-relevant information to an inherently political decision-making process. By educating and informing the public, in part through the use of customer-oriented outcome measures, we should also expect to see incremental changes in the decision-making models that favor more objective evaluation and debate.

CHAPTER 7

DEVELOPING AND EVALUATING ALTERNATIVES



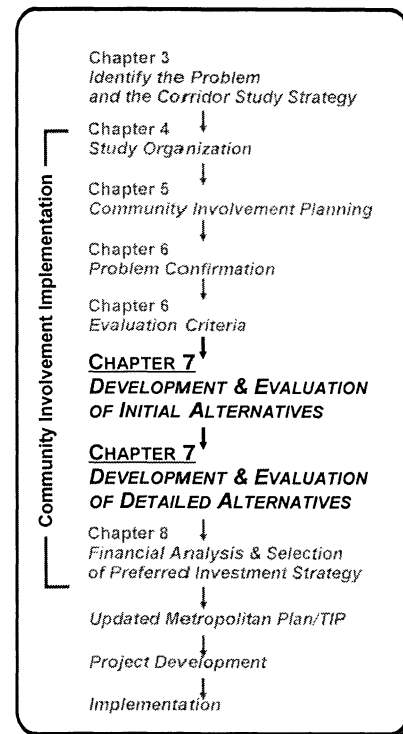
Chapter Topics in a Nutshell

- 7.1. Identifying Initial Alternatives
- 7.2. Lessons Learned by Practitioners
- 7.3. Choosing the Base Condition
- 7.4. Evaluation Methodologies



Principles and Lessons Learned

1. Alternatives should directly address the identified problems. The exact number and nature of alternatives will depend on the problems and circumstances being addressed.
2. The result of a corridor study could be a single preferred alternative or investment strategy or could be a set of reasonable alternatives that are analyzed later in the NEPA process. The development of the corridor study strategy, discussed in Chapter 3, indicates some of the possible options.
3. Three basic approaches to identifying and analyzing alternatives include a traditional screening/detailed analysis approach, an incremental learn-as-you-go approach, and analysis of individual components, followed by assembly of those components into alternatives for further analysis. Studies may consist of a combination of these approaches.
4. The financially constrained MTP (minus any corridor transportation improvements that are included in a study alternative) will be the preferred choice for the base condition in the large majority of cases. However, there are exceptions, depending on whether the Plan is viewed to realistically reflect improvements that could influence travel in the corridor being analyzed.
5. One of the most important principles in dealing with uncertainties in assumptions is that the potential implications be discussed in an open environment so that there are no surprises. Analysis methodologies should be reviewed with the technical committee or subcommittee before application.
6. There are two primary occasions when land use should be considered for specific inclusion as a study issue: (1) when one or more new, major facilities (either highway or transit) may be considered as alternatives and have the possibility of influencing land use or (2) when the study has as an explicit goal the rethinking of land use policies and strategies, tied to the transportation strategy.
7. The study team must have qualified individuals involved in each of the subject areas important to the analysis. The *Guidebook* provides general information to assist study managers and other stakeholders in understanding the issues. The methods employed need to be designed by the stakeholders to address the objectives of each particular study.



The exact number and nature of alternatives will depend on the problems and circumstances being addressed.

The statement of the problem and development of evaluation criteria represent the foundation of the corridor study process. The definition and evaluation of alternatives is where the decision-making process begins to take place. As indicated in Chapter 3, the decisions in certain corridors may be simple and straightforward,

possibly even determined at the study initiation meeting. In most cases, however, multiple alternatives will need to be identified and evaluated. The exact number and nature of alternatives will depend on the problems and circumstances being addressed. Chapter 7 deals with many aspects of defining and evaluating alternatives, from the general evaluation framework to methodologies for transportation and environmental analysis. It includes discussions of both screening-level and detailed-level analyses. However, because the number of topics in the development and evaluation of alternatives is vast, this chapter focuses on some of the more important and overarching issues and refers the reader to additional sources of information. The discussion refers to preferred alternative and preferred investment strategy as synonymous terms.

7.1. Identifying Initial Alternatives

7.1.1. General Principles

Many lessons have been learned over the years regarding the definition and evaluation of alternatives. Principles that have been applicable to the NEPA process are also generally applicable to pre-NEPA corridor studies. Listed below are some of the general principles that apply to the definition of alternatives:

- Alternatives should respond directly to the identified problems and needs.
- A range of alternatives should be identified to provide decision-makers with a spectrum of choices and tradeoffs. Even though the alternatives should target the same problems and needs, the objectives may vary (e.g., some may focus on demand reduction, while others focus on capacity increases or service to different travel markets).
- Alternatives should be developed through a collaborative process.
- Alternatives should be reasonable. Although opinions may differ on what constitutes reasonableness, responsible agencies need to make decisions that control the number of alternatives investigated.
- Alternatives should be as competitive as possible within the limits of the objectives of each alternative. If a decision is made to move a particular alternative forward based on a comparison with other alternatives that were poorly constructed, this could cause the results of the decision-making process to be vulnerable.

It is important to note that the result of a corridor study could be a single preferred alternative or investment strategy or could be a set of reasonable alternatives that are analyzed later in the NEPA process. The development of the corridor study strategy, discussed in Chapter 3, indicates some of the possible options. It is important to understand the type of decision to be made, which defines the ultimate objective of the corridor study. If the corridor study is not conducted as part of NEPA, it may be unwise to select among final alternatives until the process has been brought under the NEPA umbrella.

7.1.2. Frameworks for Developing and Analyzing Alternatives

As with other parts of the corridor study process, there is no one size fits all to the definition and evaluation of alternatives. In simple cases, the identification and analysis of alternatives could be a one-step process. In most cases, however, there will be a process of initial alternative development,

refinement of those alternatives, and analysis of those alternatives. In many cases, there will be a two-step process: screening of initial alternatives and analysis of detailed alternatives. But there are other possibilities as well. Exhibit 7-1 illustrates the traditional approach and two examples of other ways in which alternatives can be developed and analyzed. These are merely examples. Any individual corridor study may use one of the options, several of the options, or options that are not shown here. A description of the options in Exhibit 7-1 and some of the pros and cons are discussed below:

- **Traditional screening and detailed analysis.** An initial set of alternatives is identified, and enough analysis is conducted to allow the several most promising alternatives to be evaluated in greater detail. This is an efficient approach that allows resources to be conserved in the early stages and applied to the alternatives that have the greatest chance of becoming part of the preferred alternative or preferred investment strategy. The level of detail used in screening depends on the consequences of making a wrong decision at that point. If there is doubt about whether an alternative should be brought forward, the best approach is usually to include it in the more detailed analysis. Alternatives may need to be refined and adjusted after the screening phase.
- **Incremental analysis.** This represents a learn-as-you-go approach. A small number of alternatives would be analyzed initially. The lessons learned during the initial analysis would be used to refine the alternatives or introduce new ones. These would be analyzed and another refinement of alternatives would occur. The process would continue until the decision-makers arrived at a preferred alternative or investment strategy. This approach may be appropriate when there are many possibilities, and it is desired not to invest too heavily in evaluation until the potential effectiveness of some of the basic alternatives becomes more clearly understood.
- **Analysis of components, followed by analysis of detailed alternatives.** This may be appropriate when there is a wide range of options that may be viable and where the preferred alternative will likely consist of a multifaceted transportation strategy. Analysis of individual components early in the project could help to determine which components could be included together to form an overall optimum strategy. If the components are put together first and then analyzed, it can be difficult to identify which individual parts are proving to be most beneficial and which may have little or no benefit. This approach can require additional resources up front, but reduces debate and uncertainty over the benefits of individual components.

Some corridor studies may involve a mixture of these and other approaches. Some studies have evaluated well over 100 alternatives. Although this was far from the original intent, the circumstances made it evident to the stakeholders that this was necessary. Other studies have been able to come to conclusions with only a few alternatives. The decision-making process must be sensitive to the unique factors and the concerns of the stakeholders involved. If a viable decision cannot be made without an additional iteration of analysis, the additional effort will usually need to be invested. However, agencies need to learn to bring analyses to a conclusion and make a decision, even if that decision is the no-build alternative.

The methodologies applied in the analysis will vary widely by the type of issues being explored. In addition, the level of detail and analysis methodology may vary by the following factors:

- **Importance associated with the particular issues being evaluated.** As a general rule, if the issue is more important and controversial, the methodology will need to be more rigorous.
- **Stage within the alternatives selection and refinement process.** Methodologies applied at the screening level are less rigorous than those applied at the detailed analysis level.

- **Available budget.** In some cases, sufficient funds do not exist for analysis at the level of rigor desired. This is where agencies must exercise great judgment in determining the proper balance between cost and rigor. Typically, there are no clear answers on this, unless the level of rigor has been determined by a mandate or requirement already imposed on the process. However, agencies should be cautious not to be “penny wise and pound foolish.” Skimping on resources at critical points may cause more serious problems later.
- **Feedback by stakeholder groups.** The assessment of the importance of issues during study initiation can provide substantial input into making judgments on the level of detail and methodological rigor. See Chapter 4 for more information on determining the appropriate level of detail.

7.1.3. Sources of Transportation Strategy Ideas

Agencies and consultants involved with transportation analyses on a day-to-day basis typically have no shortage of ideas concerning transportation strategies and alternatives. But because the public, elected officials, and those less involved in the technical aspects of transportation may not be familiar with the range of transportation strategies, a listing or library of such strategies can be useful as a starting point. These lists not only provide non-technical individuals with a concept of the opportunities, but provide the technical staff with a checklist that will ensure that ideas will not inadvertently be overlooked. Some possible sources of transportation strategies include:

- Listings in the metropolitan area’s CMS. In some cases, these strategies have been pre-screened to include only those that may be applicable in the region, or even within particular corridors. Exhibit 7-2 is a listing of strategies developed for the CMS in the Denver, Colorado, region.
- Other statewide or local documents and studies that identify and describe potential transportation strategies.
- National sources (see list of references in Chapter 1).
- Other ideas that are generated through the agency and public involvement process.

The development of transportation strategies and concepts is an excellent opportunity to obtain public participation and comment. Workshops, meetings with community groups, meetings with business groups, hot lines, e-mail, and so forth are all potential methods to obtain public input. However, the study team needs to focus the public and agency/organization representatives on how the alternatives relate to the problems originally identified. The study team needs to be open to innovative ideas, while quickly helping the technical committee or policy committee to discard ideas that will clearly be infeasible or impractical.

One of the concerns that has been expressed by agencies managing corridor studies is that the suggestions for alternatives may include those that have no remote possibility of being feasible. They may include options that are simply unrealistic financially, operationally, or institutionally. There are several techniques that can be useful in helping all stakeholders to recognize when an alternative should not be considered even at the screening level:

- Demonstrate that the alternative has no relationship to the problems originally identified.
- Demonstrate, through “back of the envelope” methods that the alternative holds no possibility for making a significant impact on the identified problems. For example, an estimate could be made of how much a vehicular ferry service would actually reduce traffic demand on a particular bridge identified with a congestion problem.

- Demonstrate that there is no realistic way to implement the alternative or that the cost would be too great, based on what similar systems tend to cost.
- Demonstrate that the concept has been tried elsewhere and has not worked in circumstances that may have been similar or more favorable.
- Demonstrate that the concept could not be operational at certain times of year or under certain weather conditions.

... agencies should be careful not to prematurely discard alternatives just because they are non-traditional or difficult to implement.

At the same time, agencies should be careful not to prematurely discard alternatives just because they are non-traditional or difficult to implement. There are a number of examples around the country of legal, institutional, or other barriers that were overcome to implement creative solutions to transportation problems.

Exhibit 7.1
Approaches to Development and Refinement of Alternatives

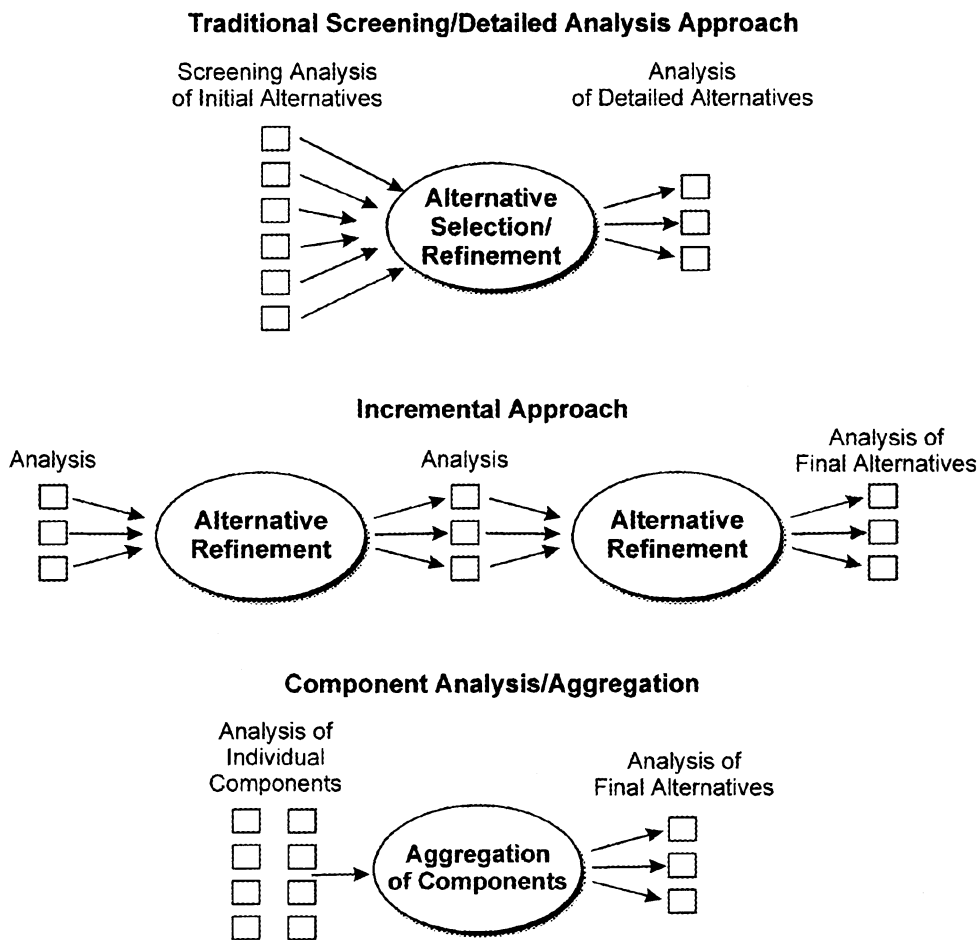


Exhibit 7-2.

Transportation Strategy List in the Denver, Colorado, Congestion Management System

- 1. TDM Measures.**
 - a. Regional rideshare match assistance (matching, promotion/information, targeted outreach).
 - b. Vanpool program ("3rd party").
 - c. Guaranteed ride home.
 - d. Parking management - preferential carpool/vanpool parking.
 - e. Parking management - supply restriction (maximum ratios or caps).
 - f. Parking management (on-street parking permits or meters). (Compliments 1c.)
 - g. Alternative work schedules (flexible work hours, staggered work hours, compressed work weeks).
 - h. Telecommuting.
 - i. Employer trip reduction support measures (e.g., rideshare coordinator and/or transit information on site).
 - j. Employer trip reduction ordinances.
 - k. Eliminate employer parking subsidies/parking cash-out program.
 - l. Employer-based transit pass subsidies/transportation allowances.
 - m. Neighborhood support measures (transportation coordinators, park-and-ride lots, marketing, transit pass provision/subsidy).
 - n. Corridor/subarea support measures (TMOs, transportation information centers).
 - o. Driving prohibitions (no-drive/limited-drive days). (Voluntary or mandatory.)
 - p. Truck restrictions/prohibitions.
 - q. Restrict start/finish of major social/recreational events to outside of congested time periods.
- 2. Traffic Operations Improvements (Traditional)**
 - a. At-grade intersection improvements (add turn lanes, channelize, prohibit left turns).
 - b. At-grade intersection replacement (grade separation, interchange).
 - c. Link traffic flow improvements - urban applications (removal of on-street parking, bus turnout bays, add lane for left turns, prohibit left turns, acceleration/deceleration lanes, improved shoulders).
 - d. Link traffic flow improvements - rural applications (build truck climbing lane, add slow moving vehicle turnout).
 - e. Traffic signal improvements (upgrade traffic signal control capability, interconnect and coordinate signals, remove unwarranted signals, super-street treatment).
 - f. Conversion to one-way street system or one-way pairs.
 - g. Railroad grade separations.
 - h. Reversible traffic lanes.
 - i. Improved traffic management during construction.
- 3. High occupancy vehicle measures.**
 - a. HOV lanes.
 - b. HOV bypass lanes at ramp meters.
 - c. Direct HOV ramps to freeway HOV lanes.
- 4. Public transit capital improvements.**
 - a. Fixed exclusive facility (rail, busway).
 - b. Bus lanes.
 - c. Deregulate/eliminate barriers to entry for private transit.
 - d. Bus only ramps to freeway.
 - e. Bus bypass lanes at ramp meters.
 - f. Transit malls.
 - g. Park-n-Ride, transit center or other mode change facilities.
 - h. Paratransit service or other flexible routing or on-demand service.
 - i. Expand transit service (provide reduced headways or service to new areas).
 - j. More/better amenities (shelters, newer buses, other).
- 5. Public transit operational improvements (traditional).**
 - a. Additional service with current fleet (e.g., extended hours).
 - b. Transit schedule coordination (e.g., timed transfers).
 - c. Signal priority for buses/rail vehicles.
 - d. Transit promotion/marketing.
 - e. Express bus service in mixed-use lanes.
 - f. Service revision focusing on congestion relief (more service in congested corridors, more freeway express service, shuttle service).
- 6. Nontraditional modes.**
 - a. Build bicycle paths, lanes.
 - b. Build pedestrian paths.
 - c. Build pedestrian malls.
 - d. Grade separation for bicycles/pedestrians.
 - e. Purchase/provide "free" bicycles.
 - f. Bicycle/pedestrian encouragement measures.
- 7. Transportation pricing.**
 - a. Tolls (with peak period pricing).
 - b. HOV lane tolls for SOVs.
 - c. Peak period parking surcharges.
 - d. Fuel tax increases.
 - e. Registration fee increase or vehicle surcharge.
 - f. Transit fare reductions/reduced fare zones, times.
 - g. VMT tax/emissions tax.
 - h. Increased property assessment ratio for private parking lots.
- 8. Growth management and activity center strategies.**
 - a. Land use policies/regulations (e.g., high density along transit corridors, mixed use site design, jobs/housing balance, child care integration with development).
 - b. Site design standards (transit friendly site design, bike/pedestrian compatibility, neotraditional neighborhood design, joint use with transportation facilities).
 - c. Growth limitations/controls/hard boundaries.
 - d. Concurrency management; trip budgets for new development.
 - e. Incentives to encourage employees to live closer to work (e.g., waiver of head tax, low-interest home loans, housing subsidy).
 - f. Subsidized housing near transit facilities.
- 9. Access Management.**
 - a. Adopt access control plan for new roads (driveway control, median control, side street/alley access).
 - b. Retrofit existing facilities (consolidate/eliminate driveways, construct median barriers, eliminate/restrict signals).
 - c. Construct frontage roads - freeways.
 - d. Construct frontage roads - arterials.
- 10. Incident management (information elements included under ITS).**
 - a. Rapid vehicle removal laws and clearance policies for minor accidents.
 - b. Freeway service patrols.
 - c. Accident investigation site/policies.
 - d. Institutional arrangements for rapid response (tow truck contracts, hazmat response arrangements, etc.).
 - e. Detour route preplanning.
 - f. Rapid detection/response (e.g., coordinated through a traffic operations center).
- 11. Intelligent Transportation System.**
 - a. Computerized signal control and enhancements (advanced traffic control).
 - b. Freeway ramp metering.
 - c. Electronic toll collection.
 - d. Real-time motorist information (e.g., changeable message signs, highway advisory radio).
 - e. Dynamic route guidance.
 - f. Real-time ride matching and dynamic bus routing.
 - g. Real-time transit information (requires vehicle location and operation status).
 - h. Public transit operations management (security enhancements, fare collection, etc.)
 - i. Port-of-Entry automation.
 - j. Weigh-in-motion.
- 12. General Purpose Capacity Improvements.**
 - a. Lane additions.
 - b. Auxiliary lanes.
 - c. Interchange reconstruction.

7.2. Lessons Learned by Practitioners Regarding Identification of Alternatives

Exhibit 7-3 lists observations by practitioners regarding lessons learned on the identification of alternatives.

Exhibit 7-3. Observations from Practitioners on Identification of Alternatives

- Remaining focused on goals and objectives prevents pursuing too many alternatives that are not feasible. Use initial course screening to reduce alternatives.
- Studies should build on work done in prior studies regarding alternatives that are feasible for the region.
- Reasonableness of alternatives should consider types of problems, corridor travel patterns, environmental constraints, and costs.
- Involve the public to avoid going back to evaluate an alternative late in the process. Evaluate alternatives in tiers.
- Should include non-transportation as well as transportation alternatives.
- Look at all alternatives. Do not rule out any until screened.
- We always seem to generate a lot of alternatives. The danger is in sometimes shutting down the entrance of new alternatives too soon. Sometimes you have to wrestle with the first set before a more ideal concept comes to mind.
- People have needed reminders that additional lanes are not the only alternative.
- Any alternative can be considered, but in-depth analysis should only be performed on feasible alternatives.
- Discuss as strategies, not projects. Use inclusive process.
- Public will list possible alternatives that are beyond your wildest imagination. You cannot ignore them – a pre-screening evaluation process is needed.
- Need to include one or more alternatives that can be funded within financial constraints of transportation plan. OK to study other alternatives as well, but only fundable ones can be incorporated into the plan and cleared environmentally.

7.3. Choosing the Base Condition

The classic evaluation strategy is to compare future conditions with the no-build scenario for the same future time period. The no-build scenario is also required under NEPA. The benefits, costs, and impacts of an alternative are best understood and quantified by making a comparison of the alternative against a base condition in which everything is the same except for the alternative itself. Therefore, if a future year is analyzed with the alternative in place, that same future year must be analyzed and compared against the conditions in which the alternative is assumed not to exist. This basis of comparison can be referred to as the “base condition,” “base case,” “no-build alternative,” or “no-action alternative.”

It is important to note that there could be a need for more than one base condition. For example, it may be important to analyze the first year of project operation as well as the metropolitan area’s current “horizon year.” One of the main reasons for this would be to estimate the expected growth or changes in benefits and costs over time, allowing for a net present value or benefit cost ratio to be estimated. In other cases, the analysis of the horizon year may be all that is warranted, as the comparison of alternatives for that single future year may provide ample information for the selection of alternatives.

There are several possible options for constructing the base condition for the horizon year. The options center around the transportation facilities and services assumed to exist in the base condition. Exhibit 7-4 identifies several options, along with the advantages and disadvantages.

Exhibit 7-4. Options for Identifying Projects in the Base Condition

Base Condition Option	Advantages	Disadvantages
Use projects in the applicable MTP.	Most logical choice for most situations. Represents a set of conditions that has been reviewed and approved on a regional basis.	May not be the best choice if the MTP projects do not represent what is reasonable under financial constraint in the vicinity of the corridor being analyzed.
Use only projects in the TIP.	Provides greater assurance that projects will actually be in place in horizon year.	Conditions would appear worse and benefits of certain alternatives may look better than they actually would be if more projects were assumed.
Use a set of fundable projects that is viewed to be reasonable by the stakeholders.	Can solve dilemma of an MTP that is believed to be unrealistic.	Takes more time to identify base condition. Could be challenged if broad agreement is not reached.
Where there is uncertainty as to future major improvements in corridor, use dual base conditions, testing sensitivity of alternatives against each condition.	May remove uncertainty from a decision that could be contingent on other future projects. This approach is particularly advantageous where a potential improvement in the corridor is one part of a larger potential improvement.	Increases resource requirements in analysis of alternatives (but sensitivity analysis may not be needed for all alternatives).

It is expected that the MTP will be the preferred choice for base condition in the large majority of cases. However, where decisions are expected to be more controversial, the study team should discuss how to cover the possibilities and give decision-makers ample information on the “what-if” scenarios (e.g., what if facility x is not built). In this case, the full complement of evaluation criteria would not necessarily need to be developed for each case, only for those that were expected to be sensitive to the results.

In addition, it may be necessary to make other adjustments to the MTP base condition to provide a level playing field among alternatives. For example, if a transportation facility exists in the MTP that would “compete” with an alternative to be analyzed in the corridor study, it is usually most appropriate to exclude the facility from the base condition and include it as an alternative or an element of an alternative. However, if that facility is a “done deal,” with the funding and implementation strategy in place (including inclusion in the TIP), then the facility should be included in the base condition.

Another major dilemma in developing the base condition exists when evaluating the potential for a rail alternative (this could also apply to a busway or HOV alternative). The potential success of a rail alternative depends partly on how much of a critical mass exists in the regional transit system. The larger the system and the more numerous the stations, the greater will be the potential ridership in the corridor being analyzed. If a rail line in a particular corridor is analyzed completely independently from a potential regionwide system or a system that is more extensive in nature, it is questionable whether the rail alternative in that corridor will have been examined in its best possible light. On the other hand, it may not be reasonable to expect that a full regional rail system would be possible within the horizon year or, for that matter, ever be possible at all. If the regional rail system, excluding the corridor being analyzed, is included as part of the base condition, this may make highway alternatives appear to be less attractive.

Although the ideal solution to this dilemma (i.e., uncertainty in major future transportation improvements in or near the corridor) may be to provide for dual base conditions, as discussed earlier, this may not be practical. If this is not practical, agencies will need to make a decision regarding the extent of a rail system that is reasonable to include in the base condition. It is important that the rationale for such a decision be documented. In addition, the corridor study report should contain a discussion of the potential implications on the results if the future base condition should vary from what has actually been assumed. One of the most important principles in dealing with uncertainties in assumptions is that the potential implications should be discussed in an open environment so that there are no surprises. Collaborative decisions made during the study process can go a long way toward defending decisions made as a result of the evaluation of alternatives.

One of the most important principles in dealing with uncertainties in assumptions is that the potential implications be discussed in an open environment so that there are no surprises.

Another important question involves what agencies should do if a key assumption within the base condition should change either during the course of the study or following completion of the study. This could occur with socioeconomic data or the inclusion or exclusion of a transportation facility. It is not unusual for either of these to occur. Agencies have several options:

- Determine that the change will have little or no impact on the conclusions and recommendations. This conclusion may be possible because of analysis conducted as part of the original study (e.g., sensitivity analysis of uncertainties), or simply because it is rather obvious that little or no impact would occur.
- Conduct a simple sensitivity test on one or more alternatives to determine whether, in fact, a significant effect is likely. In many cases, this can be done rather easily, particularly where the change involves the inclusion or exclusion of a highway facility. If the sensitivity test is needed after the study has been concluded, agencies will need to determine whether the test can be done with the modeling data sets that were used during the study, or whether later versions of the model data sets should be used. Because the use of the older data sets may be the simplest approach that is most consistent with the existing analysis, agencies should be reminded that good documentation of the modeling process and archiving and labeling of the data sets can be very helpful in saving time and money.

One of the major benefits of using the MTP horizon year for the base condition is that model data sets are generally already prepared and approved. Agencies may also maintain other data sets for either interim years or even for years beyond the MTP planning horizon. If alternatives will be analyzed against an additional base condition for an alternate year, the appropriate data sets must be available or developed. Usually this is not necessary, but may be desirable depending on the nature of the study. The same principles generally apply for these conditions.

An additional question involves how to deal with land use or socioeconomic forecasts in the context of the base condition. As a general rule, the base condition should include the regionally approved socioeconomic data. Introducing variations in socioeconomic data or land use within the base condition usually raises additional questions and problems. **The preferred approach is to introduce variations in land use into the alternatives and to explain the nature of those variations and the feasibility/probability of those variations based on the individual alternatives.** What is sometimes necessary for corridor analysis is that more refined land use data be developed for the corridor (i.e., smaller zones) and in making those refinements it is found that the base land use data need to be adjusted. The inclusion of land use considerations in constructing alternatives is discussed later in this chapter.

7.4. Evaluation Methodologies

7.4.1. Overview

Methodologies to evaluate alternatives against the criteria vary dramatically by subject area, level of detail, and cost. It would be impossible for this *Guidebook* to cover the breadth of evaluation strategies that might be applied in corridor studies. Therefore, the intent of this section is to provide the reader with sources and references for conducting various analyses that might be appropriate based on the level of analysis detail desired.

... the study team must have qualified individuals involved in each of the subject areas important to the analysis.

In many cases, the type of analysis may be dictated by the tools that are available and by the budget that can be allocated to that analysis. One of the most important principles is that the study team must have qualified individuals involved in each of the subject areas important to the analysis. This could include

individuals on the staff of that agency, from another cooperating agency, or from one or more consulting companies. The use of qualified staff will usually ensure that the appropriate methodologies are being applied and that no major oversights will occur.

The material presented in this section is intended to provide the agency staff with a general knowledge of the types of methodologies available, it is not intended to be a replacement for the use of qualified staff. In other words, this section is not intended to be a “cook book” or to imply that the methodologies can be reduced to “plug-and-chug” exercises. In many cases, considerable judgment is required in the appropriate selection of the methodologies and in their execution. In addition, methodologies are improved and enhanced over time. The use of qualified staff who stay up-to-date with these developments in their respective fields will help to insure that the most appropriate approaches are being applied to the unique circumstances surrounding each individual study. In addition to an overview of the methodologies and sources, this section provides perspectives on the treatment of particular issues that can arise in a corridor study. In particular, a number of the issues listed in Chapter 1 are addressed.

This section is structured to provide an overview of the full range of methodologies, from screening through detailed analysis. Study sponsors should recognize that the level of analysis and sophistication largely depends on the following factors:

- Importance of the issue to the decision being made
- Budget available for the analysis
- Likelihood of the results being scrutinized
- Time available for the analysis

It is possible that relatively rigorous analysis methodologies may be important even at the alternative screening stage for one or more issue areas. On the other hand, screening level techniques may be perfectly adequate for the evaluation of detailed alternatives for subject areas that are not critical to the decision. There is no reason to provide evaluation “overkill” for those subject areas that are not important. To do so will result in a waste of resources that could have been used on other more important activities. This highlights the importance of the study initiation phase. The study management team should develop a sense of priority of where the evaluation dollars should be invested. If these decisions can be made up front and adjusted as the study proceeds, the study is likely to incorporate methodologies that are neither too elaborate nor too simplistic. For the methodologies presented in each of the subject areas in this section, the study management team can select from the range of available approaches and methodologies that are most appropriate to the

conditions. Again, however, it should be remembered that even these “typical” methodologies may need to be adjusted so that they are appropriate for the conditions at hand.

7.4.2. Traffic and Transit Forecasting

Most metropolitan areas have travel demand forecasting models that are used for a variety of applications, from regional planning, to air quality conformity analysis, to small subarea studies. They represent the primary, although not exclusive, tool for conducting the travel and traffic portions of corridor studies. It is not the intent of the *Guidebook* to explain the specific procedures involved in coding and executing travel demand forecasting models. There is a wealth of information on that subject. Rather, the *Guidebook* highlights principles and lessons learned in properly applying the models within the context of a corridor study and helping practitioners structure model-generated information in a way that decision-makers will understand.

7.4.2.1. Resources for Travel Demand Modeling and Analysis

Some of the basic references of which practitioners should be aware include

- Harvey, Greig, and Elizabeth Deakin, *A Manual of Transportation-Air Quality Modeling for Metropolitan Planning Organizations*, for the National Association of Regional Councils, 1993. This document describes “best practices” for modeling in metropolitan areas. Not all the techniques will be appropriate or affordable for corridor studies.
- Ryan, James M. and Donald Emerson, et. al. *Procedures and Technical Methods for Transit Project Planning*, prepared for FTA, 1993. This is a comprehensive guide for the application of travel demand modeling procedures to analysis of transit systems.
- Transportation Research Board, *TRB Special Report 209*, “1994 Highway Capacity Manual,” Washington, D.C., 1994. Represents the standard for analyzing traffic capacity and level of service.
- Periodic papers and reports from FHWA’s Travel Model Improvement Program, available through the web site bts.gov/tmip/.
- Federal Transit Administration, *Technical Guidance on Section 5309 New Starts Criteria*, FTA Office of Planning, September, 1997. This document provides analytical guidance to generate information needed for applications for Section 5309 New Starts funding. The techniques also generate information useful to the evaluation of alternatives in a multimodal corridor study, although they are not explicitly intended for that purpose.

The FTA document *Procedures and Technical Methods for Transit Project Planning* is a particularly thorough treatment of modeling issues associated with transit improvements. Although it was developed as a guide for FTA Alternatives Analyses and transit-oriented planning studies, it is still highly relevant to multimodal studies. However, the level of rigor followed in any particular corridor study should be a judgment made as part of the study itself.

7.4.2.2. About the U.S. DOT Travel Model Improvement Program

To remedy current model deficiencies, the FHWA, the FTA, the Office of the Secretary of the U.S. DOT, and the EPA have initiated the Travel Model Improvement Program (TMIP). It is a major program to enhance current models and develop new procedures. The program is a cooperative effort among organizations involved in transportation, land development, and environmental protection. The objectives of the program are

- To increase the policy sensitivity of existing travel forecasting procedures and their ability to respond to emerging issues including environmental concerns, growth management, and

changes in personal and household activity patterns, along with the traditional transportation issues;

- To redesign the travel forecasting process to reflect today’s traveler behavior, to respond to greater information needs placed on the forecasting process, and to take advantage of changes in data collection technology; and
- To make travel forecasting model results more useful for decision-makers.

TMIP includes a number of initiatives to improve the existing four-step transportation modeling process in the short term. In addition, it includes long-term model development activities to significantly advance modeling techniques to include activity-based modeling and micro-simulation.

7.4.2.3. Observations from Practitioners on Travel Demand Modeling

Exhibit 7-5 compiles observations from practitioners obtained from the NCHRP Project 8-34 survey concerning the use of travel demand forecasting models in corridor studies.

Exhibit 7-5.

Observations from Practitioners on Travel Demand Modeling

- Model assumptions, scenarios, and forecast years should be agreed upon prior to screening.
- Need to be able to support comparative analysis across modes. Alternatives should reflect true demand and not be influenced by modal biases. It is useful that technical work be reviewed by technical experts and others outside the committee.
- Have the model ready to run before the study begins. Think carefully about assumptions. Sufficient time needs to be dedicated to travel demand analysis. This task frequently causes delays in the study.
- Helpful to evaluate origin-destination characteristics.
- Need to have a model in which local people have confidence. Need to account for freight movement and passenger modal split.
- Model should not be the ultimate determining factor. Should not drive the study process. Agree on regional model methodology and stick to it. A recently validated model is critical and extremely helpful. Do not use raw model outputs without using sound professional judgment to interpret. Perform reasonability checks, such as peer city analysis.

7.4.2.4. Pre-study Activities

Travel demand models, though vital to most corridor planning studies, have been one of the premier sources of anxiety for study managers. Glitches in the model itself and illogical output have sometimes led to long delays or difficulties in explaining results to

One of the best things study managers can do is ensure that the model is ready for use before the study is set in motion.

decision-makers. Technical problems with the model can be embarrassing and disastrous to agency reputations particularly when the study is high profile and controversial. One of the best things study managers can do is ensure that the model is ready for use before the study is set in motion. This is less important for low profile studies, but even for those, delays can cost money and disrupt the scheduling of resources. Transit modeling introduces an additional level of modeling complexity. Corridor studies involving use of transit models should be particularly cognizant of possible complications. Several principles that are worth remembering when preparing a model for use on a corridor study include

- The study manager should fully understand the status of the model and not make assumptions concerning its availability. The modeling staff need to be part of the study team from the outset.

- The validation of the model should be examined explicitly for the areas and issues to be addressed in the study. If the validation is weak in the geographic area being examined, possible efforts to improve the validation in the area should be discussed. There should be no surprises regarding the weaknesses of the model after the study begins.
- If the model is being used to evaluate modes of travel or transportation strategies that it has not been used for previously, it would be advisable to test the model's responsiveness to those modes before the study or at least before the time that the analysis is to be conducted. For example, if HOV lanes are to be modeled, it would be useful to have tested the sensitivity of the HOV mode choice component for reasonableness before the actual analysis occurs.
- If the improvement of the model is part of the scope of the corridor study, enough development and testing time should be provided early in the study to minimize the potential impacts of delays later on.

7.4.2.5. Modeling and Analysis Methodology

The initial scope of work should establish the basic methodological concepts to be employed. In some corridor studies, however, methodology is of greater concern, and the credibility of the study will rest on the methodologies used. The study team can enhance the credibility of the study by

- **Making sure the analysis methods are appropriate for the issues at hand and for the budget available.** The most sophisticated analysis methods are not usually necessary, but the analysis should be repeatable and not overly subject to judgment of the analyst. Judgment will be necessary, but analysis staff should be able to explain the basis for those judgments.
- **Explaining the analysis methods.** The methods should be explained to interested stakeholders in ways that are appropriate for their level of interest and understanding.
- **Having an open environment for information sharing.** Those with an interest in the details should be able to get the details. An inability for interested stakeholders to obtain information usually leads to other problems and possible conflict.
- **Documenting methodologies.** These methodologies should be documented before the conduct of the analysis and review by study stakeholders.

For the more complex and controversial projects, several techniques can be employed to strengthen the analysis methodologies and to reinforce the open environment:

- **Create a subcommittee of the TAC to review analysis methods and detailed technical results.** This allows agency technical staff and other interested parties (even public stakeholders) the opportunity to provide input and critiques without burdening the main committee with technical details. The conclusions and results of these meetings should be reported to the TAC.
- **Ad hoc meetings of those interested in the details of methodology.** The study team may offer an opportunity to discuss methodologies at strategic points in time. Scheduling an open meeting will allow any individuals with concerns or questions to pose them and get answers.
- **Peer review.** A small group of outside experts on modeling and methodology could be asked to comment on methodological issues and approaches proposed by the study team. Their peer review report would be provided to the study team with recommendations for modification, where appropriate. Normally, peer reviews are reserved for focused model development activities, not for a corridor study, but the technique could be used for corridor

studies as well. Caution should be exercised in that the peer review group could recommend improvements or changes for which there is no implementation budget available.

7.4.2.6. Sketch Planning

Sketch planning represents a class of analytical techniques that are usually easier and less expensive to apply than classic modeling methods, but the results may be less reliable than more sophisticated methods. In some cases, though, modeling methods may be equally quick and inexpensive, or even more so. For example, most highway improvements (e.g., lane additions or new alignments) are modeled relatively easily, if the traffic analysis zone structures are sufficiently detailed in the geographic areas being modeled. Therefore, model-based analyses may be most cost-effective for some sets of alternatives even at the alternatives screening stage early in the study. **It should not be assumed that sketch planning methods are more economical in every case.**

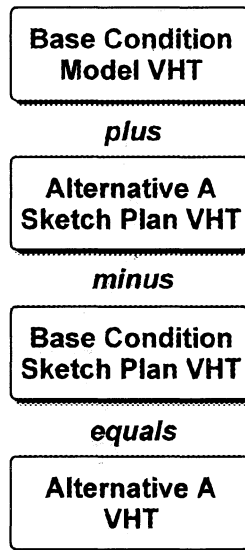
Sketch planning methods can be particularly appropriate in dealing with non-highway alternatives. In areas where mode choice modeling capability does not exist, sketch planning may be the only recourse, even when analyzing detailed alternatives. Even with sketch planning methods, one of the weaknesses in transportation analysis methodology remains in the areas of TDM, operational management (e.g., incident management), and other non-traditional strategies.

There are some fundamental principles involved when using sketch planning techniques:

- **The methods should provide for apples-to-apples comparisons.** For example, if some of the alternatives are being analyzed using the regional travel demand forecasting model, the sketch planning method should provide results that are consistent relative to the regional results. Assuming that the regional model provides estimates of VMT and VHT, the sketch planning method should pivot off the VMT and VHT produced by the model, not generate an independent estimate. There is little likelihood that the sketch planning method's VMT and VHT estimates will be comparable to those produced by the model. Thus, the sketch planning method might be used to quantify the incremental change in VMT and VHT, and this increment applied to the model's estimate. Exhibit 7-6 illustrates the concept. Even then, the increments may be of a different scale for alternatives analyzed with sketch planning versus alternatives analyzed with the model. It is preferable not to mix and match techniques, but sometimes it cannot be avoided. The study team should carefully scrutinize the results for reasonableness.
- **Critical judgments and assumptions for sketch planning should be derived collaboratively.** Key assumptions can alter the relationship among alternatives, and these need to be discussed and exposed, not left to a single analyst.
- **Sensitivity analysis should be considered where there is uncertainty in key assumptions or where there is a lack of confidence in the method itself.** Ranges in assumptions to be tested should be derived by individuals who have the expertise to provide reasonable ranges.

Exhibit 7-7 lists a range of sketch planning tools that may be appropriate in a corridor study. Almost all the tools are designed to produce VHT or delay statistics. Some also generate emissions, fuel consumption, and economic results. The exhibit lists the tool and conditions in which its application may be appropriate. The listing in Exhibit 7-7 is not an exhaustive list or an endorsement of any particular tool. Practitioners should keep updated through information on the FHWA and FTA web sites regarding modeling and sketch planning improvements.

Exhibit 7-6.
Relating Sketch Plan VHT to Model Generated VHT



7.4.2.7. Refinement and Presentation of Travel Demand Model Output

Transportation models are approximations of reality. They were originally developed to estimate future travel demands in major corridors. Their applications have been extended to assist in determining the impacts of relatively small changes in the transportation system and in facility design. Although these applications go beyond what was originally

... the most important use of models is something they are relatively well suited for: assessing incremental changes.

envisioned for travel demand models, the most important use of models is something they are relatively well suited for: assessing incremental changes. One should be cautious about accepting absolute travel forecasts on any individual facility at face value. Forecasts on any individual facility, even a major one, can be off by 25 percent or more.

Study participants need to understand that forecasts on individual facilities are approximations. In addition, the study team needs to present information in a way that emphasizes the major points and does not call the modeling results into question. The following techniques can be suggested:

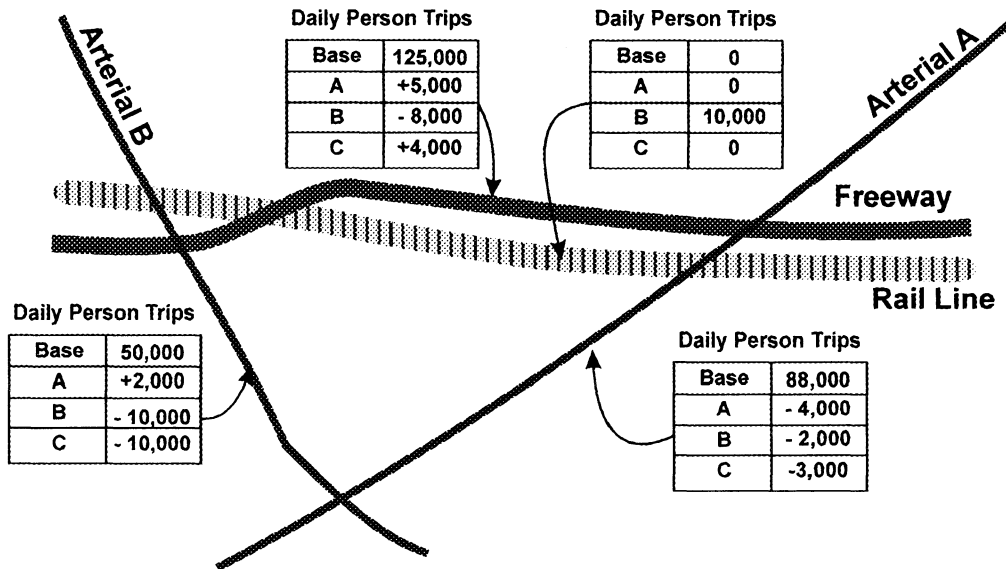
- **Focus on the differences among alternatives.** Showing the differences in traffic volumes or transit volumes on individual facilities, routes, or corridors provides a direct assessment of how each alternative influences travel. Exhibit 7-8 shows a simple example of the differences between alternatives that might have included two highway options and a transit option. The base condition volume can be shown as well, so that reviewers can assess both the differences and the total forecast.
- **Where absolute volumes are shown, refine the model output according the procedures in NCHRP Report 255,** or other locally accepted procedure for traffic volume refinement. In effect, these procedures make adjustments in volume for the future year based on the relationship between the model validation year volumes and the corresponding ground counts. **But traffic volume refinement cannot properly correct for poor modeling practice.** Refinement would be particularly important when, for example, the future year forecast shows lower volumes than the current year count for no explainable reason. It is

better to correct for these anomalies, even if they are minor issues, than to have questions raised that could damage the credibility of the entire study.

Exhibit 7-7.
Representative Sketch Planning Analysis Tools

Sketch Planning Tool	What It Does	Where Tool Can Be Obtained
STEAM—Surface Transportation Efficiency Analysis Model	Operates on trip tables from travel demand model output to analyze multimodal alternatives. Includes economic analysis.	FHWA web site: www.fhwa.dot.gov
SMITE—Spreadsheet Model for Induced Travel Estimation	Analyzes the propensity of transportation improvements to generate induced travel.	FHWA web site. www.fhwa.dot.gov
SPASM2—Sketch Planning Analysis Spreadsheet Model	Uses a spreadsheet approach to analyze transit improvements, highway improvements, HOV improvements, and auto use disincentives.	FWHA web site: www.fhwa.dot.gov
FHWA TDM Model	Operates on trip tables from travel demand model output to analyze TDM strategies.	McTrans (U. of Florida) (352)392-0378
TCM Tools	A spreadsheet analysis tool that estimates changes in VMT, VHT, trips, and emissions from a user-specified total for TDM and certain operational strategies.	California Air Resources Board
HCS—Highway Capacity Software	Implements the procedures in the 1994 Highway Capacity Manual.	McTrans (U. of Florida) (352)392-0378
DELAY	Spreadsheet program that estimates the delay due to traffic incidents.	McTrans (U. of Florida) (352)392-0378
DQUEUE	Estimates the delay at toll plazas.	McTrans (U. of Florida) (352)392-0378

Exhibit 7-8.
Example Display of Volume Differences



7.4.2.8. Simulation Models

Traffic simulation models are becoming increasingly useful as not only operational tools but planning tools as well. Macroscopic models simulate traffic on the basis of empirical traffic flow equations, handling traffic in aggregate time periods or “time slices” such as 15-minute intervals. Microscopic models simulate individual vehicles. Most microscopic models also have animation features that can show the movement of individual vehicles on the computer screen. Exhibit 7-9 indicates the types of models available for simulating traffic on freeways and arterial streets. Most are available through McTrans at the University of Florida.

The need for simulation is not anticipated on most corridor planning studies, but there are occasions when it may be useful.

- When it is the only way to reasonably estimate the benefits and impacts of certain alternatives. Examples might be arterial operations improvements or freeway ramp metering.
- When it is desired to estimate queuing and delays at bottlenecks or duration of congestion in ways that could not be estimated using travel demand models.
- To visually illustrate (through animated microsimulation) traffic operations in particularly complex locations, allowing stakeholders to better understand problems or potential benefits of a particular alternative.

Keep in mind that the simulation models generally work on the basis of fixed demand. There are some exceptions to this, but analysts should expect to feed input volumes to the models based on outputs from the travel demand modeling of each alternative. It should also be recognized that traffic forecasts substantially greater than capacity may either produce unrealistic results or cause the models to abort.

7.4.2.9. Methods of Illustrating Congestion on Roadway Segments

Two types of measures are usually of interest in corridor planning studies: regional measures and facility measures. Regional measures such as PHT, VMT, VHT, regional average speed, and emissions are excellent ways to collapse impacts (some negative, some positive) in various parts of the region into a number that represents the aggregate result. These are good for overall comparisons among alternatives.

Exhibit 7-9.
Types of Simulation Models

	Freeway	Arterial
Macroscopic	FREQ (Cal Berkeley) FREFLO (FHWA)	TRANSYT-7F PASSER
Microscopic	FRESIM (FHWA) INTEGRATION (Van Aerde)	NETSIM (FHWA)

But there are usually impacts on specific segments of the transportation network (either existing or future) that are important as well. The public is interested in how an alternative will affect the traffic volumes on the roadways passing through their communities. They are interested in how an individual facility and the congestion on that facility may be benefited or impacted by an improvement. Exhibit 7-10 describes several ways of expressing impacts on individual roadway segments, including pros and cons of each.

The use of speed, travel time, and peak period duration has gained increasing attention. These measures relate more directly to how travelers perceive transportation problems and the benefits of transportation improvements. But they are also more challenging analytically. Speeds can be derived directly from modeling output, but these speeds are generally meant for purposes of traffic assignment algorithms and are usually not refined enough to provide direct representations of speed. However, they can possibly be useful as indications of speed differences among alternatives, as long as the approximate nature of the information is conveyed to the decision-makers.

Exhibit 7-10.
Types Segment Measures That Could be Useful in a Corridor Study

Segment Measure	Advantages	Disadvantages
Peak hour volume-to-capacity ratio	Easy to calculate. Easy to understand.	Does not convey impact on trip time or delay. Not very meaningful where all values are well over 1.0.
Average peak hour or peak period speed	Directly relates to what travelers view to be important: time.	Difficult to estimate accurately.
Daily volume/capacity ratio or daily volume/hourly capacity ratio	Gives better indication than peak hour ratio of total demand/capacity relationship.	Not as easily understood as peak hour ratio.
Congestion index	A form of daily volume/capacity ratio. Can be by segment or aggregated to a facility, subarea, or region.	Not as easily understood as peak hour ratio.
Duration of peak period	May be the most meaningful indicator of magnitude of benefit for heavily congested areas.	Not as useful in areas with lower congestion levels. Difficult to estimate without advanced procedures.

Advanced modeling techniques are attempting to address the estimation of peak period duration. A recent simplified approach to peak period duration was used in a study for a major arterial corridor in Northern Virginia. An indicator of peak period duration was simply calculated by dividing the peak period demand by available hourly capacity.

7.4.2.10. Use of Trip-Based Measures

An even more powerful way to display the relationship among alternatives is to display information on trips, rather than on segments. Travelers think in terms of trips, and they readily relate to trip-based statistics, particularly trip time. Exhibit 7-11 illustrates a way to present trip time data. The data can be generated relatively easily through transportation models, but must be used with caution because of the limitations in the ability of the models to generate reasonable speeds. The results should be reported for typical O-D pairs. In presenting the information, the study team should make clear which horizon year is represented and relate the results to the existing situation. It is important to ensure that the existing trip times match public perception and seem reasonable compared to actual travel times (i.e., they should not merely be numbers pulled from the model) and that the relationship between existing and future is reasonable.

7.4.2.11. Stratifying Facility Usage by Trip Type or Origin-Destination

Decision-makers often are interested in how facilities will impact their own constituents. Common questions may include

- What percentage of the trips on facility X will be my constituents?
- What is the net benefit in terms of time saved or additional service provided to those who live in my jurisdiction?
- Where will the people be coming from who use the new facility through my jurisdiction?

The capability exists to provide this type of information to decision-makers. It does not need to be provided in every study, but practitioners should be aware that this type of information can be generated and can be useful in explaining how the benefits and impacts are distributed. Some models have the ability to provide bandwidth plots of the number of trips on a segment by trip type or by O-D. In other words, in addition to knowing the number of trips on a segment, it could be known how many of these are going to downtown, are to other major employment centers, or are through traffic. Exhibit 7-12 provides an example.

**Exhibit 7-11.
Approach for Displaying Trip Time Data**

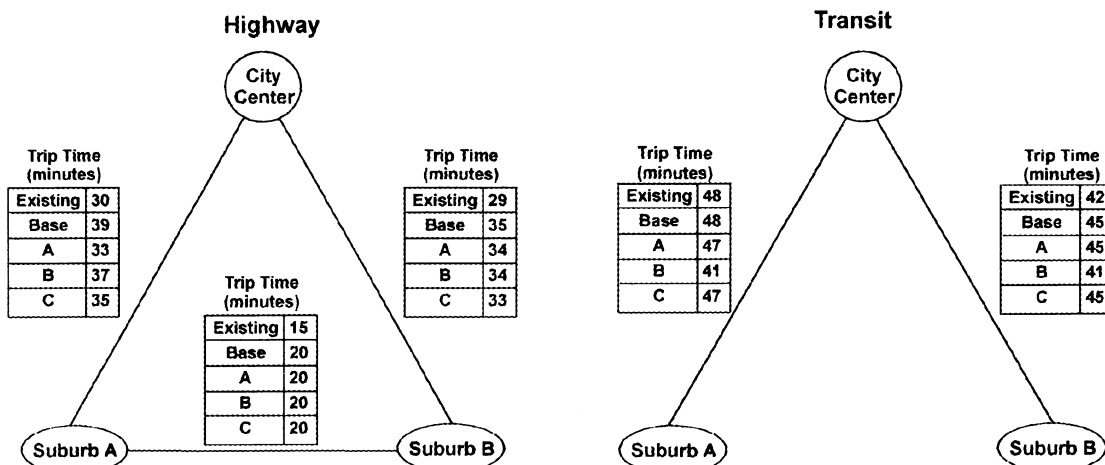
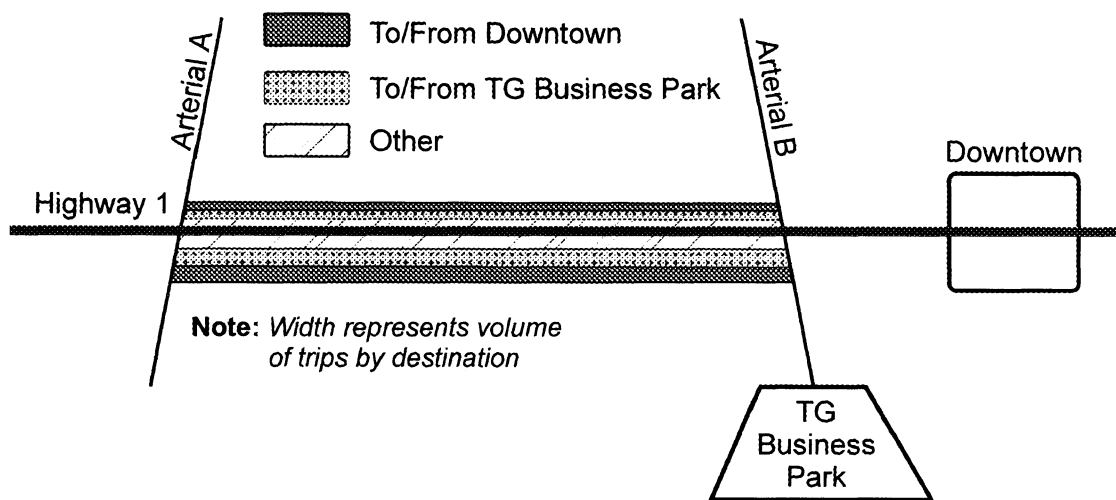


Exhibit 7-12.

Approach for Displaying Origin-Destination Data



7.4.3. Analysis of Land Use

7.4.3.1. What is the Relationship between Transportation and Land Use?

The relationship between land use and transportation is becoming increasingly visible and important in making transportation decisions. The fact that a relationship exists between land use and transportation is clearly evident from observation of the evolution of land use along transportation corridors, both highway and transit. Yet the ability to quantify these effects can be difficult and depends on the questions being asked. For example, some of the questions that may commonly arise in a corridor study with respect to land use could include

- To what extent does a new transportation facility/service or an improved facility/service influence regional growth and development? The extent to which any individual improvement has produced net regional growth has not been definitively proven. This is true even for major facilities such as beltways. There are too many factors that contribute to regional growth to discern the extent to which that growth can be attributed to transportation facilities alone. There are a number of studies that have shown the relationship between travel and urban form, but none that definitively demonstrate the relationship between regional growth and a given transportation facility, even a major one. It is important to note that this is a separate question from the relationship between transportation and land use that exists along a specific corridor.
- To what extent does a new or improved transportation facility stimulate growth in the vicinity of that facility? This is an entirely different question from the previous one. Here, a clear relationship between land use and transportation can be seen directly, as that new facility provides access to land uses in a way that was not available before. The extent to which an expanded facility (e.g., the addition of a lane) influences land use is less clear.

The purpose of the discussion of land use and transportation relationships in this section is not to address the theoretical aspects of the relationship, but to demonstrate when and how, in practical terms, land use can be incorporated into the study. *NCHRP Report 423A*, "Land Use Impacts of Transportation: A Guidebook" (1999), summarizes much of the research on the relationship between land use and transportation. The *Land Use Compendium*, a March 1998 product of the TMIP, provides state-of-the-art information on the modeling of land use and transportation interactions.

7.4.3.2. When Should Land Use Be Included As a Consideration?

Every corridor study does not need to include land use considerations. There are two primary occasions when land use should be considered for specific inclusion as a study issue:

- When one or more new, major facilities (either highway or transit) may be considered as alternatives, and there is viewed to be significant development potential that the facility(ies) will likely influence, and the differential benefit among alternatives could be influenced by land use assumptions. In this case, the conversion of an arterial to a freeway could be viewed as a new, major facility.
- When the study has as an explicit goal the rethinking of land use policies and strategies tied to the transportation strategy.

The decision of how to treat land use should be addressed during the development of the study scope. However, if it is later determined that land use will be an issue, it is advisable to include analysis of that issue. Actually, land use may be a consideration from beginning to end of the study, from scoping to recommendation of a preferred alternative or investment strategy. Exhibit 7-13 illustrates some of the ways land use may be considered throughout, and some of the issues or concerns that may be dealt with.

The inclusion of land use considerations in the analysis does not necessarily mean that it will involve a major effort. The importance of the land use issue to any particular study will tend to dictate the amount of effort invested. But agencies should not underestimate the importance of the land use issue. **Analysis of land use is integral to the analysis of secondary and cumulative effects, which is required under NEPA.**

7.4.3.3. Options for Considering Land Use within Corridor Transportation Alternatives

There are several approaches to considering land use within a corridor planning study:

- **Integrated land use and transportation modeling system.** Land use allocation models such as Disaggregate Residential Allocation Model/Employment Allocation Model (DRAM/EMPAL) can be interfaced with traditional travel demand models to provide an iterative approach to determining land use changes. A transportation alternative would be simulated with base condition land use forecasts, the results would be provided to the land use allocation model, a new land use forecast generated, and the results fed back into the travel demand model. Unless the land use allocation model has already been set up for the region, the application for an individual corridor study will likely be expensive and time consuming. Further, it is generally not advisable to set the model up just for the corridor, as there are land use interactions in major corridors that take place with other corridors in the region. It is expected that few regions will be in a position to take this approach for several years to come. Exhibit 7-14 illustrates a conceptual approach for this type of modeling framework.
- **An expert panel approach.** This approach has been successfully used in corridor studies such as the U.S. 301 Corridor Study in suburban Maryland, east of the Washington, D.C. (see case study below). The panel of experts typically would be drawn from individuals knowledgeable in real estate, finance, land planning, transportation, and related fields, in an effort to either predict market response based on various alternatives or to suggest realistic policy-based alternatives related to selected transportation options. The policy-based alternatives could be part of a land use “vision” that could be considered as an explicit alternative to be analyzed. Given the right individuals involved, the results will likely be more realistic than even an extensive modeling effort. Selecting individuals knowledgeable of the area but without vested interests in the outcome is an important element of this approach. The assumptions generated by the expert panel

would be used in subsequent modeling runs. This approach also tends to have more credibility than a modeling approach, which is not well understood by decision-makers and the public.

- **A sensitivity analysis approach.** This approach is similar to the expert panel approach, but there is less rigor implied in development of the land use assumptions. The study team would work with city/county staff to identify land use scenarios that may be appropriate for specific transportation alternatives, such as densifying around transit stations or along new freeway corridors. The emphasis of this approach is on determining how the assumed changes in land use may affect the benefits associated with transportation alternatives. It shifts the emphasis away from attempting to predict with some certainty how land uses may change to a set of what-if scenarios that essentially show how different land use outcomes may result in changes in projected traffic volumes, transit ridership, and facility needs. It basically presents an additional set of information to decision-makers so that they can factor these possibilities into their decision. The land use scenarios would need to be constructed as a cooperative effort of the MPO and local agencies, but need not be a major undertaking. These scenarios would then be fed to the travel demand modeling process. The only problem with this approach is that no assessment is made of the likelihood of the scenarios occurring. The usefulness of the exercise largely rests on the scenarios being realistic.

Some basic principles to consider in conducting land use analysis include

- **Develop assumptions collaboratively, with local input, in an open process.** There should be general concurrence that the assumptions were reasonable as a basis for fairly testing the alternatives. Keep in mind that these scenarios are for evaluating alternatives and should not require any formal regional approval. However, they need to be realistic.
- **To demonstrate realism, consider using actual densities from comparable situations in other more mature corridors, either from other corridors in the same region or from comparable corridors in other regions that have transportation service and demographic characteristics similar to the corridor and alternative being tested.**
- **If a transit “New Start” for FTA funding under the Section 5309 discretionary grants program is a serious option, it is advisable to generate the required information under the FTA land use criterion.** This information includes existing land use, containment of sprawl, transit-supportive corridor policies, supportive zoning regulations near transit stations, tools to implement land use policies, and performance of land use policies. However, keep in mind that these measures are for use by FTA in evaluating New Starts on a national basis. They are not dictated as the local decision-making criteria for determining the preferred investment strategy.
- **In most cases, the regional control totals should be maintained to try to create as much of an apples-to-apples comparison as possible.** There is little evidence of the effect that major transportation improvements have on overall regional growth, and thus little basis for changing the regional control total. By maintaining a constant regional control total, increases in development in one area would need to be countered by decreases in other areas. However, the study team may wish to test the sensitivity of travel demand to the possibility of either exceeding or failing to achieve the region’s demographic forecasts.
- **For transit alternatives (particularly rail transit), land use near transit stations in other corridors (i.e., in corridors other than the one being studied) can have a significant influence on transit ridership.** Creation of a regional land use scenario that can be used for testing transit alternatives in multiple corridors may be a useful undertaking as part of a separate effort, in advance of a corridor-level analysis. This could speed up the effort for any particular corridor.

7.4.3.4. A Case Study of Land Use/Transportation Analysis: U.S. 301 Corridor Study

The U.S. 301 Corridor Study provides a good example of how land use alternatives can be developed and analyzed. In this case, an expert panel was convened to review existing land use forecasts and to develop land use scenarios that were consistent with study goals and with transportation alternatives being analyzed. The panel consisted of local and regional planning officials and representatives of the finance, development, and real estate community. One of the interesting elements of the process was that the expert panel concluded that the base regional land use forecasts should be revised for the study area. Land use scenarios were then developed for market-driven and policy-driven conditions.

In order to determine the optimal combination of potential transportation improvements, related land use patterns, and environmental protection measures, the study task force evaluated a range of alternative transportation improvements and programs in the context of several alternative future land use patterns. A computerized travel forecasting model was used to analyze the ways in which transportation options and alternative land use patterns could satisfy future travel demands and meet other land use and environmental objectives. This case study is described in some detail, because the process highlights the practical aspects and challenges of incorporating land use scenarios into a corridor study. Exhibit 7-15 illustrates the study area.

Transportation Study Packages. For purposes of conducting the evaluation, the task force defined a series of “study packages” that described transportation improvements and programs. Each study package emphasized a particular transportation service mode such as highway or rail service. The study packages were

- **Base case.** Existing and already planned transportation improvements expected to be in place by 2020; all other study packages included these improvements.
- **Transportation systems management (TSM).** Minor construction and operational improvements to improve safety and operating efficiency without major capital expenditures (e.g., intersection improvements, access control and bus service upgrades).
- **TDM.** Voluntary and pricing programs designed to increase the number of people in a vehicle, or influence the time of, or need to, travel (e.g., telecommuting, ridesharing programs and tolls).
- **Rail transit.** Light rail transit (White Plains to Branch Avenue Metro Station) and commuter rail transit (La Plata to Bowie, connecting Amtrak/Northeast corridor line) with feeder bus service to rail transit stations; TSM and TDM options were included in this and the following packages.
- **HOV/bus.** HOV lanes reserved for use by carpools, vanpools and buses, on U.S. 301 north of MD 5, on a Waldorf Bypass or upgrade, and on MD 205.
- **Fully controlled access highway.** Improvements to provide a freeway with access only by interchanges along the entire 50-mile U.S. 301 route from U.S. 50 to the Potomac River Bridge.
- **Land use alternatives.** To evaluate the ways in which changes in land use patterns could influence travel behavior, the task force hypothesized three types of land use alternatives: (1) “current plans,” (2) “market-driven,” and (3) “policy-driven.”

Exhibit 7-13.

Illustration of How Land Use Might Be Considered in Different Study Elements

Study Element	Land Use Considerations	Possible Issues
<p>Study initiation</p> <p>a. Scope development</p> <p>b. Problem identification</p> <p>c. Evaluation criteria</p>	<p>a. Define how land use will be considered and involve agencies/groups that can provide data and input.</p> <p>b. Identify how land use patterns might be part of the problem to be addressed.</p> <p>c. Include evaluation criteria that would be sensitive to the impact of changes in land use.</p>	<p>a. Local governments or developers may see inclusion of land use in the study as a threat to their land use control. Need to show how inclusion may help them.</p> <p>b. Problems identified could include both physical land use distribution issues as well as land development policy.</p> <p>c. Criteria need to be simple enough for all to understand, including public and elected officials.</p>
<p>Development of initial set of alternatives</p>	<p>Consider land use alternatives in combination with transportation alternatives.</p>	<p>Need to limit the number of land use alternatives to a manageable set to control study costs and schedule.</p> <p>Need to identify land use alternatives that should be matched with transportation alternatives (probably cannot study all combinations).</p> <p>Need to develop land use alternatives that are realistic given market and policy conditions.</p>
<p>Screening and decision on detailed set of alternatives</p>	<p>Need to determine whether and how to carry specific combinations of transportation and land use alternatives into the next phase.</p>	<p>How to make decisions at screening level without too much analysis effort. Usually analysis is not too heavy-duty at this stage.</p>
<p>Analysis, refinement, and evaluation of alternatives</p>	<p>Need to determine whether to use land use modeling approach, expert panel approach, or some other variation.</p>	<p>Need to make land use alternatives specific enough to be analyzed (need zone-by-zone allocation).</p> <p>Need to determine how to handle regional control totals.</p> <p>Need to get buy-in on methodology and on land use assumptions for each alternative from the study committee. How will it be demonstrated that the assumptions are realistic?</p>
<p>Selection of preferred alternative or investment strategy</p>	<p>Can consider whether the land use options could be part of a financial strategy for the corridor (e.g., transportation districts, TIFs, etc.)</p>	<p>Need to consider how to get the jurisdictions with land use authority, as well as developers, to demonstrate that they can implement the land use recommendations. Funding of the transportation alternative may depend on this (a consideration in FTA New Starts discretionary grants).</p>

Exhibit 7-14.
Conceptual Approach for Interfacing Land Use and Transportation Models

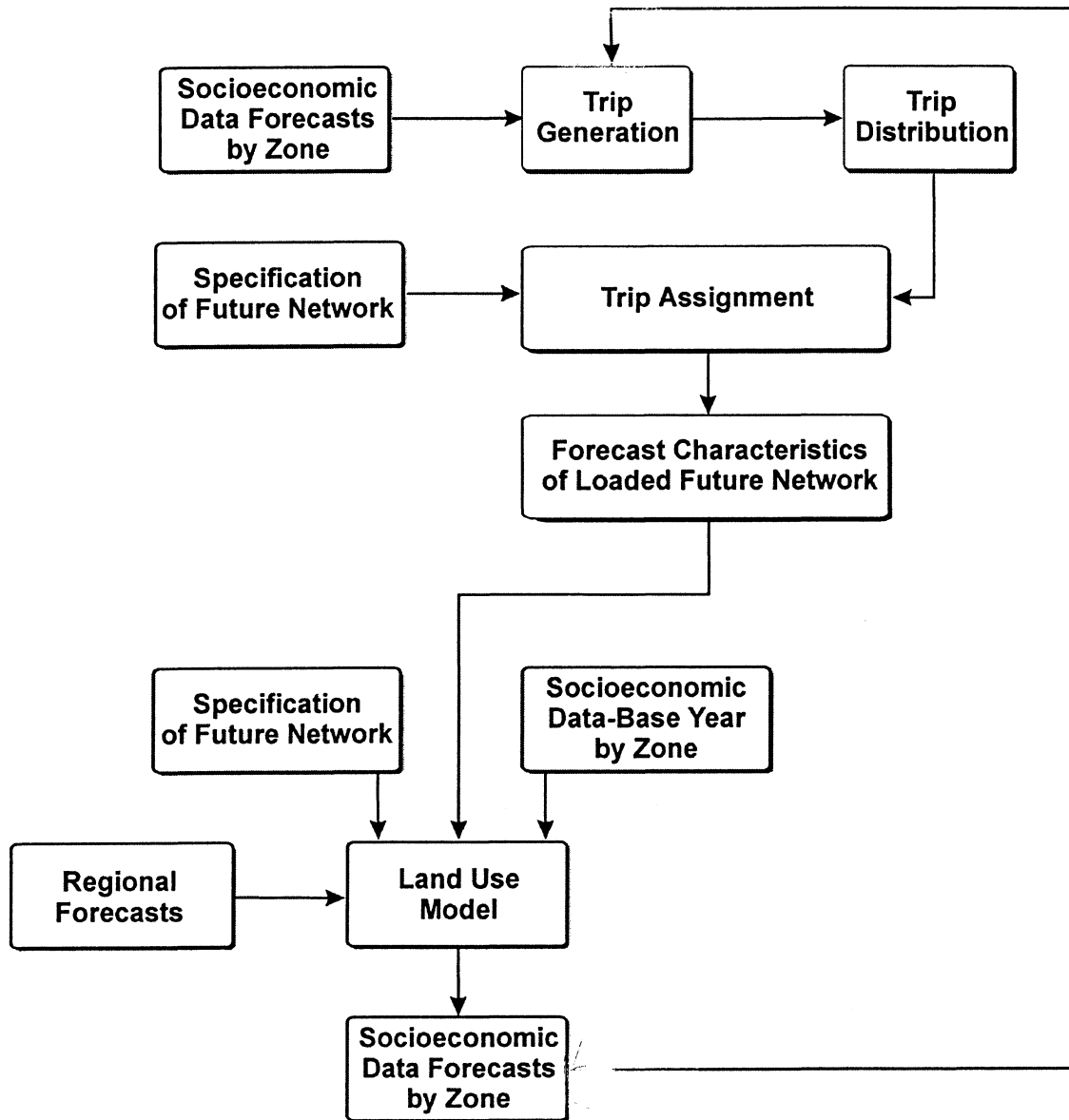
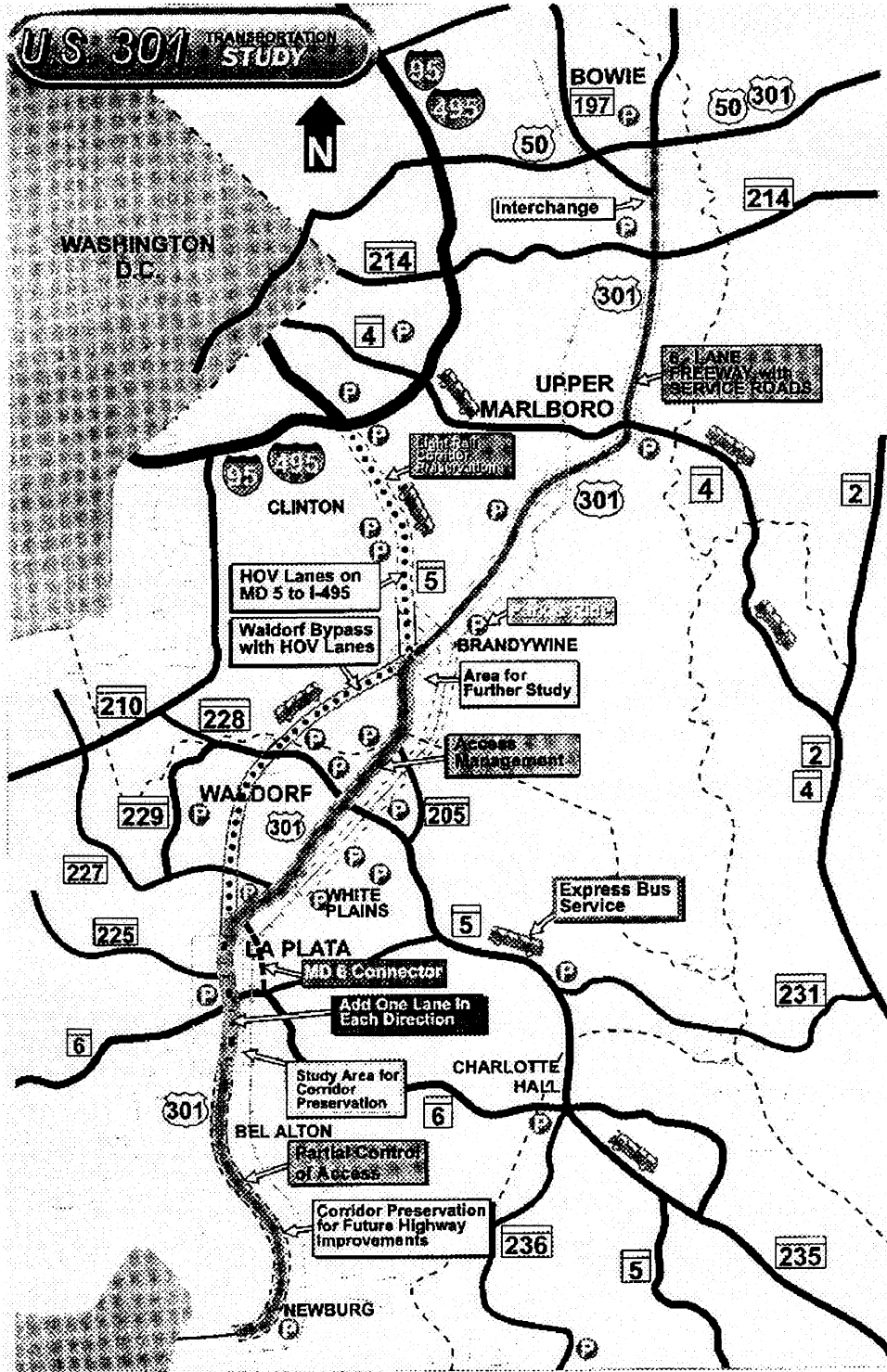


Exhibit 7-15.

Conceptual Approach for Integrating
Land Use and Transportation Modeling



HIGHLIGHTS OF TRANSPORTATION RECOMMENDATIONS

The current plans alternative was based on the regional land use projections for 1990 to 2020 made by the Metropolitan Washington Council of Governments (MWCOG). Known as “Round 5.2”, the projections were based on the comprehensive plans of local governments, which forecast land use patterns to 2020. As noted in the previous section, county plans in general promote relatively low-density development throughout much of the study area.

Market-driven land use alternatives expressed changes in planned land use patterns that might be stimulated by proposed transportation options. Although local comprehensive plans took into account most of the base case transportation improvements planned for the area, they did not necessarily assume the types of improvements incorporated in each transportation study package. Changes in forecasted land use patterns could therefore result from specific improvements or programs in each study package. For example, the Fully Controlled Access Highway package could be expected to generate greater development activity around proposed interchanges.

Policy-driven alternatives represent changes in planned land use patterns that might result from adoption of public policies designed to support proposed transportation options. For example, support of light-rail transit facilities might involve greater densities of development around potential stations. In general, the policy-driven land use alternatives hypothesized more concentrations of development near major highway and transit routes and less development in rural areas than currently foreseen by county plans.

Given the six transportation study packages and three land use alternatives, potentially the travel demand analysis might test up to 18 transportation/land use combinations. Exhibit 7-16 indicates the ways in which each of the alternatives might influence future land use. It should be emphasized that the market-driven and policy-driven alternatives were hypothetical assumptions for purposes of evaluating potential transportation services. They were not and should not be considered as proposed revisions to existing comprehensive plans, since they reflected primarily transportation-supportive land use concerns rather than a full range of planning factors.

Land Use Allocation Process. To represent the various land use patterns, the travel forecasting model required inputs of the numbers of households and jobs projected for 2020 for each transportation analysis zone in the study area—about 600. These changes to the base case statistics first would be estimated for each of the 35 development and rural areas previously designated in county plans, then allocated to Transportation Analysis Zones (TAZ) within each area.

The task force requested that an expert panel be assembled to advise on potential land use changes. The selected panel members included two economic market analysts, two urban planners, a transportation specialist, a developer, and a banker, all with experience in the region. After a briefing session with members of the task force, staff, and consultant team, panelists were sent materials outlining the assignment and study process, describing current and future land use and the land use alternatives, and providing forms on which to report suggested land use changes for each alternative and transportation study package.

Once those had been received and assembled by the study team, the panelists were convened again to reach consensus on proposed land use changes. When the panel reviewed the market-driven and policy-driven projections suggested by panel members, it found that the projections were quite similar and not very different from the current plans projections. The panel explained the following reasons for these results:

- Shifting amounts of jobs and households only within counties—that is, within a constant total for the study area—would produce little significant change in land use patterns and would not truly reflect regional dynamics that might result from the proposed transportation improvements.

- Transportation services in and of themselves do not generate substantial changes in overall patterns of land use, although they may stimulate changes in distribution of land uses within small areas.
- Panel members believed that local governments would need to significantly increase their efforts to implement local planning policies even to achieve current plans development patterns, since much current development is taking place outside designated development areas. Lacking a more intensive effort to implement land use policies, the panel concluded that policy-driven projections would not vary much from the current plans projections.

Based on these findings, the panel concluded that it would not be cost-effective for the study to proceed with model runs for all market and policy alternatives for the transportation study packages. Instead, the panel recommended that model runs be limited to HOV/Bus, Freeway, and Light Rail study packages, which were most likely to reflect land use changes. It suggested that only policy-driven land use alternatives be evaluated, since market-driven land use patterns would be little changed by transportation improvements.

Final Land Use Alternatives for Evaluation. During the panel's period of deliberations, test runs of the travel forecasting model for the base-case transportation study package and current plans land use alternative were completed. The results demonstrated the tremendous amount of traffic growth—and traffic congestion—that could be expected from continuing development as currently planned and the value in pursuing all possible avenues for reducing use of single-occupancy vehicles and increasing use of other transportation options in the study area.

Following several meetings of a special subcommittee convened to define alternatives and extensive discussion by the Growth Management Committee, it was agreed that seven combinations of transportation study packages and land use alternatives would be evaluated, all assuming additional jobs in the study area, as summarized in Exhibit 7-17. It was believed that these combinations would best reveal the possible problems and opportunities that might result from various transportation options and land use patterns in the study area.

Land Use Allocation Methodology. Based on the panel's advice on county-by-county allocations for these alternatives, the project team worked with county planning staffs to allocate changes in distributions of households and jobs for 35 subareas for each alternative. The Growth Management Committee reviewed the allocations as the basis for the project team's determination of final land use inputs at the TAZ level for each alternative. Although only households and employment were directly modified to represent land use alternatives, those changes also resulted in pro-rated redistribution of auto occupancy per household and types of employment as inputs to the model.

The ultimate conclusions included the following:

- The policy alternatives would direct most development to designated growth areas and discourage development in rural areas.
- Development in the policy alternatives would require much less land than would the base and market alternatives.
- No shortage of developable land would occur within designated development areas.
- The policy alternatives would protect many more acres of wetlands, farmlands, and forests from development than would the base and market alternatives.
- The jobs/housing ratio is increased by adding jobs to the study area and shifting households to job-rich counties.

Exhibit 7-16.
U.S. 301 Land Use Options

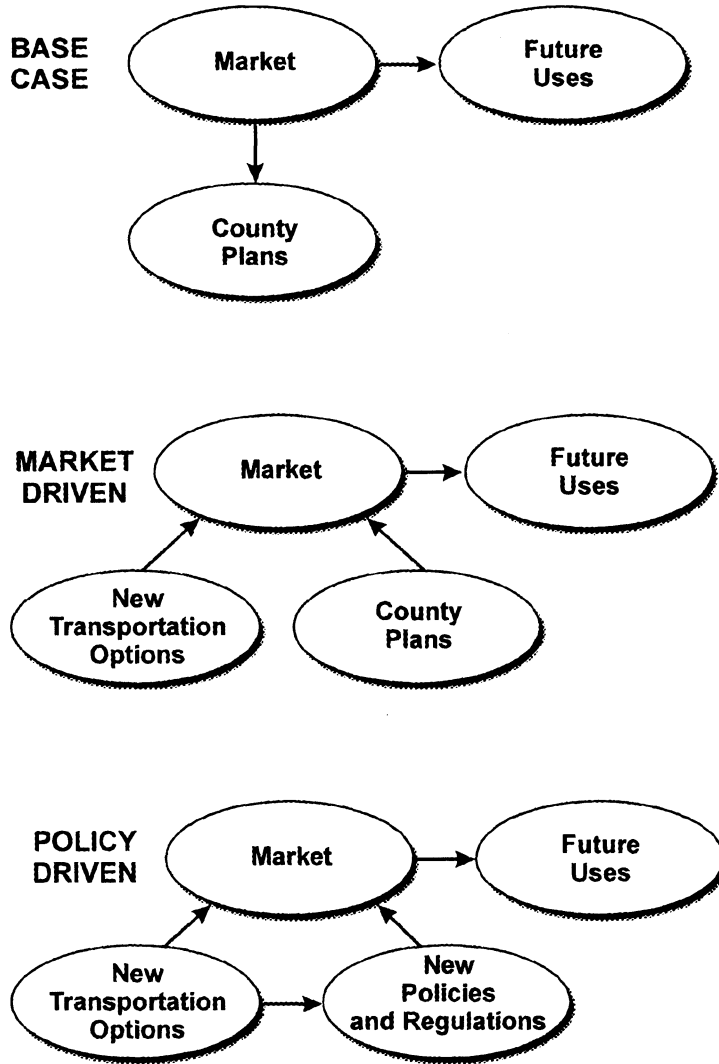


Exhibit 7-17.

Summary of Land Use Alternatives for the U.S. 301 Corridor Study

Land Use Alternative	Household Projections	Employment Projections	Basis for Distribution Among Counties, Areas, TAZs
Current Plans	WashCOG 5.2	WashCOG 5.2	WashCOG 5.2 (based on county inputs)
Highway Market 1	WashCOG 5.2	Add 80,000 new jobs from DC	Likely market response according to expert panel
Highway Market 2	Add 80,000 new households to match job increase	Same as Highway Market 1	Households distributed similar to distribution of jobs
Highway Policy	Shift 20,000 new households projected by WashCOG 5.2 from Calvert and St. Mary's counties to areas near the new highway	Shift 11,000 new jobs projected by WashCOG 5.2 from Calvert and St. Mary's counties to areas near the highway	Concentrate development in development areas near new highway facilities in Prince George's and Charles counties
Light Rail Market	WashCOG 5.2, except shift 2,000 households from outside study area to Charles County	Add 40,000 new jobs from DC to the study area	Likely market response according to expert panel
Light Rail Policy	Shift 20,000 new households projected by WashCOG 5.2 from Calvert and St. Mary's counties to areas near new rail facilities	Shift 10,000 new jobs of those added in Light Rail Market from Calvert and St. Mary's counties to areas near new rail facilities	Concentrate development in development areas near new rail facilities in Prince George's and Charles counties
Light Rail Mixed	Same as Light Rail Policy	WashCOG 5.2	Concentrate additional households near new rail facilities
Enhanced Commuter Rail Policy	Same as Light Rail Policy	Same as Light Rail Market	Concentrate development in areas near rail facilities in Prince George's and Charles counties

Projected growth rates and land use patterns for the various alternatives make a difference in travel projections:

- Recommended land use patterns and transportation options should achieve the Task Force Vision, which calls for more concentration of development in designated development areas.
- Policies that have the effect of concentrating future households and jobs mostly in designated development areas and around highway and rail corridors would contribute to overall reductions in VMT but otherwise would not benefit transportation service.
- Achieving the land use patterns projected for the policy alternatives will require revisions to current county plans and policies.
- Construction of a light rail line should be linked to adoption of supportive land use policies that would increase accessibility to transit.
- Improvements in capabilities of major highways should be protected by supportive land use policies.

7.4.3.5. A Simplified Process for Generating Land Use Scenarios

As indicated earlier, land use analysis is not usually necessary for all alternatives, but only those which are likely to bring about significant shifts in development patterns. For those alternatives that warrant separate land use scenarios, the following steps can be used to test the sensitivity of transportation alternatives to corresponding land use changes. It is recommended that each transportation alternative be analyzed with both the base condition land use and a proposed alternative land use specifically associated with that transportation alternative so that the impact of the land use change can be clearly identified. Most regional modeling systems use households and employment as inputs (rather than land use directly), and the process is explained on that basis.

- Document households per acre and employees per acre for zones in the corridor for the base case horizon year demographic forecast.
- Estimate typical households per acre and employees per acre that could correspond to the transportation alternative being analyzed for each zone in the corridor. These can be estimated from densities along similar facilities and areas in the region or from similar situations in other regions. Exhibit 7-18 lists typical densities. For rail alternatives, consideration needs to be given to realistic densities at each station location.
- Have the base and proposed densities reviewed by the study's TAC (or appropriate subcommittee) and by the agency with land use authority for each area. Make appropriate modifications to the proposed densities.
- Factor the household and employment data by the ratio of the densities (proposed divided by base) for each zone to derive new household and employment totals by zone.
- If maintaining regional control totals, factor households and employment back to match regional control totals. This assumes that new households and employment in the corridor are taken from other locations in the region. If allowing control totals to float, omit factoring step, but recognize that the interpretation of the data will need to consider the increased trip making. The alternatives will be difficult to compare with a floating regional total.
- Run trip generation model or factor trip productions and attractions by zone based on the ratios of proposed and base households and employment.
- Clearly explain changes made to demographic data along with presentation of results.

Exhibit 7-18.**Typical Household and Employment Densities**

Types of Situations	Approximate Densities
Low density residential	1-4 dwelling units per acre
Medium density residential	5-9 dwelling units per acre
High density residential	10+ dwelling units per acre
Suburban employment/retail area	20-30 employees per acre
CBD in medium-sized city	30-60 employees per acre
Suburban activity center in major city	30-50 employees per acre

7.4.3.6. Land Use Models

A more analytically rigorous approach to developing land use scenarios is to use one of several land use modeling techniques, interfaced with a travel demand forecasting model. Exhibit 7-15 illustrated one conceptual approach. The relevant results from a transportation model run are input to the land use model, which generates a modified land use forecast that is then input to the next iteration of the transportation model. The cycle is repeated until a threshold equilibrium is reached.

This approach, though conceptually appealing, has met with limited success. Land use allocation models do a reasonable job of reflecting major regional trends, but have difficulty at the micro level, which is needed for most corridor studies. Often, the models require manual adjustments to reflect changes that are difficult for the models to take into account. Some of the existing land use modeling systems include

- CATLAS—A nested logit model of residential location, route, and mode-to-work, used in the Chicago area.
- ITLUP—A modeling system containing three components: DRAM, EMPAL, and a travel demand model.
- MEPLAN—An extension of input-output modeling techniques. MEPLAN explicitly models the supply, demand, and price of land by type of commercial and residential space. It is used primarily outside the United States.
- POLIS—A linear programming model that integrates land use and transport models, used in the San Francisco Bay Area.

It is suggested that land use modeling be used for a corridor study only where there is proven experience with the modeling system in the metropolitan area where the corridor study is being conducted.

7.4.4. Environmental Analyses

A variety of environmental issues may need to be addressed in a corridor study. The level of detail and the appropriate type of analysis varies for each study. As indicated previously, the level of detail associated with each environmental issue tends to increase with the importance and level of controversy likely to occur with that issue. This section briefly covers a range of environmental areas. Only selected environmental areas are covered, with emphasis on those most likely to be issues in a corridor planning study. Additional information can be found in the extensive literature on

NEPA and environmental issues associated with NEPA. For each area, the following information is provided:

- Sources of information
- Agencies that should be included in consultation
- Highlights of methodologies for screening and detailed analysis

One of the most important principles is that qualified individuals must conduct the environmental analyses. Even though certain methodologies may appear straightforward, qualified staff will know the right agencies to consult and be able to avoid the problems that could occur by blindly applying standard methods. The description of methodologies is provided primarily to give agency study managers a basic understanding of the range of methods available, types of agencies that should be consulted, and so forth. It is not intended to replace the work of qualified professionals in each of the environmental areas. A useful reference for providing approaches and methods for examining environmental areas is FHWA Technical Advisory 6640.8A, October 30, 1987, “Guidance for Preparing and Processing Environmental and Section 4(f) Documents.” Although oriented toward NEPA and Section 4(f) documents, it provides a range of information useful for study managers and participants to know for corridor planning studies as well. However, the contents should not be assumed as the level of analysis needed for corridor planning studies. The FHWA/FTA *MIS Desk Reference* also has an extensive treatment of environmental issues that may be associated with corridor planning. In addition, Federal legislation and regulations are provided in Appendix C. Many of these regulations can be obtained from Federal web sites. Exhibit 7-19 provides observations from practitioners on environmental analyses in corridor transportation planning studies.

Exhibit 7-19.

Observations from Practitioners on Environmental Analyses

- All parties should agree on level of analysis beforehand. It is difficult to have detailed environmental analysis on broad scale design concepts.
- Level of environmental analysis should be adequate to reach a decision on design concept and scope.
- Avoid detailed analysis in early stage in natural environment. Remember social environment is very important.
- Local environmental groups should be at the table so that questions can be answered.
- Put emphasis on fatal flaw rather than on detail.
- Tools are needed for macroscale environmental analysis.
- GIS layers identifying sensitive areas are very helpful when overlaid with alternatives.
- Should be done by qualified individuals and detailed enough for evaluation to avoid duplication in the NEPA process.
- Contain the size of the study area.
- Should be done to detail necessary to answer specific questions or address specific issues.

7.4.4.1. Air QualitySources of information

- Clean Air Act (as amended), Transportation Conformity Rule: 23 U.S.C. 109 (J)
- 23 CFR 771.40
- CFR 51 and 93
- Harvey, Greig, and Elizabeth Deakin, *A Manual of Transportation-Air Quality Modeling for Metropolitan Planning Organizations*, for the National Association of Regional Councils, 1993
- MPO's regional transportation and air quality procedures
- Federal Highway Administration and Federal Transit Administration, *Estimating the Impacts of Urban Transportation Alternatives*, Participant Notebook, National Highway Institute Course 15257, Report No. FHWA-HI-94-053, December 1995
- MOBILE emission factors

Possible agencies for coordination and consultation

- EPA regional offices for modeling methodology
- State and regional environmental offices and air districts

MethodologiesScreening

1. Multiply emission factors for NO_x, CO, and VOCs by aggregate VMT for each peak period. Look up emission factors by aggregate speed for each peak period. (Assumes model results are available to obtain VMT and VMT/VHT) or
2. Use sketch planning model such as STEAM or SPASM2, which includes emissions calculation functions.

Detailed

1. Use same emissions post processor as used for regional conformity analysis to estimate regional emissions based on modeling of alternatives.
2. Usually, carbon monoxide hotspot analysis is not required. But if project-level conformity is believed to be an issue in selecting among alternatives, conduct CO hotspot analysis in accordance with required procedures.

Issues

1. Questions may arise as to how the alternatives will affect air quality conformity in the region. An estimate of the potential impact can be derived through analysis of regional emissions for the alternatives compared to regional emissions for the currently assumed improvements in the MTP and TIP. The proximity of the region to the SIP emissions budget, combined with the emissions analysis of alternatives will provide an initial indication of the impact of various alternatives on SIP conformity. However, the impact on the SIP budget cannot necessarily be assumed as a direct addition or subtraction to the SIP budget. An increase in emissions for any alternative does not necessarily mean the alternative cannot be accommodated successfully in a conforming MTP or TIP.

7.4.4.2. Community ImpactsSources of information

- Community Impact Assessment, FHWA, September 1996
- Community Impact Mitigation Case Studies, FHWA, May 1998
- FHWA Technical Advisory 6640.8A, October 30, 1987
- FHWA, "Social Impact Assessment: A Sourcebook for Highway Planners, Vol. III, Inventory of Highway-Related Social Impacts," Final Report, June 1982

- FHWA, “Non-Discrimination, Environmental Justice, and Community Impact Assessment in Planning and Project Development” memorandum to FHWA Field Offices, July 1995
- Uniform Relocation Assistance and Real Property Acquisition Regulations for Federal and Federally Assisted Programs, 49 CFR Part 24, March 2, 1989
- National, state, and local inventories of cultural resources
- Local and regional land use inventories, plans, and policies
- Census data

Possible agencies for coordination and consultation

- City and county agencies
- Local community groups
- Local business associations
- State historic preservation officer (SHPO) and local historical societies

Methodologies

Screening

1. Work closely with community to identify concerns and potential impacts.
2. Displacements: Estimate number of residential and commercial properties to be potentially taken for each alternative. Where appropriate, identify specific key properties by alternative.
3. Identify potential visual impacts: qualitative assessment of views of potential facilities, views obstructed, and so forth by alternative.
4. Identify barriers potentially introduced by facilities.
5. Identify places and institutions potentially impacted visually, by noise, safety concerns, and so forth for each alternative.
6. Community cohesion: Qualitatively characterize overall community impacts by alternative.

Detailed

1. Follow guidance in FHWA Technical Advisory 6640.8A, October 30, 1987, and FHWA Community Impacts Assessment document
2. Develop community profile (characteristics of the community)
3. Analyze impacts (displacements, visual impacts, social impacts, noise, safety, etc.)
4. Identify solutions (avoid, minimize, mitigate, enhance)
5. Document findings

7.4.4.3. Cultural Resources (Parklands, Historic and Archaeological Resources)

Sources of information

- Section 106 - 23 CFR 771, 36 CFR 60, 36 CFR 63, 36 CFR 800, Executive Order 11593
- Section 110 - 36 CFR 65, 36 CFR 78
- Archaeology - 18CFR 1312, 32 CFR 229, 36 CFR 79, 36 CFR 296, 43 CFR 7, 36 CFR 251.50-.64, 46 CFR 3, 43 CFR 10
- FHWA Section 4(f) Policy Paper, October 5, 1987
- FHWA Technical Advisory 6640.8A, October 30, 1987
- National Register Bulletin Series
- State and local cultural resource inventories

Possible agencies for coordination or consultation

- State Historic Preservation Officer (SHPO)
- Advisory Council on Historic Preservation
- Department of Interior (National Park Service)
- Bureau of Indian Affairs
- Department of Agriculture
- Department of Housing and Urban Development

- Other state and local agencies having jurisdiction
- Native American groups

Methodologies

Screening

1. Identify all potentially affected sites based on existing inventories. Consult National Register as well as existing state/local inventories.
2. Supplement with windshield survey, where appropriate. Consider field tour with stakeholders and knowledgeable professionals.
3. List sites and general nature of the impacts by alternative
4. If Section 4(f) and Section 106 impacts exist, it is suggested that decision-makers not narrow down alternatives until within NEPA process or that NEPA-level review be performed.

Detailed

1. Identify all potentially affected sites based on existing inventories.
2. Conduct field reviews, with emphasis on properties on or potentially eligible for the National Register of Historic Places. Review each potentially eligible site against National Register standards of eligibility.
3. Examine alignment alternatives that could avoid the impact
4. Identify mitigating actions to minimize the adverse effects, where other alternatives are not deemed prudent and feasible.
5. Prepare Section 4(f) statement or describe why one is not necessary.

7.4.4.4. Distribution of benefits and impacts, including environmental justice issues

Sources of information

- Executive Order 12898: Environmental Justice
- U.S. DOT Order to Address Environmental Justice in Minority and Low Income Populations (Final DOT Order, February 3, 1997)
- FHWA, “Non-Discrimination, Environmental Justice, and Community Impact Assessment in Planning and Project Development” memorandum to FHWA Field Offices, July 1995.
- EPA Office of Environmental Justice Web Site (www.es.epa.gov/oeca/oejbut.html)

Possible agencies for coordination and consultation

- EPA Office of Environmental Justice
- State and local agencies
- Local community groups

Methodologies

Screening

1. Provide qualitative assessment of how benefits and impacts are distributed by income and ethnicity for each alternative.

Detailed

1. Stratify impacts (for all environmental areas applicable) by income group and ethnicity.
2. Identify characteristics of communities impacted by facilities, for each alternative.
3. Estimate distribution of benefits by income group and ethnicity using select link or select zone modeling runs (e.g., what improvements in travel times, accessibility, and so forth accrue to each group).

7.4.4.5. Endangered and Threatened Species

Sources of information

- 7 CFR 355

- 50 CFR 17, 23, 81, 222, 225-227, 402, 424, 450-453
- U.S. Fish and Wildlife Service inventories
- State fish and game agency inventories
- National Marine Fisheries Service inventories
- Local wildlife inventories

Agencies for coordination and consultation

- National Marine Fisheries Service (marine species)
- U.S. Fish and Wildlife Service (normally all other species)
- State fish and game agency
- Local wildlife societies

Methodologies

Screening

1. Consult and map available inventories.
2. List endangered and threatened species and type of impact and likelihood of mitigation by alternative.

Detailed:

1. Consult and map available inventories.
2. Conduct biological assessment, as appropriate, to establish presence of species and possible impacts.
3. List specific impacts and mitigation measures by alternative.
4. Follow requirements for biological opinions, where necessary.

7.4.4.6. Hazardous Waste

Sources of information

- 40 CFR 260-271
- 40 CFR 300
- 43 CFR 11
- RCRA and CERCLIS databases from EPA
- Locally maintained hazardous waste databases

Agencies for coordination or consultation

- Environmental Protection Agency
- State and local environmental agencies

Methodologies

Screening

1. Identify sites that may have an influence on alignment selection using existing inventories (RCRA, CERCLA, or local).
2. Conduct windshield survey to determine whether there is the potential for other sites that could influence alternatives.
3. Identify possible hazardous waste influences by alternative.

Detailed

1. Follow screening steps.
2. Conduct additional field research on sites where questions exist and coordinate with responsible agencies in accordance with federal requirements.

7.4.4.7. Noise and Vibration

Sources of information

- 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise
- Guidance Manual for Impact Analysis of Transit Noise and Vibration Impact Assessment (FTA)
- FHWA Technical Advisory 6640.8A, October 30, 1987
- FHWA Traffic Noise Model (TNM) and documentation
- FHWA, Highway Noise—The Audible Landscape: A Manual for Highway Noise and Land Use

Possible agencies for coordination or consultation

- Local officials to identify sensitive receptors

Methodologies

Screening

1. Determine whether increase in noise is likely to be significant (generally, only new facilities produce significant increases, but even minor increases on existing facilities may be considered significant if existing noise levels are high).
2. If significant, identify screening distance(s) from Exhibit 7-19.
3. Tabulate number of homes and specific sensitive receptors (e.g., schools, hospitals, libraries, etc.) within screening distance of facility associated with the alternative.
4. Display results by alternative.

Note: The FHWA Traffic Noise Model (TNM) can be used with defaults to fairly quickly analyze noise levels. But the number of receptors impacted should still be tabulated so that comparisons among alternatives can be conducted.

Detailed

1. Determine whether increase in noise is likely to be significant (generally, only new facilities produce significant increases, but mitigation may need to be evaluated for lane addition projects).
2. Conduct noise analysis using FHWA TNM or FTA Noise Analysis Spreadsheet. Estimate the extent of impact (in decibels) for each impacted area. Compare to both FHWA noise abatement criteria and to existing noise levels.
3. Identify noise abatement measures (if appropriate) that would likely be needed and their associated costs.

Issues

1. Mitigation—At the level of a corridor planning study, specific mitigation measures do not usually need to be identified. However, if the mitigation measures could result in significant differences in alternative costs, mitigation costs may need to be estimated.
2. Uncertainty in alignments—If variations in possible alignments could exist for a single alternative, show both the worst case and best case for each alternative, unmitigated.

Exhibit 7-20.
Screening Distances for Noise Analysis

(Source: *MIS Desk Reference*)

Type of Project	Screening Distance (Ft) from Right-of-Way or Property Line
FIXED GUIDEWAY SYSTEMS	
Commuter Rail Main Line	750
Commuter Rail Station	300
Rail Transit Guideway	750
Rail Transit Station	300
Access Roads	100
Low and Intermediate Capacity Transit	100
Steel Wheel	750
Rubber Tire	500
Yards and Shops	2000
Parking Facilities	250
Access Roads	100
Ventilation Shafts	200
Power Substations	200
HIGHWAYS/ROADWAYS	
Busway	750
Access Roads	100
Transit Mall	250
Transit Center	450
Storage & Maintenance	500
Park & Ride Lots	250

7.4.4.8. Wetlands

Sources of information

- 23 CFR 771
- National Wetlands Inventory (U.S. Fish and Wildlife Service)
- National Flood Insurance Maps (Federal Emergency Management Agency [FEMA])
- State and local wetlands inventories

Possible agencies for coordination or consultation

- Environmental Protection Agency
- U.S. Department of the Interior
- U.S. Fish and Wildlife Service
- U.S. Army Corp or Engineers
- National Marine Fisheries Service
- Office of Coastal Zone Management
- Federal Emergency Management Agency
- State Coastal Zone Management Agency
- State Water Quality Control Agency

Methodologies

Screening

1. Consult and map available inventories.
2. Estimate acres of wetland impacted by each alternative.
3. Comment on wetland quality and function, where appropriate.

Detailed

1. Follow guidance in FHWA Technical Advisory 6640.8A, October 30, 1987.

7.4.4.9. Secondary and Cumulative Impacts

Sources of information

- FHWA Technical Advisory 6640.8A, October 30, 1987
- Council on Environmental Quality, “Considering Cumulative Effects Under the National Environmental Policy Act,” January 1997
- *NCHRP Report 403*, “Guidance for Estimating the Indirect Effects of Proposed Transportation Projects,” Transportation Research Board, 1998

Possible agencies for coordination and consultation

- Local land planning agencies
- State and local environmental agencies

Methodologies

Screening

1. Identify the significant cumulative effects associated with each alternative.
2. Qualitatively assess significance.

Detailed (based on above CEQ report)

1. Identify the significant cumulative effects associated with each alternative.
2. Scope the analysis.
3. Characterize the resources, ecosystems, and human communities in terms of their response to change and capacity to withstand stresses.
4. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.
5. Define a baseline condition for the resources, ecosystems, and human communities.
6. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.
7. Determine the magnitude and significance of cumulative effects.
8. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.
9. Monitor the cumulative effects of the selected alternative and adapt management.

Issues

- The major secondary and cumulative effect that comes into play in transportation studies is the stimulus of land development and its additional effects on the environment. The cause-and-effect relationship between transportation and land use is difficult to quantify. See the earlier section on analysis of land use for methods that may be pertinent.

7.4.5 Costing

Two aspects of costing are particularly critical:

- Providing cost estimates that are realistic and
- Maintaining consistency and completeness in cost estimation so that the relative costs among alternatives are valid.

One of the most frequently cited problems with cost estimation is that costs tend to be underestimated. While low cost estimates might make decision-makers and the public feel more comfortable with certain alternatives, underestimating costs will damage credibility in the long run. In addition, it creates problems in the overall transportation project programming process once an alternative is selected and brought forward into the transportation program. Either additional funds must be found for the program, the project must be delayed, or other projects must be delayed. None of these options are desirable, and any impact on other projects tends to create ill will with other project sponsors.

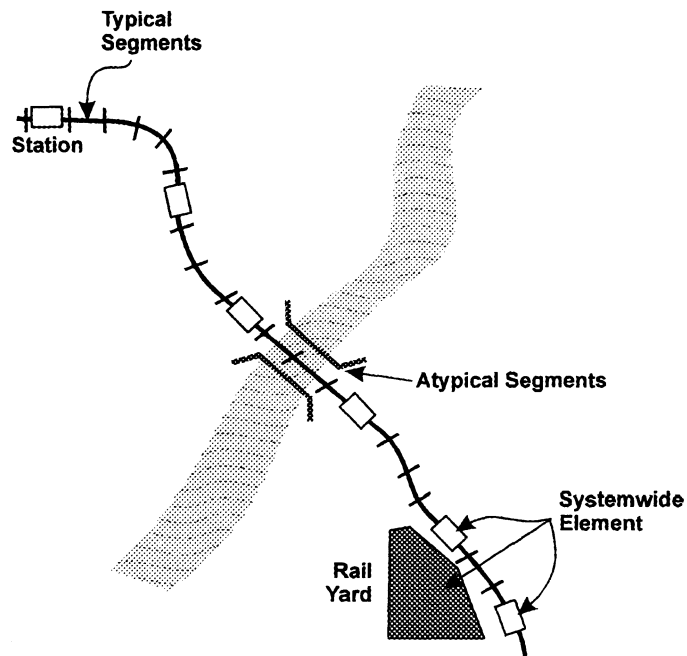
A failure to treat costs equitably among alternatives creates other types of problems. If cost differentials were a significant consideration in the selection of the preferred alternative, there may be pressure to revisit the selection. This could re-ignite controversial debates that were difficult the first time and that will be even more difficult the second time. Again, the credibility of the participating agencies will be damaged. Although there are circumstances that can influence cost estimates which may be difficult to foresee, good cost estimation practices can reduce the potential for making significant errors and preserve the credibility of the participating agencies. This section describes cost estimating approaches and principles. The discussion is drawn mainly from the FHWA document, *Estimating the Impacts of Urban Transportation Alternatives*, Participant Notebook, National Highway Institute Course 15257, Report No. FHWA-HI-94-053, December 1995.

7.4.5.1. Major Categories of Capital Costs

The capital costs of highways and rail systems can be broken down into four major categories: typical segments, atypical segments, systemwide elements and add-ons. Typical segments include those construction costs for the rail line or highway for a right-of-way that are the same throughout, so that costs can be reasonably estimated on a per unit length basis. Atypical segments are those sections of the alignment in which costs cannot be estimated on a per unit length basis. Systemwide elements are those components of construction not included as typical or atypical segments, and add-ons consist primarily of contingency and construction management and engineering costs. Exhibit 7-21 illustrates the segment types.

1. Typical segments. Initially, a planned highway or rail line is divided into segments, each of which has similar rights-of-way. In this case, “similar” means the right-of-way is reasonably constant throughout in terms of vertical alignment and landscape, and without significant turns. Usually this means the alignment can be divided into several segment categories and costs per unit of length developed for each. A segment with a particular right-of-way may occur many times throughout the highway or rail alignment. Once these segment types have been identified, cross-sectional drawings are made of each segment type, so that costs can be estimated. The cross-section would include all those construction elements necessary for the highway or rail alignment, such as roadway preparation, pavement, rails, fencing, drainage, and so forth. The cost estimates are usually made for a particular length of the alignment, such as 1 ft. Then, for each segment type, the appropriate costing factor can be applied and costs for the entire segment calculated. This is done for each segment type over the entire length of the planned highway or rail line, excluding those segments which are classified as “atypical.”

Exhibit 7-21.
Segment Types for Purposes of Costing



Typical segment types for HOV lanes are (1) separate, (2) barrier-separated, (3) buffer-separated, and (4) contra-flow. For light-rail, typical segment types are (1) city streets, (2) separate from city streets, (3) aerial, (4) tunnel, and (5) cut and cover. For highways, typical segment types could be based on a combination of number of lanes, type of area through which the highway passes (developed/undeveloped), and type of terrain.

2. Atypical segments. A highway or rail alignment usually includes atypical segments, which do not lend themselves to the straightforward approach used for typical segments. This could be because the alignment makes a rapid ascent or descent or requires complex construction because of uneven topography, for example, bridges or complex structures along canyons. Because of the uniqueness of these segments, they must be individually analyzed to produce cost estimates.

3. Systemwide elements. Systemwide elements consist of those components of the alternative outside of the immediate guideway or highway, for example:

- vehicles, yards, garages
- stations, park-and-ride lots
- power and signal systems
- interchanges
- land acquisition

4. Add-on items. Contingency, engineering and construction management costs are called “add-on” because they are usually determined as a percentage of the systemwide and alignment costs discussed previously. Contingencies are costs associated with uncertainties in the design and construction of the project. In the planning stages of a project, contingencies should be greatest in the sketch planning

phases and become successively less as the project becomes more defined and more detailed engineering is performed.

Contingencies can also vary depending upon components of the project and complexity of the overall design. For example, tunnel construction would be expected to have very high contingencies while vehicle purchases would be low. An overall design of a highway or rail line with substantial structure would likely require high contingencies.

Engineering and construction management costs likewise vary depending on the complexity of the project. Within this category should be included all the costs associated with bringing the project to fruition which have not been accounted for in the previously discussed cost categories.

7.4.5.2. Capital Costs: Rail

The capital costs of rail transit include the costs of land acquisition, guideway construction, power and control systems, vehicles, stations, yards and shops, park-and-ride lots and “soft costs” such as design, engineering, testing, and management. Costs will vary with the type of facility (light vs. heavy rail), grade (elevated, subway, surface) and specific features of the local area through which the facility is constructed.

Rough cost estimates can be developed by applying unit prices to various elements of the proposed system such as line miles, number of stations, and number of vehicles. Per line mile, rail rapid transit construction costs for recently constructed systems are shown in FTA’s *Characteristics of Urban Transportation Systems* (the CUTS Report, September 1992, available on the FTA web site). However, these costs are dated and need to be updated to current levels using cost indices or, more preferably, with new data from recent rail projects.

Example costs are not provided in the *Guidebook*, as costs can vary widely based on local circumstances. Additional sources that may be useful include the *Light Rail Transit Capital Cost Study* (FTA, April 1991) and the *Transit Capital Cost Price Index Study* (FTA, July 1995). The *Index Study* can be used to update earlier cost information. An additional resource for general transit network planning and operational parameters (e.g., capacity and speed) is the *Estimation of Transit Supply Parameters* (FTA, October 1984). Most importantly, agencies should obtain the services of engineering expertise with a background in this field.

7.4.5.3. Capital Costs of Buses

Estimated values for the costs of various-sized motor buses are provided in CUTS Tables 3-11 and 3-12. The costs of buses in each size class vary as a function of the number of buses ordered, the interior finish, engine specifications and air conditioning capacity. Again, this data needs to be updated.

7.4.5.4. Highway Capital Costs

The capital cost of highways includes costs for land acquisition, facility construction, and construction of structures, traffic control devices, lighting, grading and drainage as well as temporary traffic facilities, engineering, and administration. Costs will vary considerably with the type of facility, the location in the metropolitan area, the local geologic and topographic conditions, and other special local features.

The methods for estimating construction costs vary in the level of detail to which unit prices are specified to reflect different types of construction, the materials used and features of the local area. CUTS Table 4-16 presents typical per lane mile costs for seven types of highway improvements in urban areas. These unit costs, updated to the present, together with information on the length and

number of lanes for the improved highway, can be used in the early stages of system planning to provide rough cost estimates. However, since more detailed procedures might produce significantly higher or lower estimates, sensitivity analysis should be conducted before eliminating an alternative on cost considerations. Two of the cost items that can introduce substantial variation are right-of-way and utilities. Additional work may be needed in these areas.

7.4.5.5. Capital Costs of HOV Projects

Capital costs of HOV projects vary depending upon the type of facility involved, location, local geology, topography, development and other special features. Depending on the type of HOV facility involved, capital costs might include land acquisition, route construction, construction of park-and-ride structures, traffic control devices, lighting, grading and drainage, as well as temporary traffic facilities, engineering, and administration. CUTS Table 6-1 provides capital cost per mile for 22 HOV projects, ranging from construction of a busway on separate right-of-way to the establishment of contra-flow lanes on existing freeways.

7.4.5.6. Transit Operating Costs

1. Agency operates mode. The fundamental assumption in estimating transit operating costs is that these costs will change proportionately to the level of transit service provided. The best measure of the level of transit service provided is the number of transit vehicle miles, vehicle hours or peak vehicles of the transit system. Simple costing procedures take the total costs of the system today, or for some period when costs are stable, and divide by either the total miles or hours to obtain a cost per mile or hour. This ratio is then multiplied by forecasted system miles or hours to obtain future operating costs. These forecasted service variables are obtained from the travel demand forecasting process.

A more refined procedure is to associate particular operating costs with either vehicle miles or hours or peak vehicles. For example, driver wages are usually a function of vehicle hours while maintenance costs are usually related to vehicle miles. Because buses are usually cleaned once a day, these costs may be more closely related to peak vehicles than miles or hours. The forecast costs for each major cost category then become a function of the appropriate forecast service variable.

The approach for the above procedures should assume that all of today's operating costs are variable for forecasting purposes, that is, there are no fixed costs. This assumption matches historical trends which show costs rising proportionately to service increases, so that economies of scale do not seem to occur in the transit industry.

2. New mode. When a mode is planned that is different from that provided locally, the previously described approach cannot be applied. Instead it is necessary to identify a similar agency, or group of agencies, which operate the mode of interest and use their costs. Because system age, weather, and work rules can affect costs, these variables and others that are relevant should be reasonably similar to those of the agency planning the new system. Presuming that several similar agencies can be identified, their costs can be averaged and used.

Care must be taken in using costs from other agencies because of differences in labor rates, the extent to which operations are contracted out and organizational structures. For differences in labor rates, use of a productivity approach to costing can be used. For example, rail maintenance costs would be determined by computing how many vehicle miles can be served by a mechanic at a similar agency operating a rail system. That productivity ratio is then applied to total forecasted rail miles for the planned system to obtain the number of mechanics which are needed. The number of mechanics

needed is then multiplied by the salary of a mechanic for the planned system to obtain total mechanic costs. Each major labor cost category is handled similarly.

Organizational structure is important because costs from other agencies may not be all inclusive. Some costs are carried by other departments or in other budgets. For example, light rail budgets frequently exclude many administrative costs which are required but are shown on other budgets.

Estimates of rail transit operating costs might be adjusted to account for possible economies of scale for different sized systems. However, because labor costs make up the overwhelming percentage of operating costs, potential unit cost economies from larger systems are likely to be small in comparison with total operating costs. Studies have shown there are no economies of scale for transit operating costs.

More accurate estimates of system operating costs can be developed by reviewing operating cost data from individual bus or rail systems in other cities which most closely resemble the proposed alternatives. These are provided on an annual basis in the FTA's Section 15 reports. Additional operating and maintenance costs are included in FTA's publication, *Estimation of Operating and Maintenance Costs for Transit Systems*, dated December 1992. The FHWA/FTA *MIS Desk Reference* contains a substantial amount of information on the construction of cost models for estimating operating and maintenance costs. The construction of a cost model is not difficult and can be very useful in developing cost estimates for multiple scenarios.

7.4.5.7. HOV Maintenance and Operating Costs

The facility costs depend upon the location and size of facilities (lane miles, number of parking spaces) and usage (vehicle trips). Consequently, local data, where available, might be the best source. Alternatively, unit costs from other sources, such as the CUTS Report, can be used.

These unit costs, together with information on the length and number of lanes for the improved highway, can be used in the early stages of system planning to provide rough cost estimates. However, since more detailed procedures might produce significantly higher or lower estimates, sensitivity analyses should be conducted before eliminating an alternative on cost considerations.

Costs of operating HOV facilities include opening and closing the facility, placing and retrieving cones on freeways to define exclusive lanes or otherwise providing traffic control for opening and closing the facility, enforcing vehicle restrictions, and maintaining specialized traffic control.

7.4.5.8. Implementation and Operating Costs Associated with TDM and Road Pricing Alternatives

TDM and road pricing alternatives require the public and private sector to incur certain costs that are unique to these alternatives. These costs are in addition to any costs associated with capital and operating outlays incurred for facility and service expansion (which would be included under cost accounting proposed earlier). The unique additional costs of TDM and road pricing pertain to costs of implementing, monitoring and administering these programs. In the TDM context, these are incurred by the employers. In road pricing, these costs would be incurred by the pricing authority.

While the experience is quite limited, ranges of these costs for some types of programs can be derived. The TDM costs are based on experience with existing programs (Source: Federal Highway Administration, *Implementing Effective Travel Demand Management Measures*, Report #DOT-T-94-02, September 1993).

7.4.6. Overview of Economic Analysis

Exhibit 7-22 provides several observations from practitioners on the subject of economic analysis for corridor transportation studies.

7.4.6.1. Discount Rate

The discount rate provides a way to establish the time value of costs and benefits. Discount rates are used in calculations like interest rates, but they are not the same as interest rates. Neither are discount rates related to the inflation rate. In fact, all evaluations of economic efficiency measures should apply discount rates to constant dollar costs and benefits that explicitly exclude inflation.

The discount rate represents society's choice of the appropriate rate of return on its investments at a particular point in time. The choice of high discount rates implies that money is tight and thus society puts a greater emphasis on immediate costs and lesser emphasis on long-term benefits. Consequently, the determination of an appropriate discount rate is partly a political and social decision process.

The Office of Management and Budget (OMB) specifies a discount rate for use in evaluating federal investments. The proposed rate is based on consideration of availability of capital, market conditions, general societal desires vis-à-vis value of consumption now versus in the future, uncertainties in the future (but not inflation), and so forth. During the 1970s and 1980s, the OMB discount rate was 10 percent. While recognizing the stringency of budgets and so forth, many observers argued that this rate was too high and would discourage important investments that promise large benefits into the future. In October 1992, OMB lowered its recommended discount rate to 7 percent. Some would argue for further reductions; for example, in 1977, AASHTO recommended a discount rate of 4 percent for low risk investments.

Because economic efficiency assessments of transportation improvements that have a substantial part of their benefits in the more distant future are very sensitive to the discount rate used, it is recommended that, if study resources permit, analyses should be conducted using high, middle, and low values of the discount rate, such as 4, 7, and 10 percent for low risk investments. Higher discount rates are appropriate when there is substantial risk because of factors such as obsolescence and technological change.

Exhibit 7-22.

Observations from Practitioners on Economic Analysis

- Improving established modes will generally have higher benefit/cost ratios.
- Construction right-of-way trade-offs are important. Cost as well as revenue must be on the same basis, that is, know the year for discounting. Account for each source of revenue and obtain the forecast from the source.
- Benefit/cost should be used to compare alternatives, not justify decisions. Be conservative. This element will have the greatest critique.
- Benefit/cost should be consistent with programming methods, as much as possible.
- Include local economic development concerns. Each study should use the same cost analysis assumptions.
- Incorporate as many social and community benefits as possible.
- Needs to be done before work is presented to public or elected officials.
- It is difficult to show economic benefit and costs across modes. Project funding assumptions are critical to the process.

The procedures for deriving present value or equivalent annual value of a cost (or benefit) item occurring in a future year are well documented in engineering-economics literature and commonly used for evaluating transportation alternatives. Briefly, the future value (expressed in uninflated dollars) is multiplied by the discount factor to obtain the present worth. The discount factor for a discount rate (r) for future year (t) is $1/(1+r)^t$. Equivalent annual values can be derived as described in the subsections which follow.

7.4.6.2. Capital Recovery Factor

This factor is used to convert capital costs incurred at the beginning of the first year into a series of uniform annual payments over the life of the facility. The “payments” are similar to mortgage payments made to amortize a loan.

7.4.6.3. Annualization of Capital Costs

Capital costs are incurred in a lump sum manner at discrete points in time (typically over a few years before the facility/service is put into operation). To make these lump sum costs comparable with annual recurring operating and maintenance costs and annual benefits accruing from the operators (revenues and other benefits like user and air quality impacts), a common procedure is to annualize the capital costs. (This procedure is similar, in principle, to deriving monthly mortgage payments).

In general, the annualized costs are calculated in three steps as shown below:

1. Calculate present value (PV) of capital cost assumed to have been incurred at the mid-point of construction:

$$PV = C * (\text{present value factor}) = C * [1/(1+d)^{ym-ycurrent}]$$
2. Calculate value for the opening year (VO):

$$VO = PV * (\text{compound amount factor}) = PV * (1+d)^{yo-ycurrent}$$
3. Calculate annualized cost of opening year value:

$$A = VO * (\text{capital recovery factor}) = VO * \{d * (1+d)^L / [(1+d)^L - 1]\}$$

Where,

$ycurrent$ = analysis year

C = capital cost

yo = year of opening

ym = the mid-point of the construction period

L = the useful life of the investment in years

d = the discount rate expressed as a fraction (e.g., 0.07)

A = capital cost annualized over the useful life of the investment

VO = value in opening year

7.4.6.4. Economic Valuation of Benefits

Many studies will make an effort to place economic values on certain benefits of transportation improvements. Traditionally, the benefits that have been monetized most frequently have been user cost savings (i.e., time savings), vehicle operating cost savings, and safety savings. Economic values have also been placed on reducing emissions, based on health benefits. Savings in user cost usually constitute the largest portion of the economic benefits associated with transportation improvements.

The valuation of time has a significant bearing on the total benefits that accrue to alternatives, both highway and transit. Some states or areas have their own standard values of time used for transportation studies. FTA's *Technical Guidance for Section 5309 New Starts Criteria* (September 1997) uses the values in Exhibit 7-23 for the range in value of time on a person basis in 1995 dollars.

7.4.6.5. Economic Efficiency (Cost-Benefit) Measures

The measures of economic worth (which are derived from monetized costs and benefits including changes in capital, operating, and maintenance costs and in user impacts) should receive special attention. These measures indicate whether the alternatives make sense from an economic standpoint and rank them in the order of economic worth. They are also used for deriving broader cost-effectiveness measures such as FTA's cost-effectiveness index. Thus, while non-monetized impacts also should receive attention, economic measures are central to the evaluation of alternatives.

Analysis of economic worth (the traditional cost-benefit analysis) requires explicit procedures that are relatively well known. The aggregate results are represented in terms of equivalent annual costs, net present worth, benefit/cost (B/C) ratio, rate of return, and so forth. While methods are well developed, they require careful attention.

Net present worth equals the present value of all benefits less the present value of all costs. This requires each benefit and cost item from each of the future years to be converted to present value using a present worth factor based on discounting principles. Once present worth has been calculated, equivalent annual values can be calculated using the capital recovery factor. Exhibit 7-24 illustrates the estimation of B/C ratio and net present value.

7.4.7. Summarizing the Evaluation of Alternatives

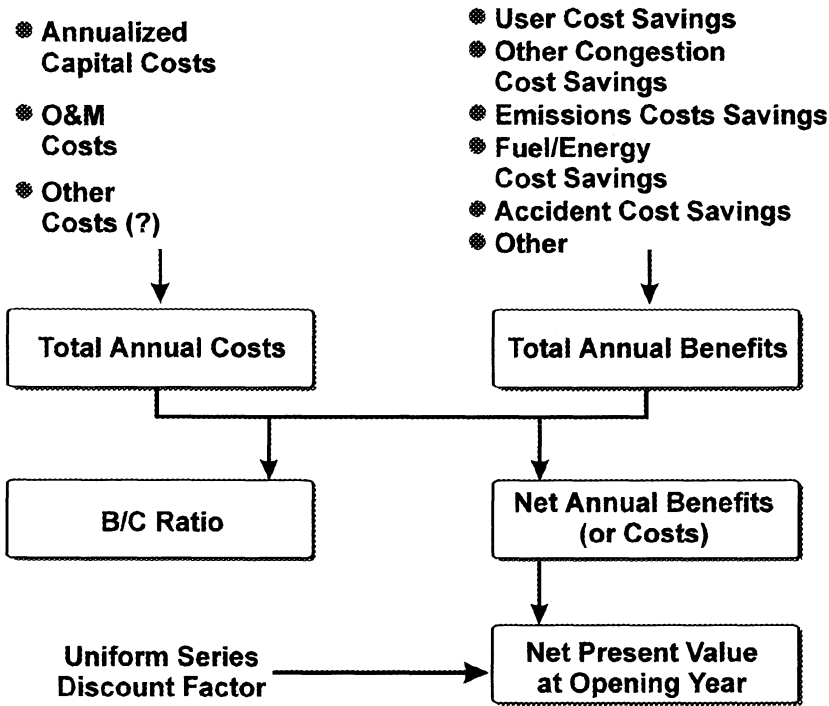
There are many ways to summarize the results of the evaluation of alternatives. Most studies use matrix formats, with the evaluation criteria on one axis and the alternatives on the other. Exhibit 7-25 shows a simple example from Northeast Corridor MIS in Dallas, Texas. This example shows only several of the daily performance measures. The total values are shown for the no-build condition. The other alternatives show the deviations from the base. This is usually the way to array information to make the comparison among alternatives easiest to grasp. Exhibit 7-26 illustrates a classic method for comparing the economic analysis results of the alternatives.

Exhibit 7-23.
Plausible Ranges for Hourly Values of Time

Category	1995 US \$ per person hour
Local travel	
Personal (auto and transit)	\$6.00–\$10.20
Business (auto and transit)	\$15.00–\$22.60
All purposes (auto and transit)	\$6.40–\$10.70
Walk, waiting, and transfer time, personal	\$17.00
Walk, waiting, and transfer time, business	\$18.80
Truck driver	\$16.50
Intercity travel	
Personal (auto and transit)	\$10.20–\$15.30
Business (auto and transit)	\$15.00–\$22.60
All purposes (auto and transit)	\$10.40–\$15.70
Truck driver	\$16.50

Exhibit 7-24. Process for Estimating Net Present Value

B/C Ratio and Net Present Worth



CHAPTER 8

FINANCIAL ANALYSIS AND SELECTION OF THE PREFERRED INVESTMENT STRATEGY



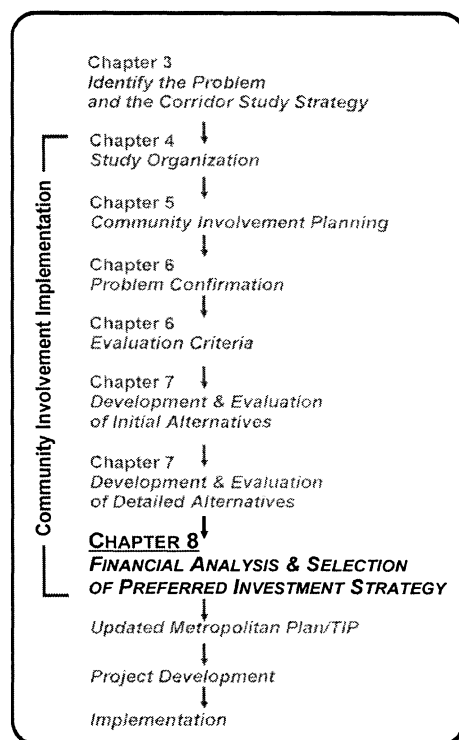
Chapter Topics in a Nutshell

- 8.1 Overview
- 8.2. Financial Analysis Activities Prior to Alternative Selection
- 8.3. Selection of the Preferred Investment Strategy
- 8.4. Observations from Practitioners
- 8.5. Strategies for Resolving Decisions
- 8.6. Post-Decision Activities—The Action Plan



Principles and Lessons Learned

1. Before the selection of the preferred alternative, the focus of the financial analysis is on the implications of funding availability for the selection of the alternative. For example, a certain highway-oriented alternative may appear to be most cost-effective, but a similar alternative that is toll-based may provide a higher likelihood of implementation. Following the selection of the preferred alternative, the emphasis is on developing the specific funding strategy that will allow the project or transportation service to be implemented in the appropriate time frame.
2. The type and scale of financial analysis is dependent on the nature of the decisions to be made. Decisions that have short-term implications require more detailed financial analysis, including examination of specific funding sources. Decisions that focus on long-term implementation will focus financial analysis on incorporation into the MTP.
3. One could develop a corridor study strategy as a type of financially unconstrained “vision plan” or, alternatively, a plan with tight financial constraint. Part of this decision depends on whether the study is expected to develop and select transportation improvements for near-term or long-term implementation. The closer potential projects are to implementation, the more seriously agencies should think about financially constraining the alternatives. Corridor budgets can be established as targets, if desired.
4. In developing the preferred investment strategy, make sure you provide all parties, including the public, with opportunities for input at points where they can influence the outcome.
5. An action plan is a way of answering the question “where do we go from here?” It is a way of describing the next steps after a decision has been made. The type of follow-up actions will also depend on the type of decision being made and the time frame for implementation.



8.1. Overview

The decision-makers participating in the corridor study process ultimately must determine what action to take. As indicated in Chapter 3, the type of decision will depend on the corridor study strategy. The nature of the financial analysis will depend on the type of decision to be made.

Some elements of a financial analysis may be appropriate prior to the selection of the preferred alternative, other elements would occur following the selection of the preferred alternative. Prior to the selection of the preferred alternative, the focus of the financial analysis is on the implications of funding availability for the selection of the alternative. For example, a certain highway-oriented alternative may appear to be most cost-effective, but a similar alternative that is toll-based may provide a higher likelihood of implementation. Following the selection of the preferred alternative, the emphasis is on developing the specific funding strategy that will allow the project or transportation service to be implemented in the appropriate time frame. This would be part of the “action plan” that is developed to guide future implementation actions.

Complicating matters further is the issue of timing. It is quite difficult to identify specific funding sources for possible projects that may be implemented well into the future. Legislation at the Federal and state level results in changing funding levels and apportionment formulas periodically. A variety of factors come into play in making specific funding sources difficult to predict well in advance. The TIP plays the important function of programming near-term projects and identifying the specific funding sources for design, right-of-way acquisition, construction, and operation.

The MTP must project funding availability well into the future to provide a framework for assessing the ability to financially meet the full spectrum of short- and long-term needs. But specific funds are not normally tied to specific projects at that time. Therefore, the nature of the financial analysis will also depend on whether implementation is anticipated in the near term or beyond.

The financial analysis is different from the cost analysis described in Chapter 7. The cost analysis and associated cost-effectiveness analysis weighs the benefits against the costs. It examines whether the investment returns acceptable benefits to the community in terms of mobility, congestion relief, safety, and so forth. The financial analysis uses the cost analysis to make judgments of whether the projects or services can be funded and implemented.

8.2. Financial Analysis Activities Prior to Alternative Selection

As indicated earlier, the type of financial analysis is dependent on the nature of the decisions to be made. Some of the possible decisions that could result from the corridor study and the implications for financial analysis are indicated in Exhibit 8-1.

The financial analysis leading to the selection of the preferred alternative (or narrowing down alternatives to be considered under NEPA) could be a relatively minor issue or a major one, depending on the alternatives. Much of the selection process is likely to be based on the benefit, cost, and impact data generated as described in Chapter 7. The question needs to be asked: “To what extent is the financial analysis likely to make a difference in the selection of the alternatives?” If the funding sources are similar and the impact on the financial capacity for transportation projects and services in the region are in the same range, then the financial analysis will not likely be a major factor in the decision. However, if funding sources and cost of the alternatives could have an impact on other parts of the MTP and TIP for the region, then the financial analysis increases in importance.

Exhibit 8-1.

Types of Decisions and Possible Implications for Financial Analysis

Type of Decision	Implications for Financial Analysis
Designate a preferred alternative, Possible short-term implementation	Analysis of specific funding sources, for possible inclusion in the TIP. Financial analysis would assess likelihood of funding for remaining alternatives.
Designate a preferred alternative, Possible long-term implementation	Provide cost and financial information to next update of MTP. General analysis of funding opportunities, possibly even extending beyond the timeframe of the financially constrained MTP.
Designate a set of reasonable alternatives to be examined in the immediate future under NEPA (i.e., do not select a preferred alternative at this point)	Have enough financial information to ensure that one or more of the alternatives is capable of being funded and implemented. Specific funding sources may be developed as alternatives move through NEPA.
Identify a set of recommended improvements in multiple corridors for possible long-term implementation (i.e., in a multi-corridor study)	Provide cost information, general analysis of funding opportunities. Allow the MTP and TIP processes to determine the financial commitments and timing.

Where the financial analysis is unlikely to be a major factor, it is still advisable to provide a discussion of the types of funding that are envisioned. A cash flow analysis would probably not be necessary until after the alternative was selected. Where the financial analysis could be a major factor in the decision, more detail is needed, particularly for near-term projects. For long-term projects, the financial analysis can be more generalized, with the primary intent of providing information to the financial analysis for the MTP. The *Guidebook* does not address the financial analysis for the MTP.

For the most part, the seriousness and rigor of the financial analysis will be determined by the expected implementation timeframe. Considerably more detailed analysis will take place for near-term projects, because it is more realistic to identify specific funding sources. Even for preferred alternatives that have long-term implementation timeframes, the possibility of staged construction may exist, requiring more of a short-term funding analysis. For short-term financial analyses, the following activities could be undertaken:

- Cash flow analysis of the capital and operating needs of the projects or services for each alternative.
- Identification of specific funding sources that could be applied to the projects or services.
- Determination of likelihood of receiving funds from those sources for the proposed projects or services.
- Estimation of additional revenues that may be generated from other sources (e.g., tolls, special assessment districts, tax increment financing districts).
- Assessment of financing needs (e.g., bonding, loans).

As indicated in Chapter 3, one could develop a corridor study strategy as a type of financially unconstrained “vision plan” or, alternatively, a plan with a tight financial constraint. Part of this decision depends on whether the study is expected to develop and select transportation improvements for near-term or long-term implementation. The closer potential projects are to implementation, the more seriously agencies should think about financially constraining the alternatives.

The closer potential projects are to implementation, the more seriously agencies should think about financially constraining the alternatives.

One interesting approach to this was used by agencies in the Denver region. In the 1995-1996 timeframe, three agencies in the Denver region (Denver Regional Council of Governments, Regional Transportation District, and Colorado DOT) collaborated on studies in three separate corridors. A *Guidance Manual for Technical Analysis* was developed so that there would be general consistency in the procedures applied for each of the three studies. This was expected to help in coordinating regional decision-making as the studies developed their individual recommendations. One of the issues covered in the

Guidance Manual was the use of corridor budgets. Budgets were established for each corridor: west corridor = \$210 million; east corridor = \$390 million; and southeast corridor = \$390 million. Because of revenue uncertainties, allowances were made for increases beyond these budgets: 50 percent for the east and southeast corridors and 100 percent for the west corridor. Alternatives that exceeded these limits were deemed to be unaffordable. This provided a general limit on options that could be considered in an individual corridor, based on the regional financial picture.

It should be noted that the FTA New Starts Criteria may affect the amount of financial planning needed if the preferred alternative is a fixed guideway transit facility proposed for Section 5309 funding. To obtain FTA approval to start preliminary engineering, the project sponsor must submit a financial plan for the project including both capital and operating costs and revenues. The plan must include a strategy for covering any identified funding shortfalls.

8.3. Selection of the Preferred Alternative or Investment Strategy

There are many political and technical aspects to decision-making. Each situation is unique. Each study has its own historical background, transportation problems, alternatives, impacts, agency positions, political personalities, constituencies, etc. Therefore, one could not expect there to be a formula by which the optimal decision is reached. However, a good study design not only will have identified the decision to be made but will have identified who will make the decision and the process by which it will be made. Legally, there are several actions that authorize expenditure of Federal funds on a transportation project. At the planning level, the projects must be included in the MTP and TIP. In air quality non-attainment areas, the MTP and TIP must also be in conformance to the State Implementation Plan, and projects must be in that conforming plan and TIP to receive Federal funds.

At the project development level, the project must be cleared environmentally, receiving either a CE, FONSI, or ROD if Federal funds or permits are required. Appropriate permits must also be obtained. The identification and commitment of funds by participating agencies, through the approval of budgets and local capital improvement programs, is also a part of the decision-making process that leads to project implementation. The point is that there are multiple decisions that lead to implementation of a project. The role of the planning-level decision is to collectively determine the course of action that is in the best interest of the community. It is up to the stakeholders how they intend to establish that a decision has been made. For studies conducted under NEPA, the recognition of the decision-making process is well established. For pre-NEPA studies, some of the choices include (more than one may be chosen)

- The decision-making committee/group approves a report that identifies a preferred alternative or investment strategy.
- A motion to endorse an alternative or investment strategy is adopted by the designated decision-making committee (e.g., the transportation policy committee of the MPO).
- A recommended alternative is approved by the decision-making body of the agency that owns or operates the portions of the system for which improvement is being recommended (e.g., state DOT, transit agency, city, or county). Approval of the entire package would be dependent on approval of the individual parts by the appropriate agency. Each agency's portion of the alternative would then be recognized in its respective plans and budgets.

One of the complications of making planning-level decisions where there are multiple participating agencies is that the committees guiding these studies have no legal authority in themselves (unless a joint powers authority or other legal mechanism for decision-making among multiple agencies is devised). The MPO has the legal authority to approve the MTP and TIP, but generally is not constituted to authorize implementation actions for any individual corridor. In addition, the commitment of funding, environmental clearance, and obtaining of permits authorize projects to move forward. This legal authority normally rests with the governing boards of the individual agencies who are responsible for those systems or facilities and with the Federal government, where Federal funds are involved.

... there are multiple decisions that lead to the implementation of a project.

The approval the MTP and TIP are the primary legally recognized planning decisions. Therefore, a primary objective of the agencies involved in the corridor study would be to see that the corridor recommendations are included in the MTP and TIP at the appropriate time. In this respect, an endorsement of an alternative by a properly constituted policy committee overseeing the project will often serve as the trigger to have the preferred alternative or investment strategy included in a future update of each of these documents. These political endorsements are very meaningful in moving recommendations forward through the other legally authorized processes.

That being said, endorsements of a preferred alternative or investment strategy are often difficult to obtain. Some corridors have been studied multiple times, still without a set of improvement alternatives in sight. In some cases, doing nothing may actually be the right answer for the community. In others, the decisions are highly controversial and are simply difficult to resolve.

8.4. Observations from Practitioners on Selection of the Preferred Alternative or Investment Strategy

Exhibit 8-2 illustrates lessons learned on the subject of selecting the preferred alternative or investment strategy, as compiled from the agency questionnaire in NCHPR Project 8-34.

8.5. Strategies for Resolving Decisions

It is not unusual to find that one or two key issues or controversies can get in the way of resolving a decision on how to address a transportation problem. In the ideal world, one could hope that thorough and unbiased technical analysis would lead decision makers and other participants to a logical conclusion that was clearly in the overall best interest of the community, and that controversy would subside under the influence of that logic. However, such a world does not exist. Individuals and agencies value objectives and criteria differently, and it is this difference in valuation that creates difference in opinion. Individuals and groups are also impacted in different ways, with some benefiting and others being negatively impacted.

Chapter 5 highlighted some basic principles in how to promote consensus building in a range of situations. How individuals and agencies handle themselves in the midst of those situations greatly influences the likelihood of controversial issues being resolved. This section takes those concepts a step further, focusing on how decisions can be brought to closure. It identifies several types of strategies or ideas for working through difficult issues. However, neither these nor any other strategies are a guarantee of making a decision. Conditions vary from one study to another, and personalities and long-standing entrenched positions can create seemingly insurmountable obstacles. There are usually no magical answers to these situations, but open minds, creative thinking, and willingness to compromise are cornerstones for successfully dealing with these issues.

Exhibit 8-2.

Observations from Practitioners on the Selection of the Preferred Alternative or Investment Strategy

- Often, more than a single solution is warranted. Could be a combination of strategies or phased projects.
- Corridor study should offer opportunity to explore new financial options and redefine or refine alternatives to achieve the intended objectives with reasonable resources. Effect of variables on local/state tax and funding sources should be evaluated.
- Should be consistent with the majority's perception of what needs to be done. Often, funds are not available to accommodate the preferred option.
- Try to find something in it for everyone. Need to look at innovative financing more inclusively. Do not skimp on budget for this issue.
- A clear picture is needed for how decisions on preferred solutions occurred.
- Study should result in a recommendation, not a commitment.
- Have early and clear understanding of how public input will affect selection. Interest groups must feel that they are heard.
- Involve the policy bodies prior to the final selection of the Locally Preferred Alternative.
- It is the prerogative of decision-makers to interpret importance of data as they see fit. However, this raises the complaint that solution was purely politically driven.
- Ensure an open process of all facts presented to the citizens. Enlist support of business titans and governments.
- Tends to be rushed and based on committee's emotions. Need to slow down and evaluate thoroughly before showing results to community.
- Technical results do not always clearly define the "best" alternative. Policy considerations are important in alternative selection as is public input and involvement. The process should come to some formal closure.

The remainder of this section provides a collection of ideas that could be employed in bringing decisions to closure. Study participants may find one or several of these ideas useful in moving constructively through the decision-making process.

- **Remember the principles of constructive dialog in Chapter 5.** How agencies deal with people should underpin the resolution of issues. Individuals and agencies may need to stay firm in their positions, but doing so in a non-constructive manner only hurts the ability to find a position that is mutually acceptable.
- **Make sure you bring the public into the process at a point where they can still influence the outcome.** Ideally, they should be provided with the information on which to base the decision and should have a mechanism for comment prior to the recommendation. Often, however, they will need a set of draft recommendations on which to comment.

- **Determine whether specific issues are truly crucial to the decision. It has not been unusual to find that differences of opinion are often a result of false assumptions or understanding.** Extra effort is sometimes needed to discuss assumptions to determine whether the issue in contention is one that there might be a basic agreement on if assumptions were clarified.
- **If agencies are struggling with a decision, determine whether the issue can be resolved by broadening the scope of the strategy.** Often, the focal point of the controversy centers on the impacts of a potential transportation facility. Other social and environmental issues usually will be analyzed in terms of the consequences of the transportation strategy. A different approach is to broaden the scope of the strategy that enhances the social and environmental setting as an adjunct to the transportation strategy. For example, creation of an urban park, fixing drainage problems, or cleaning up hazardous waste sites may be logical parts of an overall strategy that the community could see as beneficial. If something is in it for a broad cross section of stakeholders (i.e., not just transportation facility users), support for the decision is more likely. The reality of this approach is that it also usually costs more money. But keep in mind that funding may be a cooperative effort among agencies and that inclusion of additional features may be less expensive than continued community battles over the solutions.
- **Give elected officials a way to maintain a positive image in front of their constituents.** Often, politicians may have made promises to the electorate or to constituent groups during campaigns or at other times. It may become evident that their original position proved not to be the right one or not to be in the best interest of the community. Yet, because of earlier commitments, it is difficult for the politician to back out of that position. Agency staff can assist political figures in this dilemma by identifying ways of modifying their position that is not viewed to be an embarrassment or defeat.
- **In some cases, discussion on mitigation approaches is essential to making a decision, even in the planning stage.** Outlining an approach to mitigation, rather than specific actions, can be enough to move decisions forward. Agencies would need to specify the process they envision and the parties they expect to be involved. In some cases, an agency will need to make a clear commitment of resources to actions that will mitigate the impacts and back that commitment up with believable actions. Simply put, there may be a price to resolving an issue. As indicated in Chapter 3, studies that have the potential for near-term action are usually best conducted under the NEPA umbrella, and agencies will be in a better position to know what commitments they can make under these conditions.

8.6. Post-Decision Activities: Development of an Action plan

An action plan is a way of answering the question “where do we go from here?” It is a way of describing the next steps after a decision has been made. The actions will depend on the nature of the decision. **Where the preferred alternative or investment strategy is long term, the following actions may be appropriate:**

- **Clearly identify all elements of the preferred alternative, not just physical infrastructure elements, but policy and institutional elements as well.** For example, if changes in land use policy are part of the strategy, there may be immediate actions that can be taken, even though the implementation of the transportation project may be some years away. These types of changes usually take time for developing consensus and implementation strategies. Cost estimates should be provided at a level that allows for consideration in the next update of the MTP. The transportation strategy should be provided in sufficient detail to enable the modeling of the improvements for the MTP.
- **Establish a realistic timeline for implementation for all project elements.**
- **Identify general funding sources.** If significant funding shortfalls are expected, provide a notification of this as an issue to be taken up among elected official bodies at the regional or state level.

- **Identify agency responsibilities for implementation, including pursuit of funding, development of policy, or development of interagency agreements at the appropriate time.**
- **Pursue any appropriate early-implementation mitigation actions.** Some of these activities may cost less if action is taken earlier (e.g., land acquisition for parks, habitats).
- **Provide information to the public on the outcome of the study, what they can expect to happen next and over what timeframe.** Press releases, final study fact sheets, brochures, and other approaches may be appropriate.
- **Have participating agencies prepare resolutions supporting the recommendations.** This provides a type of formal recognition of acceptance by the governing bodies of each agency, giving the recommendations greater weight.

Where the preferred alternative or investment strategy is near term, the following actions may be appropriate:

- Identify improvements and costs at a level of detail sufficient for inclusion in the TIP.
- Identify specific funding sources, sufficient for inclusion in the TIP. If additional sources remain to be identified, specific responsibility needs to be assigned for who will complete the funding picture for various project elements.
- Identify a timeline of actions and agency responsibilities leading to implementation.
- Identify a timeline for initiation of the NEPA process, if the study was not already conducted under NEPA. Funding to carry out the environmental process needs to be identified.
- Identify possible resolutions by participating agencies supporting the study recommendations. A sample resolution can be prepared as a starting point, from which individual agencies can develop their own.

Where corridor preservation is an element of the study decision, the following may be appropriate:

- Where right-of-way acquisition is a part of the action, assuming the study provided the proper legal authority, proceed with the acquisition process according to agency procedures.
- Where the corridor preservation approach is through means other than acquisition, distribute information to local agencies, developers, and the real estate industry so that they can make decisions in keeping with the preservation approach.
- If a long-term preferred alternative was also selected for the corridor, provide the appropriate information to the MTP.

Where the study ends with the selection of a set of reasonable alternatives to be forwarded to subsequent NEPA analysis and decision-making, the following may be appropriate:

- Package study information so that it can be incorporated into subsequent environmental documentation and serve as a starting point for the NEPA process.
- Provide information on the remaining corridor alternatives to the MTP so that any existing assumptions in the MTP can be refined for the next update.
- Identify a timeline for initiating and completing the NEPA process.
- Identify lead agency for initiating the NEPA process.
- Identify funding for the NEPA environmental analysis and documentation.
- Identify stakeholders and their roles in the subsequent effort.
- If funding needs for the remaining alternatives appear to be beyond currently projected capabilities, provide a notification of this as an issue to be taken up among elected official bodies at the regional or state level.

Exhibit 8-3 provides a graphic showing the projects and timelines for the Bakersfield Metropolitan Transportation Investment Strategy. This was a multi-corridor study that resulted in recommendations at the system level and corridor level. Presenting the information graphically or in tables provides a concise, direct format that can be understood by decision-makers. To the extent possible, the action plan should be approved by decision-makers, in addition to the recommendation of the preferred alternative. Exhibit 8-4 shows the table of contents from the financial analysis for the Bakersfield strategy.

Exhibit 8-3.

Example Action Plan Timeline

(Source: Bakersfield Metropolitan Transportation Investment Strategy)



Exhibit 8-4.

**Example Table of Contents of a Financial Analysis Report
(Source: Bakersfield Metropolitan Transportation Investment Strategy)**

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 1.3.3. Alternative 3—Strategic Grade Separations, Bridges and Roadways
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 1.3.4. Alternative 4—SR 178 Freeway/Further Bus Transit Expansion 5

 1.3.5. Alternative 5—SR 178 Freeway/Enhanced TSM Bus System 5

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 2.2.1. Local Revenue Sources 10

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CHAPTER 9

CORRIDOR STUDY DOCUMENTATION



Chapter Topics in a Nutshell

- 9.1 Overview of Documentation
- 9.2 Types of Documentation
- 9.3 Graphic and Visualization Techniques
- 9.4 Use of pre-NEPA Report in Subsequent Decisions Under NEPA



Principles and Lessons Learned

1. Corridor study documentation does not include only preparing the study report. Presentations, meeting minutes, and agency/public correspondence is also important and often more important than the report itself.
2. Documentation at all levels should be designed to support the decision-making process.
3. Voluminous documentation can be counter-productive and should be avoided. Backup material can be provided in appendices or maintained in agency files.
4. Documents should be organized so that the relationship between the written documentation and the decision-making process is readily understood.
5. Ideally, every comment should be responded to, both comments received during the meetings and public outreach as well as comments received in response to a draft report or other reports. This is particularly important if comments from the public and agency have been specifically solicited as part of the public involvement program.
6. Circulation and commenting for a pre-NEPA corridor planning study will depend on a wide range of conditions pertaining to the scale of the study, level of controversy, overall public involvement approach, and so forth.
7. Photographic rendering and visual simulation should be employed selectively, when these techniques will help to distinguish among alternatives and help decision-makers to better understand the impacts.
8. It is important to remember that decisions are made by elected officials and agency administrators, most of whom have relatively little time, many other issues on the table, and, in most cases, a surface understanding of technical issues. There are exceptions, of course, but it is critical to remember that the decisions they make can be no better than the amount of information they are able to absorb.
9. The inclusion of corridor study documentation within subsequent NEPA documentation should be anticipated as the corridor study documentation is prepared.

9.1. Overview of Documentation

The focus of a corridor planning study is on decision-making. Documentation, while not the decision-making process itself, is necessary for a number of reasons:

- It records the basis upon which the decisions were made.
- It provides a historical record of the study process for later reference. The need for reference could include refreshing the memories of stakeholders from time to time, conveying the rationale for decisions to stakeholders who were not involved earlier, or conveying information so that others can carry out the next steps in the planning, project development, and implementation process.
- It serves as the “paper trail, describing the processes that were followed and the technical analyses conducted. This could be important for several reasons, including revisiting decisions or defending decisions that are challenged or litigated.

Documentation is also important because study participants, including project managers and consultant personnel, change over the course of a study. Good study documentation can help to bring them up to speed.

... documentation does not mean simply writing the study report.

It is important to recognize that documentation does not mean simply writing the study report. In fact, other types of documentation often become more important than the study report itself as far as documenting decisions that have been made and the information behind the decisions. For example, meeting minutes and exchanges of agency correspondence are critical to maintaining a paper trail of decisions and chronology of events, which may be extremely important even in cases where decisions are not controversial.

This chapter focuses on all aspects of documentation, with emphasis on its relationship to making and sustaining decisions. The first section provides an overview of elements of documentation and how they fit together. The remaining sections discuss specific documentation options and issues. Responsibility for documentation can be shared between agency staff and consultant or assumed entirely by either party. But the responsibility for documentation must be clear, or critical documentation items will invariably slip through the cracks.

As with other elements of the corridor study process, a wide range is possible in the level of documentation detail. Simple decisions require little documentation. Complex decisions require considerably more. But before describing the range of possibilities, several basic principles should be identified:

- **The emphasis in corridor planning, as with the project development process, should be on decisions, not on documentation.** A successful process should not be known so much by the quality of its documentation, but by the quality of its decisions. Documentation should support decisions, not the other way around.
- **Documentation, at all levels, should be factual and informative, not exhaustive.** Voluminous documentation can be an obstruction to understanding, not an asset.
- **In general, documentation should be designed for reading by non-technical audiences.** If the purpose of documentation is to inform decision-makers, many of whom have limited technical backgrounds, then the information needs to be communicated in a way that they can readily understand the issues. Highly technical language does not impress these audiences.

Rather, it can confuse and frustrate them. Where technical terms are necessary, they must be clearly and simply defined.

- **Develop documentation as if you expect it to be scrutinized.** Documentation that is months or even years removed from the original decisions needs to tell the story of the study in a way that can be understood. Documenting reasons for decisions tends to be very important, particularly as time passes following the completion of the study. The story told by the documentation should be understandable even by those who have not been involved. In fact, reviews by uninvolved parties can be helpful in spotting gaps in logic or information that may not be apparent to those who have been close to the study. In controversial studies, keep in mind that the documentation may be used in court, and prepare it accordingly.
- **Conserve resources in documentation by keeping it as brief as possible.** This must be balanced by the need to be complete in documenting the information behind the decisions. Some of the technical detail can be placed in appendices or stored in project files.
- **Develop a level of expectancy and consistency in the way that documentation is presented to stakeholders.** This helps them to understand the message. Presentation formats should be consistent throughout the course of a given study and, if possible and appropriate, across multiple studies. This will help stakeholders find the information they are looking for and minimize the possibility of confusion.

... reviews by uninvolved parties can be helpful in spotting gaps in logic or information that may not be apparent to those who have been close to the study.

The above principles apply to all elements of documentation, not just study reports. It is important to remember that decisions are made by elected officials and agency administrators, most of whom have relatively little time, many other issues on the table, and, in most cases, a surface understanding of technical issues. There are exceptions, of course, but it is critical to remember **that the decisions they make can be no better than the amount of information they are able to absorb.** Consequently, whether the study issues are simple or complex, there are generally two areas of documentation that tend to be most important for decision makers: presentation materials and meeting minutes. Decision-makers generally do not attempt to digest full study reports or backup material; they rely on staff to take care of this. Their focal point is typically on a limited number of core issues, and their questions are usually targeted toward these issues. The backup documentation needs to be consistent with the material presented to decision-makers.

The remainder of this chapter discusses each of the types of documentation in greater detail, including strategies and lessons learned. It should be re-emphasized, that there is no single best way to prepare documentation. State, regional, and local agencies may also have their traditions and internal requirements and expectations. The most appropriate approach for any individual corridor study will be influenced by all these factors.

The exhibit illustrates the possible role of the technical committees versus the policy- or decision-making group. The technical committee would normally serve as a screener and critiquer of material before it is released to the decision-makers. The backup material would be provided to the technical committee as well and made available to the decision-makers who desire to examine the information in greater depth. This in-depth material would consist of a corridor study report, which would also have its own technical backup material as either appendices or in a stand-alone document. Agency correspondence is usually advisable to include, and responses to agency and public comments could be included as well. This is required for an EIS and is probably advisable for the more controversial, complex corridor studies.

9.2. Types of Documentation

9.2.1. Presentation Materials

Perhaps one of the most significant failures on the part of the technical community in conveying information to decision-makers and the public is in making clear, simple, straightforward presentations. Another major problem tends to be failing to understand the issues that are of most concern to decision-makers. A failure to be clear or to directly address the issues can result in a poor decision.

The following represent principles that should be remembered for structuring presentations for corridor planning studies. These principles are applicable to many other areas of transportation practice as well:

- **Provide a context for the presentation and subsequent discussion.** Where are you in the decision-making process? What have you accomplished so far?
- **State the objective of the presentation.** What specifically are you trying to get across?
- **Do your homework.** Make sure you understand what the group is most interested in. But remember that it is also your responsibility to tell them what they need to know. Their interest areas and what they need to know are not necessarily the same. You need to cover both.
- **Present the facts clearly and simply, while also being sensitive to the way in which the facts may be received.** Certain pieces of information may be hard for some individuals to "swallow," and it is particularly important to be prepared with backup support for those points.
- **Present the information in a way that reinforces collaboration, not conflict.** Collaboration can be reinforced through the presentation, even as you may be presenting material that is difficult for some groups to accept. It should be apparent that you are making an effort to provide information that will lead to a solution that is in the overall best interest of the community.
- **In the handout material, ensure that there is sufficient information and clarity for making the decision at hand.** Remember that the handout material may be given to others who have not heard the oral presentation and that the handout itself should be self explanatory, to the extent possible. Also remember that the presentation materials may be used by other individuals to convey information to their colleagues.
- **Be prepared to provide interpretation of the information, not just the information itself.** Decision-makers may find it difficult to understand the implications of technical information. Remember that some may be new to their position or may have come to the position part way through the study. These individuals need to be brought up to speed so that they can understand the implications. This may mean a separate briefing prior to a committee or group meeting. If this is a responsibility of an elected official's staff person (e.g., a mayor's aide), touch base with that staff person to see if he or she requires any assistance in providing this information.
- **In preparation for presentations, anticipate potential questions and have answers ready.**

9.2.2. Meeting Minutes

Preparation of meeting minutes may sound mundane, particularly to those who have analysis or technical issues as their main interest, but meeting minutes are often an important and invaluable resource both during and following the study process. Minutes need not be lengthy nor do they need to be a laborious task. But they need to be done consistently and well. The following principles can be applied to the preparation of meeting minutes:

- **Make sure the responsibility for meeting minutes is clear.** The lead agency will often have established practices for preparing meeting minutes, and those procedures should be followed.

- **Make meeting minutes concise, with emphasis on action items and decisions.** TACs are usually in the position of making recommendations to a policy body, and those recommendations should be worded clearly and simply.
- **Make sure all parties present at the meeting understand the decisions and actions, and the complete wording and recommendations should be formulated while agency stakeholders are present, especially if the recommendation or decision is critical.**

9.2.3. Corridor Study Reports

9.2.3.1. Overview

As indicated earlier, documentation supports the decision-making process, not the other way around. Documentation is not the goal and needs to be placed in the proper context. The basic principle that documentation supports the decision-making process has several implications:

- **Documents should be organized so that the relationship between the written documentation and the decision-making process is readily understood.** It is possible that the standard format for EISs (see Exhibit 9-1), which is often used as the organizational model for corridor study reports, may not be appropriate for corridor planning studies. The NEPA documentation process is generally organized around the definition of a project, as if one had already been proposed and alternatives to that project were being evaluated. The normal organization of an EIS does not follow the logic of the decision-making process. It should also be noted that, although there are years of tradition and practice in how EIS's should be organized, and although the NEPA regulations suggest an organization, such an organization is not required. Other report structures may be better suited to documenting the corridor study process and results. If a different report structure is used, the alternate structure should be explained up front, along with the reasons for using that structure.
- **The length of documents should be consistent with providing information to the decision-making process, not amassing detail.** CEQ has made very clear that volume is not what was sought in requiring environmental documentation. As CEQ states, the goal is "excellent action," not merely excellent documentation. It is not that documentation is unimportant, but the emphasis must be on decision-making.
- **Be clear on the target audience.** In some cases, a study may be more internally focused, with less public involvement. In other cases, public and agency involvement with collaborative decision-making may be extensive. Different audiences have different expectations, and it is important to tailor the structure and format to those expectations.
- **Discuss information that is pertinent to the decision and that is needed to provide the proper context to those unfamiliar with the study.** If a particular environmental issue or impact area was determined not to be relevant to the decision, make sure this is explained. Readers should understand why certain environmental issues may not have been analyzed.

The remainder of this section discusses format and presentation options for corridor study reports.

9.2.3.2. Document Format and Style

A corridor study report is not simply a place to put all the information one has compiled during the course of the study. It is a reference piece that needs to tell a story about how stakeholders are proposing to address specific problems and issues that the study was designed to address. Since 1969, Federal NEPA regulations have identified a typical structure for preparing environmental documents. There are very good reasons for that structure. But that structure may not be appropriate in every case, particularly for documents that do not need to fulfill any NEPA requirements. Alternative structures are available for study documentation, some of which could possibly be considered even for NEPA documents, depending on the circumstances. Exhibit 9-2 describes some of those possibilities and the conditions under which they may be appropriate.

Exhibit 9-1.

Typical Format for an Environmental Impact Statement

Summary
Table of Contents
1. Statement of Purpose and Need
2. Alternatives, Including the Proposed Action
3. Affected Environment
4. Environmental Consequences
5. Mitigation Measures for Adverse Environmental Impacts

Exhibit 9-2.

Sample Documentation Formats for Corridor Study Reports

Option for Documentation Format	Conditions in Which It May Be Appropriate
Organize document in a way that tracks the decision-making process.	A logical choice for most reports, except for EISs, where standard NEPA format is needed to meet expectations of resource agencies.
Summary document only with backup technical memoranda attached or available on request.	Appropriate in cases where it is desired to provide a concise publicly oriented document that provides essential information. Streamlines the documentation.
Statement of study recommendations and decisions, supported by briefing materials provided throughout the project. No formal report.	May be appropriate in simpler cases where full-scale documentation is not necessary.
A video or CD-ROM summary of the study. This would usually be a supplement to backup documentation, but would be the vehicle for carrying the message to the public.	May be appropriate in cases where public and elected official information is important for the study follow-up and implementation efforts. Usually for a larger project.

9.2.3.2.1. Organize Document Based on the Decision-Making Process

As noted earlier, the standard format of an EIS (shown in Exhibit 9-1) is not entirely consistent with the decision-making process for a multimodal corridor study. It is much easier to describe the progression of the study when the document generally follows the chronology of the decision-making process itself. Exhibit 9-3 provides an example of this alternative format prepared for the Ohio River MIS in the Louisville, Kentucky/Southern Indiana, region. The executive summary provides an overview and highlights the decision-making chronology. The chapters are organized sequentially, according to the major steps in that process.

**Exhibit 9-3.
Sample Corridor Study Report Format
That Tracks the Decision-Making Process**

Executive Summary

1. Overview of the Study Process
 - Study purpose and objectives
 - Corridor history
 - Agency coordination and decision-making structure
 - Public involvement and outreach
 - Decision chronology
2. Corridor Problems and Needs
3. Evaluation Criteria and Methodology
 - Development of evaluation criteria
 - Evaluation methodologies
4. Development and Analysis of Preliminary Alternatives
 - Definition of alternatives
 - Analysis of alternatives
5. Development and Analysis of Detailed Alternatives
 - Selection of alternatives for detailed analysis
 - Analysis of detailed alternatives
6. Financial Analysis, the Preferred Alternative, and Action Plan

The identification of problems and needs is covered in Chapter 2, along with the evaluation criteria. Chapters 3 and 4 describe the evaluation of preliminary and detailed alternatives, respectively. The final chapter summarizes the preferred investment strategy and financial analysis. By preparing the documentation in the same sequence as material presented earlier in the study, the report was more consistent with the logic of the decision-making process. It was also easier to understand for those who had not been involved in the process.

9.2.3.2.2. Summary Document with Backup Technical Documentation

This approach may be desirable in a wide range of circumstances where a relatively brief, easy-to-read document is important to the study process. An agency may even progress to a point where this becomes the primary means of documentation. Some of the advantages include

- Ability to more widely distribute the information.
- Increased likelihood that people will read the material.
- Lower cost of publication.
- Possible improvement in the quality of the document given that fewer pages need to be reproduced.

One of the important areas to watch in this approach is insuring that the backup documentation is prepared and revised, as necessary, to be in agreement with information provided in the summary. It may not be possible to leave the supporting technical memoranda in their original form.

9.2.3.2.3. Statement of Study Recommendations and Decisions Supported by Briefing Materials

In some cases, it may not be necessary to provide full documentation of the study in a report. As an alternative, the materials prepared for briefings throughout the course of the study can serve as the basic technical documentation. This would include any tables, charts, evaluation matrices, and so forth that were important to convey the basis for the decision or recommendation. The primary missing elements would be the text that ties all the material together. At the front of this material would be a very brief summary of what was studied, recommendations or decisions made, and any proposed follow-up actions.

One of the advantages of this approach is that it greatly simplifies the documentation process, focusing on materials that have already been prepared in the course of briefing elected officials or technical staff. However, it assumes that enough structure and information are provided in the materials so that there would be a reasonable ability for those unfamiliar with the process to grasp its essential elements. This method may be appropriate for cases where public involvement has not been a critical factor and for studies that are non-controversial. This does not necessarily imply that any less effort would be devoted to issues such as evaluation of alternatives, development of cost estimates, funding, and other issues that are important to the ultimate programming of projects. It may also be appropriate where the study has been a preliminary effort and an additional more detailed study, with greater public involvement, will occur in the relatively near future.

9.2.3.2.4. Video or CD-ROM Summary

The integration of video/photography of the study area conditions, possible alternatives, and other visual features can be a powerful communication method when combined with a description of the study process and its findings. It would be similar to a final presentation on a study that describes what occurred from beginning to end. The key factor in using the video or CD-ROM format is that this information now becomes accessible to a broad audience. In addition, it compresses the study "story" into an amount of time (usually between 10 and 20 min) that conveys the essential facts in a format and a timeframe where people are willing to listen. This can be a supplement to other forms of documentation, but it could also be a replacement for the hard copy summary referred to earlier. The use of CD-ROM is rapidly becoming more popular and economical. The use of still photography can often be as effective as video and is less expensive. An expected cost for a typical video may be \$20,000, plus additional costs for effects such as visual simulation of future alternatives, or aerial photography, where desired. However, the cost of a video or CD-ROM can range widely because of other factors as well. Quality and impression are important. The products should be professional but not appear extravagant or come across as too slick.

9.2.3.3. Report Circulation and Comments

The NEPA process has very clear document circulation requirements. For example, in an EIS, a draft is circulated for agency and public comment, and responses to comments are provided in the Final EIS. The results of any additional analysis are also included in the Final EIS. Circulation and commenting for a pre-NEPA corridor planning study will depend on a wide range of conditions pertaining to the scale of the study, level of controversy, overall public involvement approach, and so forth. It is impossible to establish hard and fast rules. However, there are some general rules that can apply, such as

- **One indicator of the need to circulate a document could be the degree to which complaints would be expected if the document is not circulated.** In general, it is better if

comments are received, both pro and con, while documents are in draft stage, as part of the decision-making process rather than be subject to criticism that stakeholders were not provided with a fair chance to comment. Although it is possible that some stakeholders may complain even if they are given a fair chance to comment, agencies should not expose themselves unnecessarily to that type of criticism. Failure to obtain comments could also result in important considerations being omitted.

- **Ideally, every comment should be responded to, both comments received during the meetings and public outreach and comments received in response to a draft report or other reports.** This is particularly important if comments from the public and agency have been specifically solicited as part of the public involvement program. A failure to respond to comments in either a written or verbal fashion will likely affect the credibility of the study and of the agency or agencies involved in the study. The following principles generally apply to dealing with comments:
 - Keep track of the comments. This may seem like a trivial matter, but lost comments are embarrassing and can even jeopardize the more controversial studies. The agency project manager should have a system for organizing and logging comments so that there is no possibility of their being lost.
 - Comments and responses should be circulated to technical and policy committee members.
 - In preparing responses to comments, it is acceptable to cite references to specific sections of reports or to previously answered comments, but make sure the reference material answers the specific question at hand.
 - Answer the questions directly; do not beat around the bush. If the comment is difficult to answer, remember that this may be an indication that further investigation is needed. The person commenting may have a valid point.
 - If the impacts of an alternative are significant, acknowledge that point. Don't try to minimize the impact.
- State, regional, or local requirements and practices, where they are standardized, are important to follow.

9.3. Graphic and Visualization Techniques

The computer revolution has introduced a number of powerful tools that are relevant to corridor planning studies. One of these tools is the ability to provide visual simulation, both in photographic rendering and in animated video. These approaches may be most appropriate for larger studies where there is potential for significant impact that cannot be understood fully without visualization of the improvement. Example applications could include assessing visual impacts of an elevated transportation facility, assessing how a transit station might fit into a historic setting, creation of an urban park in conjunction with a transportation improvement, or visual changes to the landscape through a developing area. The following provides some observations on the use of visualization techniques:

- Use the techniques only where there is a real need, such as exploring conceptual design issues or responding to a controversial impact. Exhibit 9.4 provides an examples of a photographic rendering of a freeway-to-freeway interchange in Albuquerque, New Mexico.
- Select angles that are meaningful and related to the issues.
- Treat all alternatives equally. It is possible that several alternatives may warrant visual simulation or photographic rendering while others do not. But when this occurs, it should not distort the impacts or benefits of a particular alternative over another.

- Make sure that the public and decision-makers are given an accurate representation of what is possible. Portrayal of a rosier picture (physically or financially) than is likely to occur could create more serious problems later on. Set appropriate expectations.

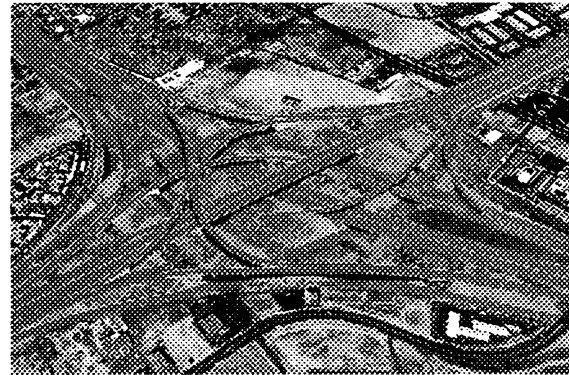
In addition to visual simulation, there are a wide range of graphic techniques for conveying information concerning alternatives, their costs, benefits, and impacts. GISs open up a world of possibilities for displaying information, comparing alternatives, and presenting results. It should be remembered that, although color can be extremely helpful, black and white photocopies are also sometimes made of the color copies. To the extent possible, graphic patterns and shadings should be selected that allow the same information to be interpreted in a black and white format. This will depend on the extent to which copying by others is expected. Design of graphics and exhibits should also keep in mind the possibility of making documents available over the Internet. Graphics should be integrated with the text.

Exhibit 9-4.
Photographic Rendering of a Proposed
Interchange in Albuquerque, New Mexico

Existing Conditions



Proposed Interchange



9.4. Use of a pre-NEPA Report in Subsequent Decisions Made Under NEPA

Chapter 3 discussed the development of a strategy for the corridor study. This should include defining the types of decisions that the study is expected to make as well as a number of other strategic issues. One of these other issues involves the use of study documentation, particularly if the study was not conducted under NEPA. There are several possible considerations, one or more of which may be appropriate when the NEPA process is formally initiated.

- Recognize the documentation and associated decisions in the NOI and at the scoping meeting. The acceptability of the analysis and conclusions of the corridor study can be confirmed at the scoping meeting and at other initial public meetings. If potential concerns are raised about any of the information in the study, the specific issues in question should be considered for revisitation under NEPA. The opportunity for comment should be broadly advertised to afford as much confidence as possible that the information will hold up under scrutiny. Legal requirements for examination of alternatives under Section 4(f), Section 106, and other location-determining statutes, as appropriate, need to have been met in the study and confirmed

as part of the subsequent NEPA process. Failure to address all the legal requirements and to have had the proper consultation means that additional work will likely be required within the NEPA process.

- If the alternatives were narrowed down in the pre-NEPA study (i.e., a preferred alternative was not selected), the NEPA process will be dependent mainly on those portions of the analysis and documentation that support the selection of the alternatives being studied further. Although it may be possible to incorporate some of this information by reference, it is usually better to bring appropriate information directly into the NEPA documentation. This approach usually provides a clearer and more comprehensive understanding of the issues. Those involved in follow-on NEPA studies need to assure themselves that there are no alternatives previously eliminated that should also be analyzed within the NEPA studies.
- Providing that the information in the pre-NEPA study has not become outdated, a great deal of the information from the corridor study should be usable, particularly the statement of the problems (as a basis for the Statement of Purpose and Need), comparative data among the alternatives, and descriptions of alternatives that were considered but eliminated.

If some agencies believe that they should take a “no-risk” approach and start from scratch in the NEPA process with new problem identification, alternatives development, analysis, and so forth, it should be recognized that this decision comes with a price, not only the resources required to complete the work, but possible confusion in the public arena, with the reintroduction and reanalysis of alternatives. These issues are best resolved when the corridor study strategy is initially conceived and planned. Agencies should have as an objective, “no retracing of steps.” The corridor study strategy may warrant taking the definition and evaluation of alternatives only to the point where participants believe the formal NEPA process should be engaged.

CHAPTER 10

DEALING WITH TECHNICAL AND INSTITUTIONAL ISSUES THAT ARISE DURING A CORRIDOR STUDY

Exhibit 1-2 in Chapter 1 identified a variety of issues that tend to arise in corridor studies. Chapter 10 addresses these issues specifically, in one of two ways: a direct response to the issue or a reference to the section number in the *Guidebook* that answers the question raised. For each issue, the question is repeated and the answer follows.

A. Relationship of Corridor Studies to the Overall Transportation Planning Process

A1. When should corridor studies be initiated and carried out, given transportation planning and project development requirements?

Answer: Refer to section 3.4 on the corridor study strategy.

A2. What is the role of system planning, and how does it relate to corridor/subarea planning?

Answer: Corridor planning and system planning are interrelated. System planning looks at the interconnectivity of systems either within a single mode on a geographic basis or among multiple modes. Corridor planning involves integrated multimodal planning within a given travel shed. Corridor planning can feed more detailed information concerning transportation options to flesh out a system planning effort. System planning allows for better corridor planning by providing the context within which corridor options can be defined. Both activities are important. See also section 2.3.

A3. What is the relationship between a corridor planning study and the NEPA process?

Answer: See section 3.4.2.

A4. How does a corridor study recognize a strong regional policy toward particular strategies or modal options?

Answer: Regional policy is an important input to any corridor study, providing an overarching framework within which corridor decisions are made. See section 2.3.1.

A5. How does a corridor study relate to activities in the management systems, particularly the CMS?

Answer: See section 2.3.1.

A6. How does a corridor study relate to the Metropolitan and Statewide Transportation Plans?

Answer: See section 2.2.

A7. How does a corridor study relate to local government comprehensive planning efforts in that corridor/subarea?

Answer: See section 2.2.

A8. How does a corridor study relate to project development activities?

Answer: See section 2.2.

B. Initiation and Overall Conduct of Corridor Studies**B1. How should the technical and policy committees guiding the study be formed?**

Answer: See section 4.4.

B2. How can one determine the proper allocation of time, costs, and resources associated with a corridor study?

Answer: The level of detail for a corridor study will be predicated on the issues that stakeholders believe to be important in addressing the identified problems. A method for identifying key study issues is presented in section 4.3.2.

B3. How much of a corridor study should be done in-house versus by consultants?

Answer: See section 4.3.

B4. What in-house resources and capabilities should agencies be building to carry out effective corridor studies?

Answer: See Chapter 11.

B5. How can the costs of corridor studies be controlled?

Answer: Study costs can be managed by trying to focus the study on the issues that are most critical to the decision. There is little use in spending significant resources on an issue that is not germane to the decision. Appropriate methodologies scaled to the nature of the issue and available budget can also be used to manage cost. However, agencies should be careful not to be “penny wise and pound foolish” in addressing corridor study issues. If certain issues need attention to develop a valid decision, agencies should not skimp on resources in those areas.

B6. What factors need to be taken into account in setting up a schedule for a corridor study?

Answer: A schedule will depend on the recognized urgency of dealing with the decision, the level of resources available, and the mechanics of developing and implementing a collaborative process to make the decision. The study should also consider the timing of updates to the MTP and the TIP, election cycles, and opportunities for funding.

B7. What are some options for identification of problems and needs?

Answer: See section 3.3.

B8. How does one determine/predict how significant certain environmental areas will be? How does one scope a corridor study to account for these uncertainties?

Answer: This can only be done effectively by getting the relevant stakeholders to the table. Even then, there will be uncertainties. Section 4.3.1 provides some possible approaches.

B9. How should the technical committee structure be established to ensure fair representation?

Answer: Fair representation should, first and foremost, be established by ensuring an open process, wherein all stakeholders have an avenue for receiving information about the study and providing their viewpoints. The technical committee should be composed of a cross section of stakeholders. Often, it will consist of mainly agency representatives. In some cases, non-agency stakeholders would be represented on the committee. Usually, technical committees are advisory, and the policy committee is responsible for making the key decisions.

C. The Alternatives Development and Evaluation Process**C1. How should evaluation criteria be selected?**

Answer: See section 6.3.

C2. Should evaluation criteria be weighted?

Answer: Generally, the numerical weighting of criteria is discouraged. However, weighting can sometimes be used to help stimulate thinking concerning different points of view related to building consensus. It is strongly recommended that a formal weighting of criteria not be used to make the decision itself. Rather, it could be used as an additional input to the decision to provide perspective on how different stakeholders view the criteria. Section 6.3.6 discusses criteria weighting in more detail.

C3. What evaluation criteria and performance measures are best for comparing multimodal alternatives?

Answer: See section 6.3.8.

C4. How are evaluation criteria best linked to the definition of the problem?

Answer: Some of the evaluation criteria should be derived directly from the definition of the problem. For example, a problem of long trip times from the east side of region x to downtown should be addressed by data that indicate how commute times might change as a result of the alternatives. Other criteria will be established to identify how the alternatives may impact other goals and objectives (e.g., environmental, economic, etc.). See section 3.3.3 for example problem statements.

C5. How should the base condition be established? What set of assumptions should be used?

Answer: See section 7.3.

C6. How can one determine what is a reasonable alternative? What strategies can minimize the chance of being challenged on failure to consider an alternative?

Answer: Views concerning what is a reasonable alternative can vary widely by stakeholder group. One group may view an alternative to be entirely unreasonable while another group believes it to be reasonable. Several tests can be used to determine whether an alternative is reasonable, based on the unique circumstance of each study: Does the alternative address the identified problem? Is the alternative of reasonable cost given the likely resources available in the corridor? Does the alternative have an impact that will be viewed as too severe by the community? To minimize the chance of being challenged on failure to consider an alternative, the study team needs to ensure that the process for suggesting alternatives has been open, that the study team and committees have fairly understood the potential alternatives, and that a reasonable process was used to select the preferred alternative. Careful attention must also be paid to legal statutes concerning the consideration of alternatives (e.g., Section 106 and Section 4(f))

C7. At what level of detail should alignments be specified? If broad corridors are used, how does one tabulate and characterize impacts?

Answer: This depends on the decision being made and on the circumstances of each individual study. Some studies may require a higher degree of conceptual engineering simply to demonstrate that an alternative is feasible. One would not want to continue to consider an alternative if the alternative was not feasible from an engineering standpoint. In addition, some stakeholders may be unwilling to agree to an alternative unless the alignment was specified in considerable detail, because they fear a decision could be made later to choose an alignment that, in their view, had an unacceptable impact. Where an alternative is specified with possible multiple alignments to be examined later during project development, a problem can exist in knowing how to characterize and tabulate impacts. Approaches include showing a range of impacts (e.g., both the fewest and greatest likely displacements of any possible alignment within that alternative), a number that is typical of the several

possible alignments, or the maximum impact. Where acceptable to stakeholders, a qualitative evaluation can also be used.

C8. How are potential improvements handled that are beyond the planning horizon year?

Answer: Normally, a corridor study will not have a hard and fast financial constraint. However, costs need to be held within a reasonable range. It does not make sense to consider alternatives that have no prospect of implementation. Alternatives may be considered that go beyond the region's planning horizon year, and this will need to be dealt with when the study recommendations are considered in the update of the MTP. A corridor study could become a type of "vision plan" from which projects are drawn into the MTP when they become financially feasible and of high enough priority.

D. Public Involvement and Consensus Building

D1. What public involvement approaches work best under various sets of conditions?

Answer: Chapter 5 identifies techniques that may be appropriate for outreach to various types of participants in the study process (e.g., the public in general, resource agencies, the media, etc.). In addition, many references are available describing the various possible techniques in detail. Those performing corridor studies will need to weigh the strengths and weaknesses of the various techniques against the circumstances faced within the unique conditions of each study. The public involvement program needs to be flexible and adaptable so that the study can take advantage of techniques that seem to be working and discard those techniques that are not. The way in which study staff deal with people is often more important than the specific techniques that are applied.

D2. Which community involvement functions are best handled in-house versus using consultants?

Answer: Agency staff should be continually upgrading their community involvement skills. Even if consultants are used, agency staff may be called upon to speak to various groups, answer questions, make portions of presentations, and so forth. The more public involvement functions that can be handled by agency staff, the more fluid all the community involvement activity should become.

D3. What techniques are best in working with the media?

Answer: See section 5.5.

D4. What principles and approaches are useful for making technical data more understandable to the public?

Answer: Chapter 7 describes ways of displaying technical data that relate to the identified problems and that are understandable to the public and elected officials. Chapter 9 discusses principles for making presentations and preparing report material for public consumption. As a general rule, study staff need to keep the material as simple and straightforward as possible, while conveying information that contributes to making the decision. The study team should recognize that, not only the public and decision-makers need to understand it, but also those who review the study results and documentation at a later date.

D5. How does one deal with responses to public comments on corridor study results or draft documentation?

Answer: See section 9.2.3.

D6. For highly controversial issues, what types of strategies are helpful in working toward resolution?

Answer: See section 8.3.

E. Analysis Activities

- E1. How can one limit the level of detail in the environmental analysis, while still providing meaningful input for the decision?**

Answer: Section 7.4.4 briefly describes sources of information and a range of analysis activities for each major environmental area. It also describes sources of information that can be referenced for additional guidance. The level of analysis needs to be scaled to the issues at hand and based on the available budget. The proper level of detail is usually a matter of judgment of study staff, based on their experience and understanding of the circumstances. It also requires input from the full range of stakeholders, as described in section 4.2.

- E2. What are some options for incorporating land use into the evaluation process?**

Answer: See section 7.4.3.

- E3. How should secondary and cumulative impacts be treated?**

Answer: The interaction between transportation and land use is probably the most significant secondary and cumulative impact issue with regard to conducting corridor planning studies. Section 7.4.3 provides a considerable amount of material on that subject. FHWA has developed a sketch planning model that deals with induced travel, which can provide insights in some cases. However, secondary and cumulative effects go beyond travel inducement to include the effects of development on other environmental resources. CEQ has provided additional guidance on the analysis of cumulative effects in “Considering Cumulative Effects Under the National Environmental Policy Act,” January 1997. Quantifying these effects is quite difficult, and much of the treatment in a corridor planning study will need to be qualitative, except where it makes sense to analyze land use scenarios as suggested in section 7.4.3.

- E4. What is the role of sensitivity analysis? Risk analysis?**

Answer: Sensitivity analysis and risk analysis should be considered wherever uncertainties in assumptions or forecasts could influence the selection of alternatives. For example, if the impact of certain types of TDM strategies is unknown, a range of potential effectiveness may need to be evaluated to determine whether different effectiveness levels could make a difference in the decision. Risk analysis applies probabilities to different possible outcomes. It is particularly useful in the context of economic and financial analysis, to assess the range in rates of return that may be possible by various transportation investments. Chapter 7 addresses sensitivity analysis in several locations.

- E5. How should a corridor study deal with unresolved regional issues, such as system-level decisions on a rail system?**

Answer: Planning is a dynamic activity, with changes occurring in transportation strategies and projects from year to year. Where a strategy or project could potentially interact with the choice of alternatives in a corridor study, an assessment needs to be made of the extent to which the presence or absence of these other improvements could influence a potential benefit, cost, or impact of the alternatives being considered. Where the potential effect is significant, alternatives may need to be analyzed both with and without the other improvement. If this is unmanageable, possibly a sensitivity analysis of the other improvement could be undertaken to at least determine how different assumptions may change travel patterns within the corridor being studied. A judgment can then be made regarding how those changes in travel patterns could influence the relative effectiveness of the alternatives under consideration.

E6. How can a corridor study work around changing socioeconomic and transportation network assumptions?

Answer: Certainly, the latest sources of information always need to be used in the study. The answer is similar to the answer given in E5, in that the study staff need to make an assessment of whether and how any of these changing circumstances might influence the relative benefits, costs, and impacts of the various alternatives. For example, a sensitivity analysis may be necessary to test how different socioeconomic or land use assumptions could influence the outcome. Often, this does not require a great amount of effort, and it provides additional insurance that the decision ultimately made will be the right one. Where greater analysis effort is required, the study team will need to make a judgment regarding how important such an analysis may be to developing a decision that will endure the test of time.

E7. How can one include evaluation of non-traditional strategies, such as trip reduction measures and Intelligent Transportation Systems, which cannot be readily accommodated in the four-step modeling process?

Answer: Chapter 7 highlights a range of analysis approaches that can be used under various conditions. Some of these can address certain non-traditional strategies. One of the most important principles is that methodologies should be reviewed by appropriate stakeholder groups so that there can be a general buy-in to the procedures. The analysis needs to be conducted in an open environment. In some cases, these uncertainties can be addressed through sensitivity analysis, determining how a conservative or liberal assumption might influence the outcome.

E8. How should a corridor study deal with land use scenarios when the base data in the corridor used in the approved transportation plan are known to be or found to be flawed or unrealistic?

Answer: If necessary, this problem can be addressed by creating two base conditions, one with the officially recognized socioeconomic or land use assumptions and another with a set of assumptions that the stakeholders believe to be more realistic. Sets of land use or socioeconomic assumptions that are specific to each alternative may also need to be analyzed, as described in section 7.3. Presentations made to technical and policy committees should clearly indicate where the study team believes there are uncertainties, and how those uncertainties may need to be considered in their deliberations over the alternatives. Uncertainties are best brought out into the open. If they are not, but are discovered by stakeholders after decisions have been made, this may raise questions about those decisions.

F. Decision-Making in a Corridor Study

F1. How is input best obtained from resource agencies in a corridor study?

Answer: Studies that are conducted under the NEPA umbrella have built-in requirements for obtaining comments and providing responses to resource agencies. But even within NEPA, agencies still need to be proactive in providing information to and obtaining input from resource agencies as the decision-making process takes place. If the study is not conducted under the NEPA umbrella, resource agencies often have an even more difficult time determining whether and how they should provide their input. The study team needs to be proactive in obtaining this input for environmental areas that are critical to the decision. Often, this may mean phone calls or personal visits to the resource agencies involved. Because many resource agencies have limited staff time available, the mechanism for providing their input needs to be as simple as possible. Some states have more formal interagency coordination procedures and cooperative agreements that bring resource agencies to the table so that their input can be provided even on planning-level issues. Even where alternatives are being narrowed down within a pre-NEPA corridor study, it can still be important to have resource agency involvement, depending on the issue.

F2. How valid are commitments made in a corridor study by resource and permit agencies?

Answer: In general, only those commitments that are made in writing by authorized agency staff should be considered valid commitments. Study staff involved at the planning level need to understand the potential implications of not having such commitments before making a decision. Where critical decisions hinge on commitments by resource agencies, it is usually advisable to defer the decision until firm commitments are in place. Normally, these types of commitments will be made within the NEPA process or in response to state statutes. Planning staff need to carefully coordinate with project development staff to ensure that decisions are not made prematurely. This can raise expectations of the public and participating agencies and create confusion if decisions must be changed as a result of the input of a particular resource agency.

F3. How can a decision rendered in a corridor study be best protected and sustained?

Answer: Principles for making decisions that can stand the test of time are provided in section 2.5. The prospect of having a decision that endures is clearly increased by making a decision that is in the overall best interest of the community in the first place. At the same time, conditions and circumstances can change. If this means that a decision should be revised or modified, this should be done rather than staying with the previous decision simply for the sake of protecting that decision. Making a right decision is the priority, not protecting a decision already made.

F4. What decisions are appropriate for a technical committee versus a policy committee?

Answer: A technical committee is usually advisory to a policy committee. For key decisions or milestones, the technical committee will make a recommendation and the policy committee will make the decision. Key decisions might include selecting among preliminary alternatives or designating a preferred alternative or investment strategy. There are a variety of lesser decisions that may be appropriate for the technical committee to make. However, the policy committee should be informed of decisions made by the technical committee so that concerns can be raised before study resources are spent on subsequent efforts that are dependent on those decisions. Usually, the policy committee is content to let the technical committee deal with the details. The study team needs to be aware of those issues that are significant enough to be elevated to the policy committee directly.

F5. To what extent should commitments be made to mitigation in a planning study if that commitment is key to making a decision?

Answer: Mitigation strategies and decisions are usually reserved for the project development stage. However, in some cases, mitigation can be a serious consideration, even in the planning stage, when alternatives are being evaluated and compared. Stakeholders can, understandably, be concerned if a certain alternative is recommended that has serious impacts but where no commitment is indicated for how those effects will be mitigated. If this concern arises, then serious discussions should be undertaken regarding what mitigation may be appropriate. Mitigation should also be considered as an element of the alternative with which it is associated and the costs assessed accordingly.

F6. Under what conditions may alternatives examined in a corridor planning study need to be reopened in an EIS? How can the chances of this be minimized in the conduct of the corridor study?

Answer: The corridor study strategy should seek to avoid the potential to reopen alternatives that have previously been eliminated from consideration. Reopening alternatives usually only creates confusion in the mind of the public and among agencies. A good corridor study strategy will ensure that decisions are made at the appropriate times. Good decisions will help to avoid revisiting a decision. However, if agencies conclude that a decision should be

modified, based on new information or changes in circumstances, they should not be afraid to change the decision. A plausible explanation will need to be given to the public. Agencies may also find that it is premature to rule out certain alternatives in a corridor study. If so, the alternative selection process for those remaining alternatives should be deferred until such time as the NEPA process can be engaged. One of the major factors in determining whether NEPA should be engaged is how imminent the implementation of a potential project may be.

F7. Should a voting process be used for making decisions?

Answer: The mechanism for reaching decisions needs to be agreed to in advance by the participating agencies. The extent to which voting is appropriate will be determined by local practice. In general, however, voting is reserved for the key decisions, not for every detail in methodology. For the more complex, controversial studies, it is usually beneficial if a clear record is provided of the approval of study milestones. These could include such things as consensus decisions on problem identification, evaluation criteria, initial alternatives to be examined, selection of detailed alternatives, and selection of the preferred alternative or preferred investment strategy.

G. Documentation

G1. What is the “shelf-life” of a corridor study before it would need to be updated? How thorough does the update need to be?

Answer: If a study is conducted under the NEPA umbrella, there are specific timelines for when a supplemental environmental document or re-evaluation of an environmental document may be necessary. Generally, a maximum of three years can transpire between major actions in moving a project forward. There are no specific timelines for pre-NEPA corridor studies. Agencies must be aware that conducting corridor studies well in advance of possible implementation will increase the possibility of changed circumstances, which could influence work previously done or decisions previously made. This suggests that studies should not be conducted so far in advance that there is little likelihood of the original decisions being valid. If a substantial amount of time has transpired since a pre-NEPA corridor study was conducted, conclusions and recommendations that are carried forward into project development should explicitly be reconfirmed by the appropriate group of stakeholders as the project development stage is entered. Some agencies have suggested specific timelines for possible re-examination of the previous conclusions in a corridor study, but the key is recognizing when circumstances changed to a degree significant enough to warrant a re-examination or confirmation. Sometimes, this can occur within 1 year if there are dramatic developments that were unexpected.

G2. How much documentation is needed for alternatives eliminated from consideration?

Answer: Sufficient evidence needs to be presented as to why an alternative was eliminated. The rationale needs to be clearly explained in a way that is convincing even to those who had not been involved in the study. Where there are significant dissenting opinions, it is often useful to document these decisions so that a complete understanding of the range of considerations that went into the final decision can be provided. Good documentation is particularly critical to minimize the chance of having to re-analyze the alternatives eliminated during a subsequent NEPA study.

G3. Should a pre-NEPA corridor study report be organized in the same way as a NEPA document? When are variations from that structure advisable?

Answer: Section 9.2.3 discusses various approaches for organizing a corridor study report.

- G4. What should be considered in circulating the corridor study document? If the EIS will incorporate sections from the corridor study report on Purpose and Need, Alternatives, and so forth should the lead agency be concerned about conforming to similar notification and circulation requirements?**

Answer: Section 9.2.3 discusses report circulation, comments, and responses to comments. Where sections from the corridor study document are incorporated into a subsequent NEPA document, it is advisable that all the relevant stakeholders reconfirm the sections that are being incorporated either directly or by reference.

H. Corridor Study Approvals and Decisions

- H1. When a policy body approves a corridor study or decision, what is actually being approved?**

Answer: There are several possible dimensions to the answer. If the study is conducted under the NEPA umbrella, a ROD or a FONSI will be the official legal action concluding the process. For corridor studies not conducted under NEPA, several actions could occur. First, the policy body could approve the forwarding of the corridor study recommendation for consideration in the next update of the MTP. It could also approve the preferred alternative or investment strategy and authorize the implementing agencies to initiate subsequent steps that are outlined in an action plan. Finally, the policy body could simply acknowledge that the study was conducted according to acceptable procedures and methodologies without any specific disposition of the decision itself.

- H2. What if only part of the recommendations can be included in the financially constrained MTP?**

Answer: The entire recommendation will usually be forwarded for consideration in the next MTP update. It is then up to those decision makers involved in approving the MTP to determine which improvements should actually be included within the limits of the financial constraint. It is possible that the process of choosing improvements to include in the MTP would be assisted by prioritizing improvements in the corridor study action plan. This would be particularly appropriate in the case of a multi-corridor study with a number of possible projects being implemented as a result. The lead agency for the corridor study should be in communication with the individuals shaping the MTP to ensure that the highest priority items are included.

- H3. How does approval of a corridor study relate to other competing projects in other corridors or areas?**

Answer: This is where the prioritization and decision-making process within the development of the MTP happens. There is no guarantee that recommendations within a corridor study will automatically be included within the MTP, given that there are competing interests. The development of the transportation plan exists for the very purpose of weighing the benefits, costs, impacts, and tradeoffs among various projects in different areas and corridors.

I. Economic and Financial

- I1. Should a corridor planning study be financially constrained?**

Answer: Generally, there should be no arbitrary financial constraint placed on the improvements possible in a corridor, as improvements could extend beyond the horizon year of the MTP. In this sense, the corridor study will serve as a master plan or vision plan of what should ultimately occur in the corridor. However, the improvements need to be reasonable in cost, and the more reasonable they are, the more likely they are to be included and implemented within the MTP and the TIP. Thus, in effect, there should be a self-imposed restriction on reasonableness of the cost.

12. How detailed does the financial analysis need to be?

Answer: The importance of reasonably accurate planning-level cost estimates is often underestimated. Good costing is at the foundation of good transportation planning. The financial analysis should be detailed enough so that decision-makers understand the impact that the construction and operation of improvements would have on state, regional, and local financial capacity and cash flow. See Chapter 8 for additional information.

13. How firm do the funding sources need to be before a decision is made?

Answer: Part of this depends on how imminent the implementation of the recommended projects may be. If the preferred alternative or investment strategy is likely to be a near-term activity, it would be useful if the corridor study could identify funding sources in enough detail so that the project(s) could be specifically included in the next TIP cycle. Sometimes the ability to identify the funding sources is an activity that must be continued following the completion of the corridor study and cannot be specifically documented in the study itself. Thus, there may be a series of decisions, the first being the corridor study recommendation and the second being the inclusion of the fundable projects in the TIP when specific funding sources have been identified.

14. To what extent does economic development constitute a corridor need? How should economic development be evaluated in comparison to other criteria?

Answer: Economic development is clearly one of the reasons that many transportation projects, particularly new highway projects, are constructed. Economic development can be identified as a corridor need, but evidence should be presented that it is, in fact, a need. This need can be demonstrated through the identification of policy statements, goals, and objectives that are expressed at a state, regional, or local level and are pertinent to the corridor being studied. Specific citations that provide the background should be identified from local, state, and regional plans and policy statements. At the same time, a full evaluation must include any negative impacts associated with a transportation facility that could allow the desired development to occur or to be accelerated. The overall importance of economic development will need to be weighed in the consideration of all the study evaluation criteria, given the spectrum of community values among jurisdictions and stakeholder groups.

15. How should transit be evaluated in an economic sense, given that it may often increase trip time?

Answer: In the past, most economic B/C analyses have been conducted on highway projects. Values of time can also be associated with transit person trips, and travel time can be estimated. The corridor study needs to document the facts in a way that is consistent among all modes of travel. If transit does, in fact, produce an increase in PHT, this needs to be counter balanced with some of the recognized benefits of transit, such as potential productive uses of time while riding transit, and so forth. FTA has conducted studies on economic evaluation of transit that can be used in assessing economic benefits.

16. What other aspects of transit should be considered that a traditional economic analysis does not take into account?

Answer: See previous question.

17. How does one consider previously procured right-of-way in the analysis of costs of the alternatives?

Answer: In most cases, the procured right-of-way should be considered a cost offset for the alternatives that would not be using that right-of-way. In other words, it would be assumed that the right-of-way would be sold at market value. If it was expected that the right-of-way

would be used for another transportation purpose (e.g., use as a collector roadway), it may be best to assume that roadway as part of the alternative.



CHAPTER 11

ACTIONS AGENCIES CAN TAKE TO FACILITATE THE CONDUCT OF TRANSPORTATION CORRIDOR STUDIES



Chapter Topics in a Nutshell

- 11.1. Transportation Model Improvement
- 11.2. Staff Training
- 11.3. Geographic Information Systems
- 11.4. Local Cost Data
- 11.5. Programmatic Mitigation
- 11.6. Building Intra- and Interagency Communications
- 11.7. Ongoing Public Relations Activities



Principles and Lessons Learned

1. Corridor studies can be made easier if agencies set the stage through their regular, ongoing planning activities. The development of some of these capabilities takes time, and an agency cannot expect those capabilities to be available unless it plans ahead and invests over the long term.
2. Travel demand models are one of the key analytical tools for corridor studies and need to undergo upgrades periodically to better support studies of land use and transportation.
3. Agency staff can provide considerable support to corridor studies in the areas of travel demand modeling, public and agency involvement, GIS, and selected environmental areas. Additional training for staff in these areas is often useful.
4. Providing GIS coverages of environmental features at a regional level not only helps to make corridor studies more efficient, but also allows for environmental impacts to be taken into account in regional planning. Such coverages can be a worthwhile investment, but need to be maintained to be useful on a continuing basis.
5. Programmatic mitigation at a regional scale can help to simplify dealing with environmental issues on a corridor-by-corridor basis and needs to be a part of an ongoing process.
6. Intra- and interagency communication linkages need to be built to support constructive analysis and decision-making in corridors. Effective communication between planning and project development staff is paramount and should be an ongoing effort, not just a sporadic effort within each study. Coordination meetings with staff of the resource agencies can help build bridges of understanding and expectations that will pay dividends when individual corridor studies are conducted.
7. Ongoing work building relationships with the public will also pay dividends when individual corridor studies are required. A reputation of trust and reliability may not make tough corridor decisions easy, but should make the process easier than if the agency were viewed as an adversary from the beginning.

Corridor studies can be made easier if agencies set the stage through their regular, ongoing planning activities. The development of some of these capabilities takes time, and an agency cannot expect those capabilities to be available unless it plans ahead and invests over the long term. Most of these activities are useful for other transportation planning and project development functions as well, but because they are so relevant to corridor planning and environmental studies, Chapter 11 is devoted to the development of these capabilities. Some of these issues have been alluded to earlier.

11.1. Transportation Model Improvement

The required level of transportation modeling sophistication depends on the types of issues faced by a particular metropolitan area. One of the most important of these is the region's air quality attainment status. The EPA has expectations in terms of modeling capabilities for non-attainment areas. These expectations are also consistent with desirable features for the assessment of transportation impacts. Exhibit 11-1 identifies features that are desirable for modeling for corridor studies in most areas and virtually mandatory in others: The FHWA/FTA TMIP should be consulted for ongoing model improvement information (access web site at www.bts.gov/tmip/).

11.2. Staff Training

There are several areas where state DOTs, MPOs, and transit agencies should concentrate their efforts in terms of developing in-house capabilities for corridor planning studies. In some agencies it may be possible for agency staff (from either a single agency or a combination of agencies) to conduct corridor studies entirely on their own. In other agencies, additional core competencies would be needed. Each agency needs to make an assessment of its strategy to provide all the skills in-house, a portion of the skills in-house, or primarily rely on consultant assistance. Much of this determination depends on the consistency of the study workload. In general, however, the development of skills in the following areas can be particularly productive.

- **Travel demand modeling.** Staff qualified in travel demand modeling should be able to provide most if not all the necessary services for a corridor planning study. This is easiest to achieve for highway alternatives. For transit alternatives and other specialty areas, such as TDM, additional training and emphasis may be required.
- **Public involvement and consensus building.** Agency staff should hone their skills in working with people. This is becoming more important in engineering and planning fields in general, and is particularly important in corridor planning and environmental studies. All the staff who may have occasion to speak to the public or to the media or to assist in building consensus among multiple agencies and stakeholders, should become skilled in public involvement and public speaking. This will provide greater flexibility for agencies in the way they choose to handle each corridor study. Agencies may find that they can increasingly take on greater responsibility in public involvement and consensus building. Agencies should not simply designate one or two individuals with non-technical backgrounds to conduct all the public involvement. Individuals who can serve technical roles and deal with public and consensus building issues will often allow for greater responsiveness to the public and decision-makers. In addition, it is economical to use one person where two might be required otherwise.
- **Training in selected topics that can be used to support corridor studies.** Examples include economic analysis, financial analysis, and funding. Although public involvement seminars can be helpful, actual experience and critiques of that experience are usually the most powerful teacher. Senior agency staff should be prepared to offer constructive reviews and debriefings for other staff. In addition, consultants who are hired to work on one project may be able to use that project to help train agency staff for public involvement activities. In the Ohio River MIS, agency staff were used to assist the consultant in leading the public involvement effort. This provided an easy way for other staff to gain experience in handling

public involvement situations so that they could be more prepared to handle those situations in subsequent studies.

11.3. Geographic Information Systems

Many states and MPOs are developing and maintaining a GIS system for a variety of statewide and regional planning activities. The availability of GIS and the various coverages on demographic, environmental, transportation network, and other regional characteristics can play a vital role in corridor planning studies. SCAG has made an effort to map several environmental resources at a regional level, increasing the ability to catch environmentally problematic alignments and alternatives earlier in the process, even prior to initiating a corridor study. This capability is being developed to accelerate the process of screening corridor alternatives. For example, the habitat and endangered species coverages were developed by funding a U.S. Fish and Wildlife Service employee to work along with SCAG staff to convert the paper inventory into an electronic GIS inventory. Exhibit 11-2 is an example environmental coverage from the GIS system. Such inventories will usually need to be spot checked at the time the study is initiated, and regular updates of certain resources will be needed to maintain the usefulness of the data set. One of the benefits of creating GIS coverages of environmental features is that they can be layered and displayed on road networks and land use maps, making it easier to understand the location of resources.

The U.S. DOT Bureau of Transportation Statistics has been conducting reviews of GIS systems at state DOTs. The web site at www.bts.gov/cgi-bin/gis/ provides information on the GIS systems of several state DOTs. The North Carolina DOT has an active GIS program that has included not only coverage of the state roadway system, but environmental mapping as well. For example, their Strategic Wetlands Analysis and Mitigation Program (SWAMP) was initiated to estimate the number of wetland acres affected by proposed highway and bridge construction projects for years 1996 to 2004 in order to forecast wetland mitigation needs. North Carolina DOT's TIP projects were overlaid on spatial data layers showing the National Wetlands Inventory (NWI). Using GIS and database query and selection tools, the affected acreage was computed and summarized by location, wetland type, and project timing. These forecasts help identify where and when additional wetland mitigation acreage will be needed.

11.4. Local Cost Data

Unit cost data appropriate for local use can accelerate development of cost estimates as well as improve them. In the coordinated corridor studies conducted in 1996-97 in the Denver region, the unit cost data were developed collectively by the agency and consultant teams so that there could be consistency from study to study. This could also be done on a regional basis and updated regularly to provide cost information to support a variety of uses, not just corridor studies. The biggest caution is that agencies must carefully examine the possible variation from those unit costs based on the unique characteristics of each study. A problem that has plagued many statewide and regional transportation plans is inaccurate cost estimates, particularly overly optimistic cost estimates.

11.5. Programmatic Mitigation

Programmatically mitigating the impact of major transportation improvements is a large field in and of itself. The concept has been most widely applied to the preservation of wetlands and habitats. One of the most proactive forms of programmatic mitigation is the concept of "banking," wherein mitigation is provided in advance of the actual need for replacement of wetlands or habitat. The specifics of the banking program and its relationship to possible transportation improvements would be specified in interagency agreements with participation of interested stakeholders. Programmatic

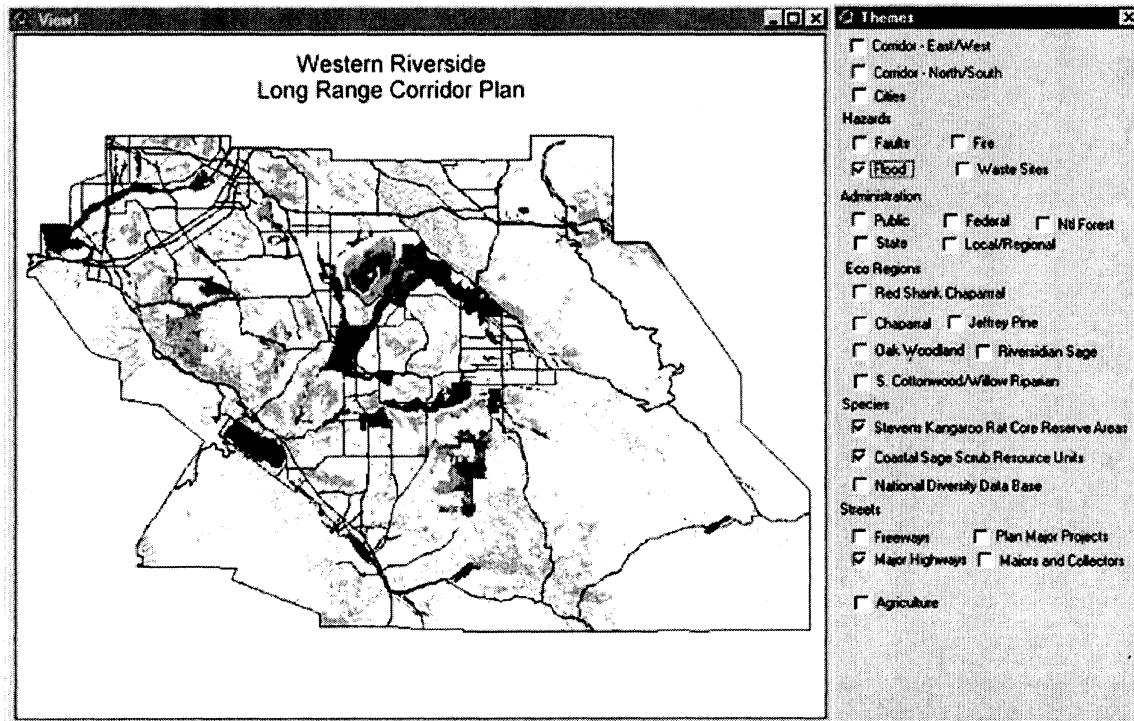
Exhibit 11-1.

**Desirable Model Components Used to Estimate Travel on Modes and Facilities
(Source: FHWA/FTA MIS Desk Reference)**

<p>Trip Generation</p>	<p>In larger urban areas, consideration should be given to including non-motorized trips in trip production and attraction models.</p> <p>Production models should be calibrated at a disaggregate level, using household size, auto ownership, and income as independent variables.</p> <p>In larger urban areas, consideration should be given to including sensitivity to accessibility measures.</p> <p>Trip attraction models are often aggregate because of data limitations—remove constants.</p> <p>Where trip distribution is stratified by socioeconomic variables, attractions must be stratified as well.</p>
<p>Trip Distribution</p>	<p>Differences in travel patterns among socioeconomic classes suggest stratification of distribution models by income or auto ownership.</p> <p>Where significant transit shares indicate transit's influence on travel patterns, a composite impedance measure should be used to include the influence of all modes.</p>
<p>Mode Choice</p>	<p>Related choices are often included in a nested model structure—recognizing choice of mode, auto occupancy, access to transit.</p> <p>Modes should be described in generic terms, except where calibration demonstrates that there are mode-specific effects ("biases") not explained by times and costs.</p> <p>Models should recognize constraints on choices—travelers face constraints if they live in 0-car households, are located beyond walking distance to transit, or have unusual or highly variable work hours.</p> <p>Efforts should be made to include sensitivities to TDM strategies.</p>
<p>Coding and Analysis of Highway Facilities</p>	<p>Procedures should be able to estimate both highway volumes and speeds correctly; more detail is needed on network capacity, particularly in the representation of delays at intersections.</p> <p>Development of methods should include calibration of speed/delay functions.</p> <p>Highway assignment procedures should recognize peak spreading.</p> <p>The approach should develop separate paths and impedances to represent separate options—SOV, HOV, toll roads—and then make simultaneous assignments of different trip types to the highway network.</p>
<p>Coding and Analysis of Transit Networks</p>	<p>Operating speeds for transit vehicles in mixed traffic should be consistent with highway travel speeds and congestion levels.</p> <p>Walk- and auto-access to transit service should be represented very carefully.</p> <p>The weights applied to path building to individual components of impedance should be consistent with the weights found in the mode choice model.</p> <p>The development of multiple transit path types should be considered as a way to represent the variety of choices available in the transit system.</p> <p>Transit assignment procedures should provide for equilibration of volumes, capacity, and loading standards.</p>
<p>Parking Costs, Times</p>	<p>Estimates should be derived from a calibrated analytical procedure.</p> <p>Employment density of the area (not just the individual zone) should be considered as the explanatory variable in this procedure.</p>

Exhibit 11-2.

Example Environmental Coverage from the SCAG GIS System



resolve if a negative impact in one area (e.g., taking a portion of a park) is balanced by a benefit in another (creation of an even better park facility). Properly applied, programmatic mitigation allows for greater flexibility and opportunity to resolve issues that may not be possible to resolve if the single corridor were being considered in isolation. For more information on programmatic mitigation, contact the FHWA Office of Environment and Planning or visit its web site at www.fhwa.dot.gov.

11.6. Building Intra- and Interagency Communications

Good communications among agencies and people within those agencies is crucial to good decision-making in both transportation planning and project development including

- **Building communications between planning and project development within agencies and among agencies.** The need for close communication between planning and project development is paramount. Corridor planning should be viewed as an integrated activity, not as isolated steps. Project development personnel need to be involved in designing the corridor planning approach, to assist in determining how critical certain environmental impacts may be and to define the decisions that need to be made. They can assist in determining how far the decision-making process should go before it enters the formal NEPA process. Joint meetings to share information on approaches and procedures will help build technical skills as well as build relationships.
- **Interagency coordination meetings.** The development of ongoing relationships with agencies that have significant input to the outcome of decisions can save considerable time and effort in the long run. If these relationships are built prior to the initiation of a transportation corridor study, there is less likelihood that surprises or misunderstandings will

develop. Conflicts over decisions may still occur, but the building of trust among agencies will at least reduce the element of suspicion that is unfortunately present with too great a frequency. Building relationships with resource agencies can be particularly important, but is sometimes difficult. However, there are some success stories. For example, PennDOT has had an ongoing process of monthly interagency coordination meetings for nearly 10 years. The PennDOT partners in the concurrence process include a number of Federal and state resource agencies. The agency coordination meetings are used to facilitate information sharing and obtain agency concurrence with various decisions within the NEPA process. However, coordination meetings may also be used to provide general information on the status of studies so that issues of concern can surface earlier, reducing or eliminating surprises. The agency coordination group is not a committee, but a mechanism for bringing the agency stakeholders together to focus on and resolve issues related to potential transportation projects. Appendix B describes the experience at PennDOT. Because resource agencies have a wide range of issues to deal with, establishing these meetings typically takes the initiative of the transportation agencies, who are usually the study sponsors. One of the benefits of the PennDOT approach is that it documents agency concurrence in writing.

11.7. Ongoing Public Relations Activities

Conducting a corridor study, particularly a controversial one, can create substantial tension among agencies and between agencies and the public. Just as in human relations in general, relationships between agencies and the public require continuing work to foster the type of constructive working atmosphere that can allow for consensus to occur. General lack of trust and an adversarial atmosphere significantly degrade the chance of corridor study success. In this respect, many of the principles of community involvement and consensus building in Chapter 5 also apply to ongoing relationship building. The additional effort working with communities in the “off season” will invariably pay off when specific studies need to be initiated. Several approaches include

- Speaking on a regular basis with community groups and business associations. Visibility in the community provides evidence that the agency is working for and listening to the taxpayers.
- Being proactive in solving little problems before they become big ones. When agencies cannot be responsive to requests, they at least need to be able to give a logical explanation as to why.
- Being responsive to routine public inquiries. A tracking system and specific responsibilities for returning phone calls and responding to letters.
- Holding special workshops, town hall meetings, and so forth to obtain feedback on a periodic basis.
- Taking care of routine agency business. It is easier to convince citizens that the agency cares, if potholes have been filled, snow has been plowed, grass has been trimmed, and so forth.
- A general attitude of customer service. This attitude becomes evident to the public and makes it easier to address the tough choices that are sometimes necessary in corridor studies.

APPENDIX A

SUMMARY OF OUTREACH RESULTS

This appendix provides a summary of some of the more pertinent findings derived from the outreach to practitioners. The information viewed to be most germane to the development of principles and procedures for corridor/subarea transportation planning is included.

Tabulation of MISs from Agency Questionnaires

This section provides a tabulation of selected information from agency listings of MISs in the NCHRP Project 8-34 questionnaire. The information is strictly a reflection of the MISs listed by the responding agencies and is not a statistically representative sample of MISs in the United States. There were 291 MISs listed, including those that are complete, planned, and underway. Some of the information, such as costs, was not always provided.

The following represents the distribution of MISs by metro area size:

- Large (more than 1.5 million population): 165 (58%)
- Medium (0.5 to 1.5 million population): 57 (20%)
- Small (less than 0.5 million population): 61 (22%)

Because the majority of the listed MISs were documented from questionnaires returned by state DOTs, the distribution by metro area size is likely to be reasonably representative of reality. The distribution indicates MIS activity across all metro area sizes.

The completion status indicates that many MISs have already been conducted, but a similar number are currently underway:

- Complete: 42%
- Underway: 41%
- Planned: 17%

Approximately two-thirds of these are Option 1 MISs:

- Includes EIS/EA (Option 2 MIS): 33%
- Does not include EIS/EA (Option 1 MIS): 67%

State DOTs have served as the lead agency in nearly two-thirds of the MISs. This likely stems from the considerably larger numbers of corridors that tend to be highway-oriented or have problems that are believed to have the greatest potential for highway solutions:

- State DOT: 65%
- MPO: 19%
- Transit agency: 14%
- City/county: 2%

In terms of the agencies that actually perform the technical elements of the MIS, approximately one-quarter are conducted completely in-house. The remainder are conducted completely or partially using consultant services:

- In-house: 24%
- Consultant: 45%
- Both: 31%

Exhibit A-1 indicates the approximate average costs for MISs, stratified by Option 1 and Option 2 MISs and by performing agency.

Those MISs conducted in-house have a considerably lower cost than those using consultant assistance. One of the major reasons for this is that the more complex MISs tend to be conducted using consultant assistance. In addition, the Option 2 MISs (with NEPA documentation) tend to be more costly than the Option 1 MISs, due to the additional level of detail. It should be noted that the costs for the Option 2 MISs were significantly influenced by a few very high cost studies.

Exhibit A-2 indicates average duration of MISs in months. The data on project duration indicate that the average MIS takes 20 months to complete. This is somewhat shorter for MISs performed in-house, again because of the lower level of complexity of most in-house MISs. Option 1 MISs have shorter durations, by 3 to 5 months, than Option 2 MISs.

The questionnaire also asked agencies to indicate whether they provided written guidance on MISs to their own staff or to other agencies. The following indicates the percentage that provide some form of written guidance:

- DOTs: 41%
- MPOs: 41%
- Transit Agencies: 11%

In many cases, the state DOT and MPO guidance is viewed to be joint guidance. Copies of most of the guidance documents were obtained from the agencies. In some cases, the guidance is very brief, basically summarizing the Federal regulations. In other cases, the guidance is extensive. Some of the state DOTs view their project development manuals to be guidance for conducting MISs as well.

Exhibit A-1. Average Costs of Major Investment Studies Listed in the Agency Questionnaires

Performing Agency	Without EIS/EA (Option 1)	With EIS/EA (Option 2)
In-house	\$106,000	\$104,000
Consultant	\$1.1 million	\$1.7 million
Both	\$1.2 million	\$2.0 million

**Exhibit A-2. Average Duration of Major Investment Studies Listed in the Agency
Questionnaires**

Performing Agency	Without EIS/EA (Option 1)	With EIS/EA (Option 2)
In-house	13.8 months	17.3 months
Consultant	19.7 months	22.4 months
Both	22.0 months	26.8 months



APPENDIX B

THE AGENCY COORDINATION PROCESS IN PENNSYLVANIA

(Based on a TransCore interview with Wayne Kober and Tom Kotay, PennDOT)

PennDOT has established a process of agency coordination meetings (ACMs) on a monthly basis as a mechanism for involving state and Federal resource agencies and obtaining concurrence at certain key decision points. The process was designed to address major projects that would require an EIS. However, it also typically includes potential major investments that are being considered in the planning stage as well. Corridor/subarea planning studies sponsored by other lead agencies may also utilize this for coordination with resource agencies, but may use their own process for decision-making. The PennDOT ACM process is given extensive treatment here because it was found to be one of the most thorough in the United States for organizing an approach to corridor decision-making that included resource agencies, even at the early stages of planning and project development. PennDOT also has an extensive set of procedures on public involvement. This does not imply that other states should necessarily adopt Pennsylvania's approach. However, there are elements of PennDOT's approach that may be pertinent in other states.

Overview of the Agency Coordination Meetings

PennDOT and the agencies that work with it established an agency coordination process in the early 1990s. The intent was to regularly assemble the resource agencies to work through issues on various transportation projects. The process uses monthly meetings as the focal point for decision-making. There are operating procedures for the agency coordination meetings. PennDOT has agreements with all the agencies to conduct the planning, programming, and project development process in a given way.

The agency coordination meeting process was set up for major projects that required an EIS. The EIS Handbook covers these procedures. It has a 10-step process for handling project development, as shown in Exhibit B-1. There are three main activities integrated into that 10-step process:

- Public involvement/agency coordination
- Engineering
- Environmental analysis

The agencies have also developed an interagency coordination document for Pennsylvania. That document is a 1-page Memorandum of Understanding with all the resource agencies committing to going through the 10-step process (Exhibit B-2). PennDOT also prepared the ACM Operating Procedures. That is the detailed description of how an agency places presentations on the meeting agenda, how the information is transmitted, concurrence forms to be signed at the meetings, and so forth.

There are five points of concurrence. Theoretically, as agencies move through the process, concurrence can be obtained at each step and agencies do not have to retrace steps. The operating procedures detail how to go through the process. There is an elevation process, whereby if agencies disagree at the staff level, the decision can be elevated to the supervisors and ultimately to the highest level in the agencies. It is somewhat like a 404 elevation.

PennDOT does not believe in the NEPA/404 process as a stand-alone process; PennDOT's process integrates all the environmental laws into one process. NEPA/404 includes just NEPA and wetlands. The PennDOT process factors in air quality, water, and many other laws.

PennDOT works toward consensus building in early stages. For example, if there is a project that may have some serious wetlands impacts, PennDOT may ask the agency to jointly sponsor the effort so that permitting issues can be dealt with very early in the process. It depends on the need, the project, and the relationship between the various agencies.

“The agency coordination meetings have been an excellent way to provide information and to avoid problems further down the road.”

PennDOT had a difficult time years ago selling this process to its partners, because they said that it would draw out the planning and project development process. However, PennDOT believes that it gets results that are far superior to what they have ever been. PennDOT has also become more multimodal and intermodal in its thinking. It

took some badgering from the resource agencies to get PennDOT where it is today. PennDOT was not as concerned in earlier years about coordinating with transit agencies or about dealing with air quality.

However, the sell was most difficult with those outside the agency. Pennsylvania has 14 MPOs and 7 local development districts (similar to MPOs in the rural parts of the state) doing long range planning. They also do programming for the STIP. All these partners were very skeptical about joining into this extended partnership with resource agencies.

PennDOT pays seven of the resource agencies to come to the meetings. This rose out of a need to have the agencies respond as quickly as possible. The resource agencies responded that if they were provided with the resources to come to these meetings or provided with additional staff just to deal with PennDOT projects, they would be willing to do so. The funds are 100% state dollars. Most of the \$600,000 annually committed to this activity is going to state resource agencies.

Without the assistance, the agencies simply did not have the resources to participate. For example, there are many historical bridges in Pennsylvania. PennDOT has provided funds for the Pennsylvania Historical and Museum Commission just to work on PennDOT bridges. It has significantly accelerated the process. PennDOT did need to deal with the perception early on that the agency was paying people off to get their way. But it became clear as the process went on that the people in these agencies were definitely trying to protect the resources for which they were responsible. As time went on, the perception of conflict went away when the public saw PennDOT and the agencies debating in public meetings and hearings. This convinced people that the agencies were not being bought off. It took 3 to 4 years to get beyond that point.

Sometimes there is a need for a special ACM, where 2 days are spent on a major project somewhere in the state. This has been extremely useful, allowing the U.S. Army Corps of Engineers, Fish and Game Commission, and so forth to get together in the field and look at improvements. It has been a way to help expedite project delivery.

PennDOT has now set up performance measures for all the resource agencies that are provided with funds. Their rating is based on a customer service survey. The 11 PennDOT districts, FHWA, and design people are surveyed on these performance measures.

The funded agencies include the Pennsylvania Historical Museum Commission, Pennsylvania Fish and Boat Commission, Pennsylvania Game Commission, Pennsylvania Department of Agriculture, U.S. Fish and Wildlife Service, EPA Region 3, and Pennsylvania Department of Environmental Protection (3 positions). All these are

full-time positions. The U.S. Army Corps of Engineers is not funded. The meetings are organized around the four Corp Districts in Pennsylvania.

People sometimes think this is a committee, but it is not. It is a way to have agency coordination with multiple agencies participating simultaneously. It is organized around concurrence and consensus. Votes are not really taken. It is a grouping of all the agencies in one place so that these agencies can efficiently deal with proposals and plans when they are presented.

Operating Procedures for Agency Coordination Meetings

The operating procedures for the ACMs say that presentation materials must be sent out 30 days before the meeting. Each project can have approximately 1 hour on the agenda, 15-20 min for presentation, followed by discussion. Several things can happen. Concurrence can be achieved on the same day that the information is presented.

The rule is that at the next meeting, if there is no reason for gathering more data, concurrence should occur by that meeting. This provides approximately a 60-day time period where agencies can be working to gain consensus for a certain step in the process. These do not need to be projects just where PennDOT is the lead agency. It could be a project with another agency as lead. All the relevant agency stakeholders are invited. PennDOT has interpretations from its legal counsel that these meetings can be held without making them public.

Decisions are not really made at these meetings. Concurrence means that agencies can keep moving through the process. The decision does not come until the ROD or FONSI. At the end of the preliminary alternatives analysis, where an MIS normally concludes, there are two options: if it is relatively simple, the agencies do not prepare a preliminary alternatives report, but just make presentations. If it is complex, a preliminary alternatives analysis/MIS report is prepared. The report is made available to the public for 30 days, their comments are obtained, and comments are responded to. With an MIS, often the MPO will have a public meeting. A newsletter may be used to publish the responses to comments.

Early Coordination

PennDOT is recently coordinated with an MPO concerning a planning study that may lead to an MIS. PennDOT wanted to do some preliminary work so that it understood all the ramifications. The corridor involves a four-lane roadway that is handling 170,000 vehicles per day. The region would like to widen the roadway to six or possibly eight lanes. The cost would be nearly 1 billion dollars. Improving that roadway could actually severely impact the economy in the valley during construction. All the industrial parks along this major corridor indicate that they want the road widened, but the capacity cannot be reduced at any given time to less than four lanes. At the same time, there are a series of bridges that are going to demand lanes be taken, at times, for construction. The interchanges are not at the right locations, and a point of access study is likely needed in several locations. It was suggested that, before an MIS is initiated, PennDOT carry out some overall system planning first, just to see if a major improvement is possible.

There is another project ongoing to look at light rail service in Harrisburg, with possible initiation of an MIS. This effort has been handled differently also. Each study comes with different problems and opportunities. Each one needs to be conducted differently. There is no one size fits all. In each of these cases there is a political and economic development constituency. Each study has to work within that context.

Problem Identification and Needs Studies

One of the activities PennDOT is proposing is using needs studies to define more clearly the scope of the intended improvements. PennDOT receives a quantity of planning funds each year. A portion of these funds is distributed to the MPOs. A small fund is kept for special studies, and each MPO can apply for additional money to conduct needs study work. A needs study could be regional or corridor in nature. A few years ago, PennDOT had some missing links in the Reading MPO study area. A needs study and overall highway assessment was conducted to take a look at how to bridge these gaps and the missing links in the system. This led to major project identification, resulting in projects for the TIP and for the long range plan. This was prior to ISTEA. These projects are now beginning to be implemented.

It is important to go beyond “drive-by scoping.” That is what most people are doing. Scoping is needed to set up the process and the schedule. All the stakeholders need to try to bring the public in so that they know what the process is and what the issues are and can have confidence that the procedures are going to work. Agencies must work with the public side-by-side. On occasion, PennDOT will take the resource agencies to public meetings or a CAC and have them on a panel to explain things such as the Clean Water Act requirements. These are the kinds of actions that make for good, collaborative decision-making.

Political consensus is also needed. If a study passes through many jurisdictions, the staff need to be involved and the elected officials need to be involved as well. When PennDOT conducts large projects, it sets up an executive committee. For instance, on a large transportation project in Pittsburgh, an executive committee was established consisting of elected officials, administrators with PennDOT, head of the SPRC, and so forth. The executive committee meets quarterly. That executive committee is the high-level coordinating body that ensures that cooperation and commitment are maintained through the whole process. Under the executive committee is the MIS/EIS management team, a multi-organizational group. It is made up of the MPOs, resource agencies, consultants, project sponsors, and so forth. This team is divided into subgroups. For example, there is a public involvement group, which makes sure that the public involvement is effective. It designs a program, and the consultant is paid to carry it out. There is an Air and Noise group that guides that part of the process. There are people who guide the cultural resource effort. There could be a financial planning group. Each of these groups works in strategic areas. The resource agencies are also together as a group.

The EIS Handbook and the Public Involvement Handbook document many of these principles and procedures. The Needs Study Handbook, along with some basic principles of collaborative decision-making, are geared toward clearly establishing the need with all of the stakeholders. Some professionals have the feeling that they should establish the need and no one else should be involved, because they do the traffic studies, they conduct the land use projections, and so forth. However, if all the stakeholders and the public are brought into this needs identification process, it is possible to explore alternatives with greater ease because people buy into the fact that an improvement is needed. Once they clearly understand the needs and problems, it is less likely that there will be alternatives that do not match the need.

It is important not only to look at the transportation need, but at other needs as well, such as air quality. The key to success is clearly establishing the purpose and need. If one can address all of the objectives for community livability, air quality, non-point-source runoff, storm water management, and so forth, this can start to make the project a positive force instead of just a threat.

In many cases, the MIS could be concluded at the needs stage. The transportation problem and need could be defined, conceptual solutions could be examined even without engineering, a financial plan could be developed, and the study could end there. This would significantly reduce the costs and time required to conduct these

studies. Performance measures could be established for evaluation, and the alternatives would not even need to be designed. Many alternatives should drop out because they do not meet the performance criteria and do not address the defined needs. There are no environmental factors involved in this scenario. For most alternatives, there is enough room to steer through an alignment.

Financial Considerations

The extent to which financial constraint is applied to a corridor study depends on the agencies involved, what they have planned and programmed, and whether they have line item reserves for their future projects. Many MPOs like the concept of not putting all their financial resources into their plans but retaining line item reserves that can be used accordingly when needs arise. When MISs are initiated and projects become more formalized, these dollars can be used for that purpose. Some MPOs like Philadelphia are trying to match resources, corridors, and corridor needs. That works in Philadelphia, because there are a number of radial routes into the city, both highway and transit that currently need action. In other areas where there is little growth and development, MPOs are comfortable using line item reserves and not conducting too much planning too soon. Some areas are stagnating and dying. Probably two-thirds of the MPOs in Pennsylvania are losing population. It is a tough situation in the steel belt communities. In many areas, certain aspects of long range planning are being downplayed to avoid prematurely defining what is needed.

In non-attainment areas, agencies have found ways within the existing budget, excluding the line item reserves, to achieve conformity with known planned and programmed projects. MPOs have been fortunate there. They are reserving up to 40 percent of their budgets in line item reserves. That 40 percent may be divided up into specific pots, for example, a certain percentage for bridges, another percentage for air quality-related projects, another percentage for peak period travel, enhancements, or highway grade crossings. The state is tending to downplay out-year planning.

Cumulative Impacts

One of the things Pennsylvania faces is how to deal with cumulative effects. Once a series of small actions is added up, there may actually be a serious impact on wetlands, for example. PennDOT believes it needs to do a better job at identifying these cumulative impacts and is doing more comprehensive analyses of this issue. PennDOT is working with its partner agencies next year to look at better ways of addressing this issue. Currently, mitigation is conducted only on a project-by-project basis.

Public involvement

PennDOT's public involvement activities vary widely. It is using approaches ranging from charettes and open houses to CACs, public meetings, and so forth. One of the approaches that is working very well is interactive television. Citizens may be sitting at home watching a presentation on TV, and they can call in and ask questions. The techniques are not inexpensive, but PennDOT is getting a larger cross-section of people involved. It is using the Internet as well, even though this only gets to a limited proportion of the population. PennDOT is using the Internet on an MIS in Lancaster County, with a web page set up with meeting schedules and status of work groups. PennDOT's approach is to try to be more creative, where appropriate, and use all the available opportunities.

PennDOT also recognizes that it has to answer peoples' questions. It has dedicated a person out of Lancaster County just to look at all the hits on the web site, allocate the questions to the appropriate people, and then respond to them. Agencies have to follow up, or they will be in deep trouble. It is better to have more people involved up front, even if they happen to be naysayers. Decision-makers are never going to satisfy everyone, but it is better to deal with someone along the way than wait until the ROD and then have a lawsuit.

Keys to Success in Sustaining Decisions

From PennDOT's point of view, the keys to success in sustaining decisions include public involvement early and often, full participation from all the resource agencies, and marrying planning, programming, and project development. All the agencies need to stay together throughout the process, from the first planning effort to the signing of the ROD. That is critical. There needs to be the perception or understanding that agencies are not hiding things from other agencies or the public. There needs to be an openness and honesty on the part of agencies. PennDOT believes its process has worked well, but also indicates that it took a number of years to get there. It does not guarantee that project development can be done quickly, but at least agencies can move forward together. Staff continuity is also important. PennDOT has been fortunate to have had continuity internally and with most of its partners.

PennDOT does not have an MIS Option 1 or 2. It has a preliminary alternatives analysis process, which is not a part of the EIS process. It has run 10 MISs through the ACM process. This includes those led by other agencies.

Planned Enhancements to the Process

PennDOT recently embarked on an effort to reduce the size of EISs. Its objective was to have an EIS no longer than 100 pages. A task force put together a set of principles on how to concisely document EISs. This has always been the intent of the CEQ regulations. Many of these same principles would apply to corridor/subarea planning studies as well. The first concise EIS was kept to 109 pages on a major project. This initiative was in reaction to the one-stop shopping, in which all the agencies wanted to add pages until it was out of control. In effect, the EIS is now a summary, and all the technical detail is in other places. PennDOT was able to obtain buy-in from EPA, the U.S. Army Corps of Engineers, and the other resource agencies. The first concise EIS was completed in summer 1997, and agencies have expressed a great deal of satisfaction with the process.

The next frontier, as expressed by PennDOT, is the "modular" EIS. The EIS Handbook identifies the 10 steps and five consensus points. The modular EIS involves changing the format of an EIS from the standard format to track along with the consensus-building process and the order in which the study was conducted. For example, the format would be Chapter 1, Scoping; Chapter 2, Needs; Chapter 3, Preliminary Alternatives Analysis, MIS; Chapter 4, Detailed Alternative Analysis, Draft EIS. In effect, the document is being built as you move through the consensus-building process. This would allow the document to be assembled efficiently and to fairly quickly move into the public hearing and the draft EIS circulation.

APPENDIX C

Summary of Environmental Legislation Affecting Transportation

(Adapted from material on environmental legislation
prepared by FHWA)



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General Environmental Statues

National Environmental Policy Act

Legislative Reference (1)	National Environmental Policy Act (NEPA): 42 U.S.C. 4321-4347; (P.L. 91-190) (P.L. 94-83).
Regulations Reference	23 CFR 770-772; 40 CFR 1500-1508 Executive Order 11514 as amended by Executive Order 11991 on NEPA responsibilities.
Purpose	Consider environmental factors through systemic interdisciplinary approach before committing to a course of action.
Applicability	All FHWA actions.
General Procedures	Procedures set forth in CEQ regulations and 23 CFR 771.
Agency for Coordination and Consultation	Appropriate Federal, State, and local agencies.

Section 4(f), DOT Act

Legislative Reference (2)	Section 4(f) of The Department of Transportation Act: 23 U.S.C. 138; 49 U.S.C. 303; (P.L. 100-17); (P.L. 97-449); (P.L. 86-670).
Regulations Reference	23 CFR 771.135.
Purpose	Preserve publicly owned public parklands, waterfowl and wildlife refuges, and significant historic sites.
Applicability	Significant publicly owned public parklands, recreation areas, wildlife and waterfowl refuges, and all significant historic sites "used" for a highway project.
General Procedures	Specific findings required: 1. Selected alternative should avoid protected areas, unless noted feasible or prudent; and 2. Includes all possible planning to minimize harm.
Agency for Coordination and Consultation	DOI, DOA, HUD, State, or local agencies having jurisdiction and State historic preservation officer (for historic sites).

Economic, Social, and Environmental Effects 23 USC109H

Legislative Reference (3)	Economic, social, and environmental effects: 23 U.S.C. 109(H); (P.L. 91-605); 23 U.S.C. 128.
Regulations Reference	23 CFR 771.
Purpose	To ensure that possible adverse, economic, social, and environmental effects of proposed highway projects and project locations are fully considered and that final decisions on highway projects are made in the best overall public interest.
Applicability	Applicable to the planning and development of proposed projects on any Federal-Aid system for which the FHWA approves the plans, specifications, and estimates or has the responsibility for approving a program.
General Procedures	Identification of economic, social, and environmental effects; consideration of alternative courses of action; involvement of other agencies and the public; systematic interdisciplinary approach. The report required by Section 128 on the consideration given to S.E.E. impacts, may be the NEPA compliance document.
Agency for	Appropriate Federal, State, and local agencies.

General Environmental Statues

Coordination and Consultation

Uniform Act (Acquisition and Relocation)

Legislative Reference (4)	Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (42 U.S.C. 4601 ET SEQ., P.L. 91-646) as amended by the Uniform Relocation Act Amendments of 1987 (P.L. 100-17).
Regulations Reference	49 CFR 24
Purpose	To implement the Uniform Act as amended in an efficient manner; to ensure property owners of real property acquired for and persons displaced by Federal-Aid projects are treated fairly, consistently, and equitably so they will not suffer disproportionate injuries.
Applicability	All projects involving Federal-Aid funds.
General Procedures	Procedures set forth in 49 CFR 24.
Agency for Coordination and Consultation	DOT/FHWA has lead responsibility. Appropriate Federal, State, and local agencies.

Title VI, Civil Rights

Legislative Reference (5)	Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000D ET SEQ) and related statutes.
Regulations Reference	49 CFR 21 and 23 CFR 200.
Purpose	To ensure that no person shall, on the grounds of race, color, national origin, age, sex, or disability is subjected to discrimination under any program or activity receiving federal financial assistance.
Applicability	All Federal programs and projects.
General Procedures	Procedures set forth in 49 CFR 21 and 23 CFR 200.
Agency for Coordination and Consultation	FHWA headquarters and field offices.

Executive Order—Environmental Justice

Legislative Reference (6)	Executive Order 12898: Environmental Justice
Regulations Reference	Federal Register Vol. 60 No. 125, pp. 33896-33903
Purpose	Avoid Federal actions, which cause disproportionately high and adverse impacts on minority and low-income populations with respect to human health and the environment.
Applicability	All Federal programs and projects.
General Procedures	Procedures set forth in DOT Final Environmental Justice Strategy and Proposed DOT order dated June 29, 1995.

General Environmental Statues

Agency for Coordination and Consultation	FHWA headquarters and field offices.
Public Hearings, 23 USC128	
Legislative Reference (7)	Public hearings: 23 U.S.C. 128
Regulations Reference	23 CFR 771.111
Purpose	To ensure adequate opportunity for public hearings on the effects of alternative project locations and major design features; as well as the consistency of the project with local planning goals and objectives.
Applicability	Public hearings or hearing opportunities are required for projects described in each State's FHWA-approved public involvement procedures.
General Procedures	Public hearings or opportunity for hearings during the consideration of highway locations and design proposals are conducted as described in the State's FHWA-approved public involvement procedures. States must certify to FHWA that such hearings or the opportunity for them have been held and must submit a hearing transcript to FHWA.
Agency for Coordination and Consultation	Appropriate Federal, State, and local agencies.

Historic Bridges

Legislative Reference (8)	Surface Transportation and Uniform Relocation Assistance Act of 1987: Section 123 (F) Historic Bridges 23 U.S.C. 144(O) (P.L. 100-17)
Regulations Reference	N/A
Purpose	Complete an inventory of on and off system bridges to determine their historic significance. Encourage the rehabilitation, reuse, and preservation of historic bridges.
Applicability	Any bridge that is listed on, or eligible for listing on, the National Register of Historic Places.
General Procedures	<ol style="list-style-type: none"> 1. Identify historic bridges on and off system. 2. Seek to preserve or reduce impact to historic bridges. 3. Seek a recipient prior to demolition.
Agency for Coordination and Consultation	State Historic Preservation Officer. Advisory Council on Historic Preservation.

Wildflowers

Legislative Reference (9)	Surface Transportation and Uniform Relocation Assistance Act of 1987: Section 130 Wildflowers 23 U.S.C. 319 (B) (P.L. 100-17)
Regulations Reference	23 CFR 752
Purpose	To encourage the use of native wildflowers in highway landscaping.
Applicability	Native wildflowers are to be planted on any landscaping project undertaken on the Federal-Aid highway system.
General Procedures	At least 1/4 of 1% of funds expended on a landscaping project must be used to plant native wildflowers on that project.

General Environmental Statues

Agency for Coordination and Consultation	FHWA State, Division, Regional contacts.
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Highway Beautification

Legislative Reference (10)	Highway Beautification Act of 1965 23 U.S.C. 131, 23 U.S.C. 136, 23 U.S.C. 319, (P.L. 89-285)
Regulations Reference	23 CFR 750, 23 CFR 751, 23 CFR 752
Purpose	To provide effective control of outdoor advertising and junkyards, to protect the public investment, to promote the safety and recreational value of public travel and preserve natural beauty, and to provide landscapes and roadside development reasonably necessary to accommodate the traveling public.
Applicability	Interstate and primary systems including toll sections thereof.
General Procedures	Procedures set forth in 23 CFR 750, 751, and 752.
Agency for Coordination and Consultation	DOT/FHWA, State, and local agencies.

Health

Safe Drinking Water Act

Legislative Reference (11)	Safe Drinking Water Act: 42 U.S.C. 300F-300J-6 (P.L. 93-523) (P.L. 99-339)
Regulations Reference	FAPG Subpart E
Purpose	Ensure public health and welfare through safe drinking water.
Applicability	<ol style="list-style-type: none"> 1. All public drinking water systems and reservoirs (including rest area facilities). 2. Actions which may have a significant impact on an aquifer or wellhead protection area which is the sole or principal drinking water.
General Procedures	<ol style="list-style-type: none"> 1. Compliance with national primary drinking water regulations. 2. Compliance with wellhead protection plans. 3. Compliance with MOAs between EPA and FHWA covering specific sole source aquifers.
Agency for Coordination and Consultation	EPA, Appropriate State agency.

Solid Waste Disposal Act

Legislative Reference (12)	Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976: 42 U.S.C. 6901, ET SEQ., especially 42 U.S.C. 6961-6964 (P.L. 89-272) (P.L. 91-512) (P.L. 94-580)
Regulations Reference	23 CFR 751 40 CFR 256-300
Purpose	Provide for the recovery, recycling, and environmentally safe disposal of solid wastes.
Applicability	All projects which involve the recycling or disposal of solid wastes.
General Procedures	Solid wastes will be disposed of according to the rules for specific waste involved.
Agency for Coordination and Consultation	EPA.

Federal Insecticide, Fungicide and Rodenticide Act

Legislative Reference (13)	Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): 7 U.S.C. 136-136Y (P.L. 92-516)
Regulations Reference	40 CFR 152-171
Purpose	Control the application of pesticides to provide greater protection to man and the environment.
Applicability	All activities which necessitate use of restricted pesticides.
General Procedures	Using or supervising "restricted use" pesticides will require certification.
Agency for Coordination and Consultation	EPA.

Historic and Archeological Preservation

Section 106, Historical Preservation Act

Legislative Reference (14)	Section 106 of the National Historic Preservation Act, as amended: (P.L. 89-665) (P.L. 91-243) (P.L. 93-54) (P.L. 94-422) (P.L. 94-458) (P.L. 96-199) (P.L. 96-244) (P.L. 96-515)
Regulations Reference	Executive Order 11593 23 CFR 771, 36 CFR 60, 36 CFR 63, 36 CFR 800
Purpose	Protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, archeology, and culture.
Applicability	All properties on or eligible for inclusion on the National Register of Historic Places.
General Procedures	<ol style="list-style-type: none"> 1. Identify and determine the effects of project on subject properties. 2. Afford Advisory Council an early opportunity to comment, in accordance with 36 CFR 800. 3. Avoid or mitigate damages to greatest extent possible.
Agency for Coordination and Consultation	State Historic Preservation Officer. Advisory Council on Historic Preservation. DOI (NPS).

Section 110, Historic Preservation Act

Legislative Reference (15)	Section 110 of the National Historic Preservation Act, as amended: 16 U.S.C. 470H-2 (P.L. 96-515)
Regulations Reference	36 CFR 65 36 CFR 78
Purpose	Protect National historic landmarks. Record historic properties prior to demolition.
Applicability	All properties designated as National historic landmarks. All properties on or eligible for inclusion on the National Register of Historic Places.
General Procedures	<ol style="list-style-type: none"> 1. Identify and determine the effects of project on subject properties. 2. Afford Advisory Council an early opportunity to comment, in accordance with 36 CFR 800.
Agency for Coordination and Consultation	State Historic Preservation Officer. Advisory Council on Historic Preservation. DOI (NPS).

Archeological and Historic Preservation Act (Moss-Bennett)

Legislative Reference (16)	Archeological and Historic Preservation Act: 16 U.S.C. 469-469C (P.L. 93-291) (Moss-Bennett Act)
Regulations Reference	36 CFR 66 (Draft)
Purpose	Preserving significant historical and archeological data from loss or destruction.
Applicability	Any unexpected archeological resources discovered as a result of a Federal construction project or Federally licensed activity or program.
General Procedures	<ol style="list-style-type: none"> 1. Notify DOI (NPS) when a Federal project may result in the loss or destruction of a historic or archeological property. 2. DOI and/or the Federal agency may undertake survey or data recovery.
Agency for Coordination and Consultation	DOI (NPS) Departmental consulting archeologist. State Historic Preservation Officer.

Historic and Archeological Preservation

Archeological Resources Preservation Act

Legislative Reference (17)	Archeological Resources Protection Act: 16 U.S.C. 470 AA-11 (P.L. 96-95)
Regulations Reference	18 CFR 1312, 32 CFR 229, 36 CFR 79, 36 CFR 296, 43 CFR 7
Purpose	Preserve and protect paleontological resources, historic monuments, memorials, and antiquities from loss or destruction.
Applicability	Archeological resources on Federally or Native American-owned property.
General Procedures	<ol style="list-style-type: none"> 1. Ensure contractor obtains permit and identifies and evaluates resource. 2. Mitigate or avoid resource in consultation with appropriate officials in the State. 3. If necessary, apply for permission to examine, remove, or excavate such objects.
Agency for Coordination and Consultation	Department or agency having jurisdiction over land on which resources may be situated (BIA, BLM, DOA, DOD, NPS, TVA, USFS, State Historic Preservation Officer, Recognized Indian Tribe, if appropriate).

Preservation of American Antiquities

Legislative Reference (18)	Act for the Preservation of American Antiquities 16 U.S.C. 431-433 (P.L. 59-209)
Regulations Reference	36 CFR 251.50-.64 43 CFR 3
General Procedures	<ol style="list-style-type: none"> 1. Notify DOI (NPS) when a Federal project may result in the loss or destruction of a historic or archeological property. 2. DOI and/or the Federal agency may undertake survey or data recovery.
Agency for Coordination and Consultation	DOI (NPS) Departmental consulting archeologist State Historic Preservation Officer

American Indian Religious Freedom Act

Legislative Reference (19)	American Indian Religious Freedom Act: 42 U.S.C. 1996 (P.L. 95-341)
Regulations Reference	N/A
Purpose	Protect places of religious importance to American Indians, Eskimos, and Native Hawaiians.
Applicability	All projects which affect places of religious importance to Native Americans.
General Procedures	Consult with knowledgeable sources to identify and determine any effects on places of religious importance. Comply with Section 106 procedures if the property is historic.
Agency for Coordination and Consultation	BIA State Historic Preservation Officer, State Indian Liaison Advisory Council on Historic Preservation if appropriate.

Native American Grave Protection and Repatriation Act

Legislative Reference (20)	Native American Grave Protection and Repatriation Act: (P.L. 101-601)
Regulations Reference	43 CFR 10

Historic and Archeological Preservation	
Purpose	Protect human remains and cultural material of Native American and Hawaiian groups.
Applicability	Federal lands and Tribal lands.
General Procedures	Consult with Native American group.
Agency for Coordination and Consultation	DOI (NPS), BIA, State Historic Preservation Officer.

Land Use and Water Usage

Wilderness Act

Legislative Reference (21)	Wilderness Act: 16 U.S.C. 1131-1136
Regulations Reference	36 CFR 251, 293 43 CFR 19, 8560 50 CFR 35
Purpose	Preserve and protect wilderness areas in their natural condition for use and enjoyment by present and future generations.
Applicability	All lands designated as part of the wilderness system by Congress.
General Procedures	Apply for modification or adjustment of wilderness boundary by either Secretary of the Interior or Agriculture, as appropriate.
Agency for Coordination and Consultation	AGRICULTURE (USFS), DOI (FWS, NPS, BLM), and State agencies.

Wild and Scenic Rivers

Legislative Reference (22)	Wild and Scenic Rivers Act: 16 U.S.C. 1271-1287
Regulations Reference	36 CFR 251, 297 43 CFR 8350
Purpose	Preserve and protect wild and scenic rivers and immediate environments for benefit of present and future generations.
Applicability	All projects which affect designated and potential wild, scenic, and recreational rivers, and/or immediate environments.
General Procedures	Coordinate project proposals and reports with appropriate Federal agency.
Agency for Coordination and Consultation	DOI (NPS) and/or AGRICULTURE (USFS) State agencies.

Land and Water Conservation Fund Act

Legislative Reference (23)	Land and Water Conservation Fund Act (Section 6F): 16 U.S.C. 460 -4 to -11 (P.L. 88-578)
Regulations Reference	N/A
Purpose	Preserve, develop, and ensure the quality and quantity of outdoor recreation resources for present and future generations.
Applicability	All projects which impact recreational lands purchased or improved with land and water conservation funds.
General Procedures	The Secretary of the Interior must approve any conversion of property acquired or developed with assistance under this act to other than public, outdoor recreation use.
Agency for Coordination and Consultation	DOI. State agencies.

Land Use and Water Usage

Executive Order 11990 Protection of Wetlands

Legislative Reference (24)	Executive Order 11990: Protection of Wetlands
Regulations Reference	DOT Order 5660.1A 23 CFR 777
Purpose	To avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.
Applicability	Federally undertaken, financed, or assisted construction, and improvements in or with significant impacts on wetlands.
General Procedures	Evaluate and mitigate impacts on wetlands. Specific finding required in final environmental document.
Agency for Coordination and Consultation	DOI (FWS), EPA, USCE, NMFS, NRCS State agencies.

Wetland Mitigation Banking (ISTEA)

Legislative Reference (25)	Intermodal Surface Transportation Efficiency Act of 1991. Wetlands Mitigation banks: Sec.1006-1007 (P.L. 102-240, 105 STAT 1914)
Regulations Reference	23 CFR 771
Purpose	To mitigate wetland impacts directly associated with projects funded through NHS and STP, by participating in wetland mitigation banks, restoration, enhancement and creation of wetlands authorized under the Water Resources Dev. Act and through contributions to statewide and regional efforts.
Applicability	Federally undertaken, financed, or assisted construction and improvements, or with impacts on wetlands.
General Procedures	Evaluate and mitigate impacts on wetlands. Specific finding required in final environmental document.
Agency for Coordination and Consultation	DOI (FWS), EPA, USCE, NMFS, NRCS State agencies.

Emergency Wetlands Resources Act of 1986

Legislative Reference (26)	Emergency Wetlands Resources Act of 1986: 16 U.S.C. {3901 note (P.L. 99-645)}
Regulations Reference	N/A
Purpose	To promote the conservation of wetlands in the United States in order to maintain the public benefits they provide.
Applicability	All projects which may impact wetlands.
General Procedures	1. Preparation of a national wetlands priority conservation plan which provides priority with respect to Federal and State acquisition. 2. Provide direction for the national wetland inventory.
Agency for Coordination and Consultation	FWS.

Land Use and Water Usage

National Trails Systems Act

Legislative Reference (27)	National Trails System Act: 16 U.S.C. 1241-1249
Regulations Reference	36 CFR 251 43 CFR 8350
Purpose	Provide for outdoor recreation needs and encourage outdoor recreation.
Applicability	Projects affecting national scenic or historic trails designated by Congress and lands through which such trails pass. National recreation trails and side and connecting trails are proposed by local sponsors and approved by DOI and DOA.
General Procedures	<ol style="list-style-type: none"> 1. Apply for right-of-way easement from the Secretary of Interior or Agriculture, as appropriate. 2. Ensure that potential trail properties are made available for use as recreational and scenic trails.
Agency for Coordination and Consultation	DOI (NPS), Agriculture (USFS), other Federal land management agencies may apply for designation.

National Recreation Trails (ISTEA)

Legislative Reference (28)	National Recreational Trails Fund Act of the Intermodal Surface Transportation Efficiency Act of 1991: 16 U.S.C. 1261 (P.L. 102-240)
Regulations Reference	N/A
Purpose	To establish a program to allocate funds to the States to provide and maintain recreational trail and trail-related projects.
Applicability	Trails and trail-related projects which are identified in or which further a specific goal of a trail plan included or referenced in a Statewide comprehensive outdoor recreation plan, as required by the Land and Water Conservation Fund Act.
General Procedures	Project-sponsor applies to the State, and FHWA approves spending for project. The State may be a project sponsor. Ensured access to funds is given for motorized, non-motorized, and discretionary recreation uses. States shall give preference to projects with diversified uses.
Agency for Coordination and Consultation	FHWA.

Rivers and Harbors Act

Legislative Reference (29)	Rivers and Harbors Act of 1899: 33 U.S.C. 401, ET SEQ., as amended and supplemented.
Regulations Reference	23 CFR 650, Subparts D & H, 33 CFR 114-115
Purpose	Protection of navigable waters in the United States.
Applicability	Any construction affecting navigable waters and any obstruction, excavation, or filling.
General Procedures	Must obtain approval of plans for construction, dumping, and dredging permits (Sec. 10) and bridge permits (Sec. 9).
Agency for Coordination and Consultation	USCE, USCG, EPA, State agencies.

Land Use and Water Usage

Federal Water Pollution Control Act

Legislative Reference (30)	Federal Water Pollution Control Act (1972), as amended by the Clean Water Act (1977 & 1987): 33 U.S.C. 1251 – 1376 (P.L. 92-500), (P.L. 95-217), (P.L. 100-4)
Regulations Reference	DOT Order 5660.1A, 23 CFR 650 Subpart B, 771, 33 CFR 209, 320-323, 325, 328, 329, 40 CFR 121-125, 129-131, 133, 135- 136, 230, 231
Purpose	Restore and maintain chemical, physical, and biological integrity of the nation’s waters through prevention, reduction, and elimination of pollution.
Applicability	Any discharge of a pollutant into waters of the United States.
General Procedures	<ol style="list-style-type: none"> 1. Obtain permit for dredge or fill material from USCE or State agency, as appropriate. (Section 404) 2. Permits for all other discharges are to be acquired from EPA or appropriate State agency (Section 402) Phase 1 – NPDES – Issued for municipal separate storm sewers serving large (over 250,000) populations or medium (over 100,000). Storm water discharges associated with industrial waste. Activities including construction sites > 5 acres. 3. Water quality certification is required from State Water Resource Agency. (Section 401) 4. All projects shall be consistent with the State Non-Point Source Pollution Management Program. (Section 319)
Agency for Coordination and Consultation	USCE, EPA, designated State Water Quality Control Agency, designated State Non-Point Source Pollution Agency.

Executive Order 11988—Floodplain Management

Legislative Reference (31)	Executive Order 11988., Floodplain Management, as amended by Executive Order 12148
Regulations Reference	DOT Order 5650.2 23 CFR 650, Subpart A, 23 CFR 771
Purpose	To avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to restore and preserve the natural and beneficial values served by floodplains.
Applicability	All construction of Federal or Federally-Aided buildings, structures, roads, or facilities which encroach upon or affect the base floodplain.
General Procedures	<ol style="list-style-type: none"> 1. Assessment of floodplain hazards. 2. Specific finding required in final environmental document for significant encroachments.
Agency for Coordination and Consultation	FEMA. State and local agencies.

National Flood Insurance

Legislative Reference (32)	National Flood Insurance Act: (P.L. 90-448) Flood Disaster Protection Act: (P.L. 93-234), 42 U.S.C. 4001-4128
Regulations Reference	DOT Order 5650.2, 23 CFR 650, Subpart A, 7 23 CFR 771, 44 CFR 59-62, 64-68, 70-71, 75-77
Purpose	<ol style="list-style-type: none"> A. Identify flood-prone areas and provide insurance. B. Requires purchase of insurance for buildings in special flood-hazard areas.

Land Use and Water Usage

Applicability	Any Federally assisted acquisition or construction project in an area identified as having special flood hazards.
General Procedures	Avoid construction in, or design to be consistent with, FEMA-identified flood-hazard areas.
Agency for Coordination and Consultation	FEMA, State and local agencies.

Marine Protection Research and Sanctuaries Act

Legislative Reference (33)	Marine Protection Research and Sanctuaries Act of 1972, as amended: 33 U.S.C. 1401-1445, (P.L. 92-532), (P.L. 93-254), (P.L. 96-572)
Regulations Reference	33 CFR 320, 330, 40 CFR 220-225, 227-228, 230-231
Purpose	Regulate dumping of material into U.S. ocean waters.
Applicability	Any transportation to and dumping into the open sea.
General Procedures	Apply for permit in accordance with procedures.
Agency for Coordination and Consultation	EPA, USCE, if dredge material.

Water Bank Act

Legislative Reference (34)	Water Bank Act: 16 U.S.C. 1301 – 1311, (P.L. 91-559), (P.L. 96-182)
Regulations Reference	7 CFR 752
Purpose	Preserve, restore, and improve wetlands of the nation.
Applicability	Any agreements with landowners and operators in important migratory waterfowl nesting and breeding areas.
General Procedures	Apply procedures established for implementing Executive Order 11990.
Agency for Coordination and Consultation	Secretary of Agriculture, Secretary of Interior.

Coastal Zone Management Act

Legislative Reference (35)	Coastal Zone Management Act of 1972: 16 U.S.C. 1451 – 1464, (P.L. 92-583), (P.L. 94-370), (P.L. 96-464)
Regulations Reference	15 CFR 923, 926, 930 23 CFR 771
Purpose	Preserve, protect, develop, and (where possible) restore and enhance resources of the coastal zone.
Applicability	All projects significantly affecting area under the control of the State Coastal Zone Management Agency for which a plan is approved by the Dept. of Commerce.

Land Use and Water Usage

General Procedures	Ensure that projects comply with Federal consistency regulations, management measures, and the appropriate approved State plan for Coastal Zone Management Programs.
Agency for Coordination and Consultation	State Coastal Zone Management Agency and the Dept. of Commerce (OCZM), NOAA, and EPA.

Coastal Zone Management

Legislative Reference (36)	Coastal Zone Management Act Reauthorization Amendments of 1990: 6217 (g)
Regulations Reference	N/A
Purpose	Manage non-point source pollution of activities located in coastal zones.
Applicability	All developmental activities located in coastal zone areas will be subject to non-point source control measures developed by the State Coastal Zone Agency.
General Procedures	Ensure projects comply with State CZM Plans for controlling non-point sources.
Agency for Coordination and Consultation	State CZM Agency, OCZM, NOAA, EPA

Coastal Barrier Resources Act

Legislative Reference (37)	Coastal Barrier Resources Act, as amended: 16 U.S.C. 3501-3510, 42 U.S.C. 4028, (P.L. 97-348) Great Lakes Coastal Barrier Act of 1988: (P.L. 100-707)
Regulations Reference	13 CFR 116, Subparts D,E, 44 CFR 71, 205, Subpart N
Purpose	Minimize the loss of human life, wasteful expenditures of Federal revenues, and damage to fish, wildlife, and other natural resources.
Applicability	Any project that may occur within the boundaries of a designated coastal barrier unit. Exemptions for certain actions are possible.
General Procedures	Coordinate early with the FWS regional director. Consult maps that depict the boundaries of each coastal barrier resources system unit.
Agency for Coordination and Consultation	FEMA, DOI (FWS).

Farmland Protection Policy Act

Legislative Reference (38)	Farmland Protection Policy Act of 1981: 7 U.S.C. 4201-4209, (P.L. 97-98), (P.L. 99-198)
Regulations Reference	7 CFR 658
Purpose	Minimize impacts on farmland and maximize compatibility with state and local farmland programs and policies.
Applicability	All projects that take right-of-way in farmland, as defined by the regulation.

Land Use and Water Usage

General Procedures	<ol style="list-style-type: none"> 1. Early coordination with the NRCS. 2. Land evaluation and site assessment. 3. Determination of whether or not to proceed with farmland conversions, based on severity of impacts and other environmental considerations.
Agency for Coordination and Consultation	NRCS.

Resource Conservation and Recovery Act

Legislative Reference (39)	Resource Conservation and Recovery Act of 1976 (RCRA), as amended: 42 U.S.C. 6901, ET SEQ. (P.L. 94-580) (P.L. 98-616)
Regulations Reference	40 CFR 260-271
Purpose	Protect human health and the environment. Prohibit open dumping. Manage solid wastes. Regulate treatment, storage, transportation, and disposal of hazardous waste.
Applicability	Any project that takes right-of-way containing a hazardous waste.
General Procedures	Coordinate with EPA or State agency on remedial action.
Agency for Coordination and Consultation	EPA or State agency approved by EPA, if any.

Superfund (CERCLA)

Legislative Reference (40)	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended: 42 U.S.C. 9601-9657, (P.L. 96-510) Superfund Amendments and Reauthorization Act of 1986: (SARA) (P.L. 99-499)
Regulations Reference	40 CFR 300 43 CFR 11
Purpose	Provide for liability, compensation, clean up, and emergency response for hazardous substances released into the environment and the clean up of inactive hazardous waste disposal sites.
Applicability	Any project that might take right-of-way containing a hazardous substance.
General Procedures	<ol style="list-style-type: none"> 1. Avoid hazardous waste sites, if possible. 2. Check EPA lists of hazardous waste sites. 3. Field surveys and reviews of past and present land use. 4. Contact appropriate officials if uncertainty exists. 5. If hazardous waste is present or suspected, coordinate with appropriate officials. 6. If hazardous waste is encountered during construction, stop project and develop remedial action.
Agency for Coordination and Consultation	EPA or State agency approved by EPA, if any.

Land Use and Water Usage

Endangered Species Act

Legislative Reference (41)	Endangered Species Act of 1973, as amended: 16 U.S.C. 1531-1543 (P.L. 93-205), (P.L. 94-359), (P.L. 95-632), (P.L. 96-159), (P.L. 97-304)
Regulations Reference	7 CFR 355 50 CFR 17, 23, 81, 222, 225-227, 402, 424, 450-453
Purpose	Conserve species of fish, wildlife and plants facing extinction.
Applicability	Any action that is likely to jeopardize continued existence of such endangered/threatened species or result in destruction or modification of critical habitat.
General Procedures	Consult with the Secretary of the Interior or Commerce, as appropriate.
Agency for Coordination and Consultation	DOI (FWS) Commerce (NMFS).

Fish and Wildlife Coordination Act

Legislative Reference (42)	Fish and Wildlife Coordination Act: 16 U.S.C. 661-666 (C) (P.L. 85-624), (P.L. 89-72), (P.L. 95-616)
Regulations Reference	N/A
Purpose	Conservation, maintenance, and management of wildlife resources.
Applicability	1. Any project which involves impoundment (surface area of 10 acres or more), diversion, channel deepening, or other modification of a stream or other body of water. 2. Transfer of property by Federal agencies to State agencies for wildlife conservation purposes.
General Procedures	Coordinate early in project development with FWS and State Fish and Wildlife Agency.
Agency for Coordination and Consultation	DOI (FWS), State Fish and Wildlife agencies.

Transportation Enhancements Activities (ISTEA)

Legislative Reference (43)	Intermodal Surface Transportation Efficiency Act of 1991. Transportation Enhancement Activities: Sec. 1007, (P.L. 102-240)
Regulations Reference	N/A
Purpose	To provide funds for Transportation Enhancement activities, such as landscaping and beautification, rehabilitation and operation of historic transportation facilities.
Applicability	Funds are to be used in all areas except roads classified as local or rural minor collectors, unless such roads are on a Federal-Aid highway system.
General Procedures	10% of STP funds annually apportioned to each State are for Transportation Enhancement activities.
Agency for Coordination and Consultation	FHWA.

Land Use and Water Usage

Recycled Paving Material (ISTEA)

Legislative Reference (44)	Intermodal Surface Transportation Efficiency Act of 1991, Sec. 1038 Recycled Paving Material: (P.L. 102-240)
Regulations Reference	N/A
Purpose	To reduce the use of virgin materials used for paving our nation's highways.
Applicability	Each State shall certify that it has satisfied the minimum utilization requirement for asphalt pavement containing recycled rubber.
General Procedures	20% of asphalt funded with Federal-Aid in each State is required to include recycled rubber by 1997.
Agency for Coordination and Consultation	FHWA.

Scenic Byways Program (ISTEA)

Legislative Reference (45)	Intermodal Surface Transportation Efficiency Act of 1991. Sec 1047. Scenic Byways Program: (P.L. 102-240)
Regulations Reference	N/A
Purpose	To identify and develop those special scenic byways that offer outstanding scenic, historic, natural, cultural, recreational, or archeological values.
Applicability	Any public road or highway which meets the criteria for inclusion as a Scenic Byway or All-American Road.
General Procedures	Nominations may originate from any local government, private group, or individual, but must come through the States. Final designations will be made by the Secretary of Transportation.
Agency for Coordination and Consultation	FHWA.

Noise

Standards 23 USC109

Legislative Reference (46)	Standards: 23 U.S.C. 109 (I) (P.L. 91-605), (P.L. 93-87)
Regulations Reference	23 CFR 772
Purpose	Promulgate noise standards for highway traffic.
Applicability	All Federally funded projects for the construction of a highway on new location or the physical alteration of an existing highway that significantly changes either the vertical or horizontal alignment or increases the number of through-traffic lanes.
General Procedures	<ol style="list-style-type: none"> 1. Noise impact analysis. 2. Analysis of mitigation measures. 3. Incorporate reasonable and feasible noise abatement measures to reduce or eliminate noise impact.
Agency for Coordination and Consultation	FHWA.

Air Quality

Clean Air Act (Conformity)

Legislative Reference (47)	Clean Air Act (as amended), Transportation Conformity Rule: 23 U.S.C. 109 (J) 42 U.S.C. 7521(a) (P.L. 101-549)
Regulations Reference	23 CFR 771 40 CFR 51 and 93
Purpose	To insure that transportation plans, programs, and projects conform to the State's air quality implementation plans.
Applicability	Non-attainment and maintenance areas.
General Procedures	1. Transportation plans, programs, and projects must conform to State Implementation Plan (SIPs) that provide for attainment of the national ambient air quality standards.
Agency for Coordination and Consultation	FTA, EPA, MPOs, State DOTs and State and local Air Quality Control agencies.

Clean Air Act (Sanctions)

Legislative Reference (48)	Clean Air Act (as amended), Sanctions: 42 U.S.C. 7509, sec. 179 (b), sec. 110 (m) (P.L. 101-549)
Regulations Reference	40 CFR 52
Purpose	To restrict federal funding and approvals for highway projects in States that fail to submit or implement an adequate State Implementation Plan (SIP).
Applicability	In non-attainment area, 24 months after EPA has identified a SIP deficiency. May be applied Statewide under separate rulemaking.
General Procedures	1. After EPA finds that a State failed to submit or implement a SIP, that the SIP is incomplete, or disapproves a SIP, an 18-month time clock begins. 2. Unless deficiencies are corrected within 18 months, 2:1 offset sanctions are applied. Six months later, highway sanctions are applied.
Agency for Coordination and Consultation	EPA.

Congestion Mitigation and Air Quality Improvement (CMAQ)

Legislative Reference (49)	Intermodal Surface Transportation Efficiency Act of 1991. Congestion Mitigation and Air Quality Improvement Program (CMAQ): Sec 1008, 23 U.S.C. 149
Regulations Reference	N/A
Purpose	To assist non-attainment and maintenance areas reduce transportation-related emissions.
Applicability	Transportation programs or projects in non-attainment areas and areas redesignated to maintenance that are likely to contribute to the attainment or maintenance of the NAAQS.
General Procedures	1. Project sponsor (transit operator, municipal office, etc.) develops formal proposal to improve air quality. 2. Submit to the MPO and State for evaluation and approval. 3. Included in the TIP and approved as eligible by FTA and FHWA in consultation with EPA.
Agency for Coordination and Consultation	FTA, EPA, MPOs, State DOTs, and State and local Air Quality Control agencies.

Acronyms

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
DOA	U.S. Department of Agriculture
DOD	U.S. Department of Defense
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FTA	Federal Transit Administration
FWS	U.S. Fish and Wildlife Service
HUD	U.S. Department of Housing and Urban Development
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine and Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resource Conservation Service
OCZM	Office of Coastal Zone Management
SEE	Social and Environmental Effects
TVA	Tennessee Valley Authority
USCE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFS	U.S. Forest Service

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Abbreviations used without definitions in TRB publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation

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