

ISTEA Planners Workbook

Acknowledgments

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Notes from the Editor

The ISTEA Planner's Workbook is the result of many hours of hard work on the part of the exceptional authors who are contributing to these pages. Their years of experience in addressing issues of transportation planning and policy- in many different arenas and from many different perspectives - make this book an invaluable source for both transportation professionals and citizen activists alike. Each paper adds immeasurably to the knowledge base and advances transportation planning to a new level. The Surface Transportation Policy Project is proud to present their contributions in this paper series, as summarized below.

Kristina Younger of the Capital District Transportation Committee in Albany, New York, identifies in her paper on public involvement the key decision points in which the public must be involved in order to have a meaningful impact on program and plan outcomes. In addition, she offers and evaluates a wide range of techniques for providing public participation opportunities.

Phil Braum of Barton Aschman Associates, frames the consideration of the state and metropolitan planning factors under ISTEA within policy, technical, decisionmaking, and intergovernmental frameworks. The paper further provides potential considerations for addressing each factor in both the long range plan and the project selection process. Sample projects are intended to spark thinking about innovative solutions to address the planning factors.

In his paper on financial constraint, David Murray of the Metropolitan Transportation Commission in Oakland, California articulates the reasoning behind the financial constraint requirements. He also provides a discussion about technical projection methods that will be as useful to the local advocate who is trying to participate in the planning process as it will be for the transportation professional.

The conformity of transportation plans to air quality plans is elaborated by Sarah Siwek of Sarah J. Siwek & Associates, whose paper describes the intent of conformity, health impacts of air pollutants, and requirements and responsibilities under the federal regulations. This

paper thoughtfully and clearly informs the debate on this issue, which is under much discussion nationwide.

Julie Hoover of Parsons Brinckerhoff tackles the issue of Major Investment Studies, required in the metropolitan planning regulations. She delivers much needed answers to questions of responsibility, interagency cooperation and planning linkages, while recommending clear actions for state and local entities.

Robert Stanley of Cambridge Systematics, Inc. has developed a timely paper on Congestion Management Systems and, importantly, the notion of performance. He not only provides details on the purpose and development of management systems, but identifies the need to evaluate measures of system performance within the context of ISTEA's vision.

Finally, Hank Dittmar of STPP has contributed two insightful papers to this workbook. The first is an answer to the many requests STPP receives for a model Transportation Improvement Program (TIP). This paper provides a section-by-section discussion of how a TIP can be organized and presented in order to serve as a user-friendly tool for all interested participants in the planning process. The second paper calls attention to the notion of a Metropolitan Transportation System that is articulated in ISTEA. Two examples of regions that have developed an MTS are provided and the role of an MTS is explored within the context of political and planning processes.

The breadth of knowledge brought together in these papers promises to be an important resource for transportation professionals, decisionmakers and citizen advocates. Editing the Workbook has proved to be a fantastic opportunity to soak up innovative ideas about transportation planning, and it will doubtless provide insight and guidance to anyone involved with making the vision of ISTEA a reality.

Introduction

Those who plan and design the future of our cities, communities and regions, are entrusted with numerous social, environmental, and economic goals that ultimately shape the quality of life for millions of people. Citizens, often through advocacy and involvement in civic organizations, expect planning and design professionals to provide or preserve safe neighborhoods where people of all ages can safely walk, bike and play; green spaces and recreational opportunities; and meaningful, accessible jobs. These goals and expectations are at the heart of the Intermodal Transportation Efficiency Act of 1991 (ISTEA), which provides a planning framework for developing transportation systems that serve community livability.

In an effort to bring ISTEA to life, federal regulations governing statewide and metropolitan transportation planning, management systems and conformity were released in the fall of 1993. These regulations attempt to interpret and clarify the vision and requirements of ISTEA and the Clean Air Act Amendments of 1990 (CAAA) and to provide guidance on implementation to States and metropolitan regions.

Because ISTEA and the CAAA have fundamentally changed the way in which transportation plans and programs are developed -- strengthening the role of the public, conforming transportation plans with air quality plans, constraining the programming of projects to available funding, analyzing transportation alternatives within corridors slated for major investment -- the regulations are crucial guides to state and local transportation planning. However, in many instances, the issues are so complex that they cry out for interpretation and guidance, for the benefit of all concerned, including elected officials, transportation and urban development professionals, and the law's new public partners.

The Planning Committee of the Surface Transportation Policy Project, of which we are the Chairs, has gathered together some of the most astute minds in the country who are currently working on these issues to cast additional light on the transportation planning process under ISTEA and the CAAA. The result is a compilation of papers that clarifies some of the most important, and sometimes controversial, issues that the legislation and subsequent regulations raise.

The emphasis on public involvement, planning considerations and financial constraint articulated by ISTEA signals some of the most sweeping changes in planning processes in recent memory. All interested individuals, including low-income and minority populations, are expected to be actively included in transportation decisionmaking. Social, economic and environmental factors are expected to be considered alongside more traditional concerns of mobility and capacity. Alternatives to the single occupancy vehicle are expected to be explored for major corridors. Transportation Improvement Programs are expected to accurately reflect fiscal realities. And land use patterns are expected to be closely examined.

At the same time, the Clean Air Act Amendments draw the processes of air quality and transportation planning more closely together than ever before, with conformity requirements placing greater responsibility for air quality on the transportation community. Additionally, management systems envisioned and required under ISTEA are intended to provide a mechanism to identify and address problems and opportunities in the transportation system.

The papers presented here provide -- in clear and user-friendly language -- the rationale behind many of the visions and requirements in ISTEA, the CAAA and the subsequent regulations. They also act as guidance on how to realize the promise these visions bring about. We are convinced that the direction in which ISTEA and the CAAA are taking us is one that will help all communities achieve the quality of life they seek. We are thrilled with the insight and information that the ISTEA Planner's Workbook delivers and hope that, as you read through its pages, you are inspired to realize the full potential of your own community.

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Public Involvement

by Kristina Younger

ISTEA Planners Workbook

Public Involvement Under ISTEA: under ISTEA, public involvement is:

- Proactive;
- Tailored to local needs and conditions;
- Ongoing;
- Inclusive;
- Frequent;
- Encouraged to be innovative and use a combination of techniques;
- Educational - both on issues and technical matters;
- Most effective when supported by strong leadership and institutional support; and
- Intended to impact the results of the planning process.

This is not public hearings to meet a requirement - the presentation of a fait accompli to either an empty room or an angry mob. This is public access to information BEFORE decisions are finalized, in a variety of ways, in such a manner as to allow for actual influence over the outcome of those decisions. It's the difference between public information, public participation, and public involvement.

Effective public involvement is no small task. It requires commitment from management and policy-makers, a significant postage and publication budget, and more time than you will initially budget (guaranteed). But the payoff is large. Plans don't sit on shelves -- they get implemented! Policy-makers don't rubber stamp -- they ask questions! And best of all, transportation plans and programs are more likely to reflect the needs and desires of the community at large.

Key Decision Points: the public needs to know, before decisions are made:

1) How the overall public participation process will be structured. Federal regulations (23 CFR Parts 450.212, and 450.315 (b)) require that every metropolitan planning organization and state publish an overall plan for public participation and review it periodically for effectiveness in "assuring that the process provides full and open access to all." This is one of the most important decision points because the overall atmosphere and structure of public involvement is established. The design of the overall public involvement program communicates how much public participation is valued and desired. The regulations also specifically require that "explicit consideration and response to public input received during the planning and program development phases" be demonstrated. Essentially, the participants must reach agreement on the process by which the discussions will be conducted before the substantive discussions can begin.

2) What the long range transportation plan is proposed to include. The long range plan at both the state and metropolitan levels is a 20-year "blueprint" that includes both long-range and short-range strategies and actions that should "lead to the development of an integrated intermodal transportation system that facilitates the efficient movement of people and goods." (23 CFR Parts 450.214 & 322) This is where the major alternatives facing the region or state are defined, those alternatives are analyzed, and priorities set. ANY subsequent capital projects funded through the Transportation Improvement Program (TIP) process MUST be consistent with the goals, policies, and priorities set in the long range plan. There is not one key point in long range plan development for public input --

there should be multiple points. These points must start with the initial proposal, process, and schedule for plan development. This initial proposal should identify key "milestones" in the process where input will specifically be solicited from a wide public, as well as mechanisms for ongoing input throughout the process from those with a high interest and/or stake in the process.

3) How that plan will be carried out in capital projects through the Transportation Improvement Program (TIP) and State Transportation Improvement Program (STIP). Public involvement in the development of the metropolitan TIP should start with: widespread notice of a) the start of the TIP process; b) how much money is available for new programming; c) project eligibility limitations; d) eligible project sponsors; e) the criteria by which the projects will be judged - or how those criteria will be determined; f) required materials needed to submit a project for consideration; and g) the schedule for TIP development, including any deadlines that will be adhered to. This would insure that a full universe of projects is considered. Note that the metropolitan planning organization (MPO) itself can (and has a responsibility to) put projects of regional significance on the table, particularly if they are necessary to implement the long range plan.

In TIP development, the second major point of public review is the results of the application of the evaluation criteria, usually accompanied by a preliminary recommended program of projects. This is generally when the formal "public review period" begins, and where, in areas of non-attainment of air quality standards, the required (23 CFR 450.324(c)) public meeting is held. Often, a summary document is used to disseminate the information widely, with the full document containing detailed project listings available upon request. A useful format for such a summary document is questions and answers, using pie charts to show overall program make-up and charts listing major projects to be undertaken.

Lastly, notice should be given that the final adopted program is available. The adopted TIP itself must be made readily available to interested parties.

STIPs consist of metropolitan TIPs plus additional projects not in metropolitan areas. The development of the non-metropolitan portion of the STIP should follow a process similar to TIP development, with modifications appropriate to the more rural nature of the geographic area covered and the generally smaller amounts of money available in these areas. The public involvement processes in metropolitan areas can be relied upon by states to insure adequate input on the metropolitan portions of the STIP, but the STIP should additionally contain statewide summary information. Summary materials should appropriately focus on the statewide policy implications of the STIP and its relationship to the long-range State Transportation Plan.

4) What technical studies of major metropolitan transportation investments are underway. While major metropolitan transportation investments are the subject of another paper in this series, they are a significant decision point in the process for public involvement. The regulations (23 CFR 450.318(b)) specify the need for a "scoping" meeting, but again input should be solicited at the initiation of the study, at the point where alternatives are defined, when technical information and the analysis of alternatives is available and preliminary recommendations are being formulated, and when final recommendations are available. In addition, there should be a mechanism for ongoing input from highly impacted agencies and communities in between these major study milestones.

Who is the Public? - The Identification of Stakeholders: ISTEA regulations do not define a minimum "public" that should be involved - this is left to local or state discretion to determine. Therefore, a process of identifying stakeholders - those affected or potentially affected - is a key step at the beginning of designing a public involvement program. There are three major approaches to identifying the "public" that will be affected by the

transportation planning process: self identification, staff identification, and third-party identification.

Self identification: Anyone that has attended a public meeting, written a comment letter, or phoned a hot line has expressed an interest. If this is a small number, news stories, brochures, and well-publicized public meetings generate more people identified by this method.

Staff identification: Agency personnel are a rich source of information on "key players." Mailing lists from organizations ranging from the Chamber of Commerce to environmental groups to trucking associations will often be shared if requested. Records of the users of a given service (like carpool matching or dial-a-ride service) or development permits issued in a given community are another possible source of potentially interested parties. Yellow page listings of taxi companies, freight forwarders, or warehouses are another place for staff to look for potential participants.

Third party identification: Ask people who they think should be involved! Start by consulting known "leaders", but don't stop there. It should be a standard agency line - "If you know of anyone else who should be involved, ..."

After the universe of participants has been identified it's time to determine how to involve these people. Understand that:

- Not everyone's stake is equal. Those with more to gain or lose will be more willing to put in more time over a longer period of time. The opinions of those with peripheral interests or limited time can be captured with one-shot techniques like public meetings, surveys, or displays in malls. Those with ongoing stakes need a more continuous method of involvement - advisory committees, task forces, or visioning.
- Some groups don't realize that they have any stake. Education is an integral part of the process. One-shot techniques should be combined with more ongoing methods. Use the media to generate interest.
- Different interests will be motivated to participate at different stages of the process. The "general" public needs information in "digestible" form, before decisions are made, but after alternative choices are articulated. Large stakeholders want to have a say in articulating what those choices are. A mechanism for each should be provided - and the fact that there is a choice over level of involvement should be widely publicized.
- Know your bottom line. Long range plans and TIPs are ultimately officially adopted by policy-makers - usually elected officials. Political acceptability is likely going to be a determining factor in the ultimate adoption of these documents. Belief that sufficient effort was put into involving and informing those most affected enhances political acceptability, but does not insure it. If policy makers or management has a set idea of what projects should go forward, public involvement may not change it. If this is the case, credibility will suffer. People who put a lot of time into a process developing a plan or program, only to see it go down in flames because of deal-making at the end will remember being burned the next time that they are asked to be involved. If there are limits to your flexibility - be they political, financial, or philosophical - it is better to be up front about them than to raise false expectations of promised change. Don't promise a "new vision" if you don't have a reasonable chance of delivering on it.

Techniques for Public Involvement: public involvement techniques should be selected on the basis of careful analysis of exactly what it is you wish to accomplish, with whom, when, and ONLY THEN how. Long term planning processes requires different approaches than short-

term project development. All processes face problems of maintaining interest and visibility throughout their duration. This is why, in general, a variety of techniques should be incorporated into all public involvement plans. No one method is sufficient to reach the right people, at the proper level of detail, at the right time.

Innovative Notification and Involvement Techniques: proactive public involvement requires creative thinking. It goes beyond the actual techniques used to direct the methods that let people know about the process and educate them about the issues. Here are some ideas for notification and innovative involvement that might help to get the creative juices flowing.

Notification:

- Try postcards or flyers instead of standard notices on letterhead. It may get more attention.
- Use a brochure instead of a report to communicate summary information. Preprinted brochure papers available through most office paper supply companies make basic word processing look like elaborate graphic designs. They are easily distributed, relatively inexpensive, can be designed as mailers, and are eye catching.
- Don't forget word of mouth. As any salesman can tell you, it's the most effective means of generating interest.
- Use other groups' newsletters to publicize your process. Well-written articles are often welcomed by harried staff or volunteers struggling to get out newsletters. The same article can often be modified as to length and style and used in a variety of formats.
- Youth Corps have contacts in the "traditionally underserved" community that provide an opportunity to reach low-income and minority populations. Many communities have job training programs or Youth Corps that often include community service components. There is an opportunity to form partnerships with these organizations to "spread the word" about the transportation planning process and what alternatives are being considered.
- Start your own newsletter. Particularly for a long-term process, this can provide a forum for regular progress reports that will maintain visibility.
- Newspaper inserts reach a lot of people. Big circulation. Relatively low price.

Innovative Involvement:

- Have a non-traditional conference. Conferences do not have to be structured as passive listening to keynote speakers and panel discussions, waiting for a chance to ask a question. The Capital District Transportation Commission is using conferences at key milestones in its long range planning process as a way to promote dialogue between people who would not normally talk to each other and to generate structured discussion about proposed alternatives.
- Consider cable TV options. The televised public meeting and other cable TV opportunities were used effectively by the Puget Sound Regional Council in their long-range planning process. It can generate interest and involvement that you might not otherwise get.
- Use focus groups as a tool to gauge public opinion. Focus groups are a long-standing marketing tool used to understand the reactions of customers, or potential customers, to different ideas. If used with other techniques, they can provide insight into what public reaction to a new direction in policy might be.

- Slide shows or videos provide a visual demonstration that can spark discussion. Not everyone can relate to written reports, charts and tables, or even maps. Sometimes just providing the information in another format can generate input that would not otherwise be received. Both the Metropolitan Transportation Commission in Oakland, California and the Southwest Pennsylvania Regional Planning Commission have used this technique effectively.
- Transportation Fairs or other special events provide major media opportunities. Media coverage generates involvement.
- Hot lines are useful for "hot" issues. Staffing the line with knowledgeable staff or volunteers is important for this to be effective.
- Visual preference surveys are a technique to test alternatives among "non-experts." Computer technology in this area is only getting better. It is becoming easier and easier to provide pictures that describe impacts better than words ever could.
- E-mail and electronic bulletin boards are becoming increasingly popular. If you have the staff to maintain it, this can be a way to generate input on specific proposals. Some places have community computer networks, which, due to their geographic focus, would be an ideal place to disseminate basic information about the process and to gather comments.
- Speakers Bureaus provide a visible face to the community. The Genessee Transportation Council in Rochester, New York circulates a list of topics on which their staff people are available to give luncheon speeches or other presentations to civic groups, professional organizations, neighborhood-based groups, and others. This greatly enhances their perceived accessibility to the public.

Other Processes to Strengthen ISTEA Public Involvement Provisions: there are three other pieces of major federal legislation that can be used to strengthen the public involvement provisions of ISTEA. Viewed as a package, ISTEA, the Clean Air Act, National Environmental Protection Act (NEPA), and the Americans with Disabilities Act, provide a strong set of policies to open up the transportation planning process.

Clean Air Act Amendments of 1990 (CAAA): ISTEA requires states and MPOs to coordinate the development of long range plans and TIPs with the development of plans for attainment of national air quality standards. It includes restrictions on state and local transportation planning and programming to insure that such efforts are consistent with the Clean Air Act as expressed in the State Implementation Plan (SIP). (Program for Community Problem Solving, 4/93, Collaborative Transportation Planning: Guidelines for Implementing ISTEA and the CAAA). Specific minimum requirements for public involvement under ISTEA (23 CFR 450.316(b)) which includes one annual public meeting in non-attainment areas, a 30-day review for the long range plan, the TIP and any major amendments to the plan or TIP apply to the determination of conformity with the Clean Air Act that is part of the plan in TIP adoption process. Because the technical procedures involved in air quality conformity (40 CFR part 51) involve the use of computer models to determine emissions of air pollutants, assumptions as to project scopes and schedules must be clearly stated. All technical documents related to air quality conformity determinations must be made available in a timely fashion to interested members of the public.

Essentially, the required integration of these two major pieces of national legislation is a tool that can be used to provide more complete information on overall program or plan impacts.

NEPA and State Environmental Processes: implementing the long range plan and the TIP happens on a project-by-project basis. Projects funded with federal-aid funds will be required to go through the environmental review process specified by the National Environmental Policy Act (NEPA). This process, which culminates in either a Record of Decision or a Finding of No Significant Impact by the FHWA and/or FTA, has its own set of

public participation requirements. In particular, draft environmental impact statements or environmental assessments have specified public review periods and notification of interested parties requirements. It is at this stage that alternatives must be clearly articulated. Many states have corresponding or additional state environmental laws that apply to project development, as well. This is another stage in the process where public input can impact project design, scope, and/or schedule. Mailing lists are specifically developed for each project. By contacting the sponsoring agency and expressing an interest in being informed of project development activities, getting added to these mailing lists should be easy.

Americans with Disabilities Act (ADA): as much as 14% of the U.S. population has hearing, vision, or mobility limitations. If you count temporary disabilities that impact part of many people's lives - age, infirmity, or injuries that require recuperation -- even greater numbers are involved. All events held for programs or projects funded with federal-aid and open to the general public must be made accessible to everyone, including the disability community. Special requirements, like sign language interpreters, or large print materials may also be required. Accessible facilities are always required. The requirements of ADA dovetail nicely with other public involvement procedures, and their incorporation into the overall public involvement program makes it easier for everyone to participate.

What is "Reasonable Access" to Technical Documents and Plans: reasonable access to technical documents and plans produced at major process milestones is:

- Mailing to a full list of known interested parties of the availability of the document and process/deadline for public comment;
- Press releases or public service announcements in the major media to the general public of the availability of the document;
- The deadline being far enough in the future (30 to 60 day minimum) to allow for enough time for thorough review;
- Placement of the document in public libraries in the affected geographic area at the very beginning of the review period;
- Designation of an informed and available staff person to answer basic inquiries;
- Availability of a summary document in accessible formats (free of charge) to anyone that requests it; and
- Provision of the full document (printing and/or postage charges may apply) to anyone that requests it.

Extended access includes free provision of the document (particularly if large), reasonable availability of staff to the public, including public informational meetings with visual displays, open houses, and an extensive media campaign that extends to more localized or specialized media.

Reasonable access to working papers and other interim documents is somewhat harder to define. Continuous 30-day periods for review would extend a planning process beyond a reasonable overall time period for completion. As a rule of thumb, working documents should be provided one week in advance of meetings where they are discussed and made available to those expressing a genuine interest on request.

Public Involvement at the State vs. Local Level -- Measures of Success: different participants in the transportation planning process are going to use different measures of success. Here are some sample questions that different players will ask themselves.

- Did we win?
- Was the process fair?
- Was I heard and respected?
- Will people participate the next time I ask them?
- Did it sell politically?
- Was consensus reached among the major stakeholders?
- Was the best technical solution chosen?
- Was the right decision made?
- Do we feel like celebrating?

The ISTEA regulations don't specify what constitutes success, but do require periodic evaluation of effectiveness of the methods used. Early on, it's important to figure out which of the measures of success YOU use to define effectiveness, and then to design a program (or insist on a program designed) to meet that goal.

Meaningful public involvement at the state level has some special considerations. The necessity of travel to attend meetings, difficulties of finding true representatives of statewide interests, and the need for strong interagency cooperation makes the application of certain techniques, such as Advisory Committees hard. The most successful approach is one that provides strong support, guidance, and partnership for MPO processes, supplemented by programs for non-metropolitan areas, and guided by explicit policies of statewide significance. It is appropriate for statewide processes to focus on policy matters that "fill the gaps" between metropolitan areas and provide "unifying themes" and guidance for the work of MPOs. Many of the techniques outlined above apply to state-level transportation planning processes, as do the "reasonable access to documents" provisions. ISTEA regulations (23 CFR 450.212) allow for public involvement activities carried out in metropolitan areas to satisfy state public involvement requirements in those areas (by mutual agreement). This only works if the state is providing consistent guidance, broad policy direction, and adequate support in an atmosphere of partnership.

Resources/Publications: there are a number of outstanding publications and resources available to help in both the design and execution of good public involvement programs in transportation planning. They include (but are by no means limited to):

Surface Transportation Policy Project (STPP) 1400 Sixteenth Street, NW, Suite 300, Washington, DC 20036. (202)-939-3470. An excellent source of information on the role of the public in implementing ISTEA, successful models of implementation, and much more.

The Network for Efficient, Safe and Sustainable Transportation (NESST), (202) 659-8475. Provides citizens and activists with useful information on effective participation in transportation planning.

National Association of Regional Councils (NARC). 1700 K Street, NW, Suite 1300, Washington, DC 20006, (202) 457-0710. NARC has developed regional workshops, materials, and demonstration projects to guide MPOs in the use of collaborative approaches for implementing ISTEA.

Program for Community Problem Solving, 915 15th Street, NW, Suite 600, Washington, DC 20005. 202-783-2961. This non-profit group has been working with NARC to develop various conference materials and publications, including Working Together: Collaborative

Approaches to Transportation Planning, and Collaborative Transportation Planning: Guidelines for Implementing ISTEA and the CAAA (4/93).

USDOT has published a variety of useful (and free!) publications that provide basic information about ISTEA, the Clean Air Act, public involvement, and other subjects. Contact your local FHWA Regional Office for a list of available publications. Noteworthy among these publications are:

Innovations in Public Involvement for Transportation Planning. January 1994.

Involving Citizens in Metropolitan Regional Transportation Planning. 1977 (FHWA/SES 77/11)

ISTEA: A Summary.

Air Quality Programs and Provisions of ISTEA: A Summary.

Transportation Programs and Provisions of the CAAA: A Summary.

Opportunities for Local Government under ISTEA.

Bicycle and Pedestrian Opportunities under ISTEA.

Transportation Research Board. Committee on Citizen Participation in Transportation. Contact: Florence Mills, Chairperson, FHWA Office of Environment and Planning (HEP-32), 400 7th Street, SW, Washington DC 20590, (202-366-2062). This committee sponsors research, conferences and workshops and collects "best case" examples of public participation under ISTEA.

James L. Creighton. The Public Involvement Manual. Abt Books, Cambridge, 1981. This textbook from the 1980s is now available through the American Planning Association's Planners Bookstore. It is an excellent "how to" manual.

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ISTEA Planning Factors in the Transportation Planning Process

by Phil Braum

Transportation shapes our communities and touches much of our lives. Because their effects are so pervasive, transportation systems should be designed and operated to produce benefits across the broadest set of societal values. That can only be achieved if planning for transportation improvements reflects those values and the relationships of transportation to other aspects of our society.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) responds to this need by establishing strengthened federal requirements for comprehensive transportation planning. ISTEA lists planning factors that must be a part of the transportation planning process conducted by metropolitan planning organizations (MPOs) and state departments of transportation (DOTs).

The planning factors address many of the ways that transportation relates to other values. The factors include consideration of the overall social, economic, energy, environmental, and land-use effects of transportation decisions. They include consideration of the six management systems--pavement, bridge, safety, congestion, public transportation, and intermodal transportation--that ISTEA also requires. Many of the factors concern issues that have not traditionally been addressed by transportation plans and programs. The chart that follows this discussion provides sample considerations to be addressed under the 15 factors that are required to be considered by MPOs and the 23 that are required for DOTs.

The planning factors are particularly significant for DOTs, as they have never before been subject to a federal mandate for transportation planning. Some DOTs have had planning processes in place to support their own objectives, but many others have relied upon narrow performance measures and political concerns to guide decisions. For MPOs, the factors are less novel; MPOs have established planning processes. But in some metropolitan areas, the MPO has not addressed the breadth of concerns that the factors include.

Adequate attention to the planning factors will require substantial changes in the way that planning is done in many metropolitan areas and states, including new procedures and greater effort. Assuring that planning processes respond to the factors requires attention to four aspects of the process. One is the policy framework that guides planning and decision-making. The second is the technical methods used to quantify and analyze planning issues. Third is the decision processes used to weigh the results of the analyses and to translate them into plans and programs. Finally, there are the intergovernmental relationships that should allow multiple agencies to cooperate on decisions that cut across functional responsibilities.

Policy Framework: applying the factors requires an explicit policy framework. To serve as decision criteria, policies must be formally stated in a form that can be publicly debated and that can help to guide choices.

ISTEA provides more flexibility in the way federal funds are used to allow a metropolitan area or state to pursue its own vision. Funds can be transferred between highways and transit programs, and can be used for transportation enhancements and other types of projects never before eligible for funds. Funding is less constrained by program categories and more responsive to the regional and state decision processes. This flexibility makes it especially important that the values that underlie decisions are clearly stated and understood. Different areas may have different views of the importance of such concerns as

air quality and sprawl. ISTEA gives each metropolitan area and state greater freedom to pursue its own vision, but that requires that the vision be made explicit.

Some transportation planning processes fall short of the needed policy considerations. Because they focus on projects to be built, the majority of the effort spent on plan preparation goes into project justification, not on the consideration of the larger concerns.

Many traditional regional transportation plans begin with a statement of policies. In some cases, those policies are too narrowly focused on transportation system performance such as acceptable travel times or levels of congestion on different types of roadways. The resulting plan may improve the transportation system at the expense of other values. More common is a set of policies that are generalizations; they make positive statements that are so vague that they have little effect upon decisions. The developers of these plans can claim that they have considered a broader set of concerns, but the results are the same as if the plan had no such policy pretense.

Several of the ISTEA planning factors are especially important for policy expression, as they represent the broadest societal concerns. The most sweeping of the factors is the requirement that planning consider the overall social, economic, energy, and environmental effects of transportation decisions, a factor that applies to both MPOs and DOTs. Taking this factor seriously can create a new focus for transportation planning in many places, as it includes concerns not often incorporated in the evaluation of transportation improvements.

Policies concerning land use are also vital, as transportation is an important determinant of development patterns. New and expanded transportation facilities can contribute to the continuing dispersion of development by increasing the accessibility of remote locations. This dispersion contributes to increasing travel demand that then requires additional expansion of the transportation system. Both MPOs and DOTs are required to consider the effects of transportation decisions on land use and development and the consistency of transportation plans and programs with all land-use plans. Many MPOs and virtually all DOTs have traditionally considered land use as a given to which transportation systems must respond, rather than recognized the interaction between accessibility and development. They argue that land-use decisions are controlled by local governments and market forces. This factor mandates that MPOs and DOTs recognize the development influence of their transportation decisions and include that consideration in their plans.

Development of policies to preserve existing facilities and to use them more efficiently to meet transportation needs will cause the explicit recognition of this concern. The better use of existing facilities is being forced in many areas because of fiscal, environmental, and community constraints on building new facilities. Yet the urge to build is strong, and many elected officials like the visibility to voters of new facilities. Establishing formal policies on this subject should prompt the kind of debate that will lead to more rational decisions.

Some of the factors create entirely new responsibilities. Many MPOs and DOTs have no policies on these subjects because they had ignored the subjects in the past. For example, DOTs are required to consider strategies for incorporating bicycle and pedestrian facilities into projects. Many DOTs had considered these subjects to be outside their areas of responsibility.

Formal policy statements on these and other factors provide the basis for public discussion of the values guiding transportation system development, and create the opportunity for a broader consensus.

Technical Methods: addressing the factors requires adequate means of analysis. Some of the factors are straightforward and require no special technical tools. For example,

consideration of the connectivity of roads within a metropolitan area to those outside it is raises no technical challenges. Other factors use technical methods that are already well established, such as the consideration of transportation system management actions by DOTs. But for a third group, the existing methods are insufficient. In some cases, this is because the factors require attention to concerns that MPOs and DOTs have not addressed in the past. Several of the factors require better methods because they call for consideration of complex relationships that are inherently difficult to analyze.

The complexity of environmental effects illustrates the need for better techniques in some areas. The air-quality consequences of transportation system changes are affected not only by changes in travel patterns but also by topography, weather patterns, and vehicle technologies. Air quality is a special concern for transportation plans not only because of the planning factors in ISTEA but also because of the requirements of the Clean Air Act Amendments of 1990 that transportation plans and programs conform with air-quality improvement plans in areas that do not attain air-quality standards. More sophisticated mathematical models that replicate air-quality conditions are being developed; they must be applied in areas where air quality is a problem.

The effects of transportation decisions upon land use is another complex consideration. Land use is influenced by many factors besides transportation, including geography, economic conditions, local zoning and subdivision controls, historic patterns, and community expectations. Determining the effects of transportation system changes on development patterns is difficult; projecting those effects years into the future as part of the development of the long-range transportation plan is even more so because of the variability caused by those other influences.

Mathematical models have been developed that attempt to reflect the forces that affect land use, but they require large amounts of data that is expensive to collect, and their results are not always valid. They have not been widely used in transportation planning. But the wider adoption of geographic information systems by state and local governments is making land-use data more readily available. The continuing expansion of the power of computers is increasing the ability of models to deal with complex problems. Renewed interest in land-use planning tools is leading to further efforts to improve their usefulness.

Freight is a new subject for many MPOs, so they have inadequate data about freight movement and little familiarity with the private businesses involved in freight movement. Traditional transportation plans assumed that a transportation system that served personal travel well would also serve freight. The designation of truck routes on highways was the extent of most freight planning. New attention to freight facilities and services will require better techniques for data collection and analysis.

New methods and techniques are being developed; MPOs and DOTs must devote adequate resources to the use of those technical methods in their planning processes.

Decision Processes: visionary policy statements and sophisticated technical methods mean little if the results are ignored in developing plans and programs. The decision process is the key aspect of shaping the transportation system.

Defining a decision process to reflect all of the factors is no easy task, and will have different results in different places. Because the factors address such a wide variety of concerns, there is no single measure that can be used to evaluate any given transportation improvement, no single score that can be used to rank projects. In any event, the planning process is a political process as well as a technical process. An overriding objective of planning should be to clarify public goals and provide the information needed to support the debate that is the basis of public decisions.

Decision processes have been complicated by the program flexibility that ISTEA created. Because there is greater ability to shift funds between program categories, projects competing for funding may have very different characteristics, and so be difficult to compare using strictly transportation-based measures. The comprehensive process required by the planning factors can help solve that problem. Projects must be evaluated for their contribution to the overall values of the metropolitan area or state, not solely against narrow transportation-system-performance measures. This allows more even-handed comparison of projects that involve different transportation technologies and modes.

The factors must inform transportation decisions at several levels in the planning process. They must guide the development of the long-range plan that defines the overall concept of the transportation network, and must also be used in decisions about the implementation of individual projects that will move toward that plan.

The long-range plan is important because it most directly expresses the metropolitan area's or state's vision. It is a reflection of how the metropolitan area or state views the importance of the factors and how the transportation system is to relate to them. The broadest of the factors, those relating to land use, environmental effects, and energy policies, are the most important at this level of planning, but all of the factors must be considered because the plan constrains the projects that will follow.

The translation of the plan into reality occurs through the definition of projects to achieve the plan, and their inclusion in the Transportation Improvement Program. The selection of projects to be included in the program is one of the key steps in transportation system development. The selection may be among projects that are necessary to accomplish the long-range plan or ones that are advanced for some other reason. In this step, the policy framework must provide the basis against which projects are judged, and the technical analysis must provide the necessary information to evaluate a project. The decision process must then be appropriately structured to allow the most beneficial projects to be chosen. The inter-relationships of the steps in this process are demonstrated in the following chart.

Intergovernmental Coordination: because the factors address a variety of concerns, some cut across the existing functional responsibilities of different agencies. Since real problems do not respect agency charters, solutions must transcend them as well. Developing improved transportation planning processes that allow for the participation of multiple agencies can be a challenge because different agencies may have different and even conflicting interests.

Some of the factors address concerns that are not in the purview of MPOs and DOTs. An agency may have ignored those concerns on the grounds that it cannot be responsible for decisions beyond its control. Transportation planners are understandably reluctant to tie their plans to the actions of other agencies that may have no interest in the transportation system or that may be pursuing other objectives in opposition to the planners' interests.

In some areas, responsibility for specific transportation functions are assigned to agencies that are independent of the MPO and DOT. For example, some areas have airport authorities that are functionally separate from other transportation responsibilities. Airport siting, expansion, and operations have dramatic effects on roadway and public transit needs, but an airport authority may focus more on air traffic needs, airlines' desires, and funding programs than on ground access issues.

Other factors are complicated by the location of responsibility at different levels of government. The most apparent of those is the control of land use. Both MPOs and states are required to consider the effects of transportation decisions upon land use and the consistency of transportation plans and programs with all land-use plans. The connection

between land use and transportation is a powerful one. The transportation system creates accessibility that affects development patterns; those patterns are a determinant of travel demand and the relative attractiveness of different modes of transportation. But land use is primarily under the control of local governments, through zoning and subdivision controls. Local governments' land-use decisions in many areas are driven by an interest in increasing the property-tax base and in avoiding citizen complaints about undesirable uses, not by concerns about transportation system needs. It is crucial that transportation planning agencies work closely with local governments to encourage land use decisions that take transportation into account.

Some of the factors specifically address the need for better intergovernmental coordination. For example, DOTs are required to consider metropolitan area plans developed by MPOs and to consult with local elected officials with jurisdiction over transportation as they consider the transportation needs of non-metropolitan areas.

The literature on intergovernmental coordination is extensive; this is not a new problem nor one that is unique to transportation planning. The need for improved transportation planning processes alone will not create the impetus for solutions, but adequately addressing the planning factors will, in some places, require changes in intergovernmental mechanisms.

At the very least, this may include improved communications among agencies to simply keep others informed of their activities. More substantial changes may include participation in advisory committees and interagency technical committees. In some cases, changing the make-up of the MPO board to create new representation may be needed to adequately involve the necessary interests.

Changing the Process: responding to the planning factors in every metropolitan area and state in the country will be a gradual process. Doing so will require the improvement or replacement of established practices. Existing practices have typically been crafted to satisfy local political conditions and interests, so change will not come easily. New tools to analyze the consequences of transportation decisions will need to be adopted and applied by transportation planners, and new means of cooperation among participants in the planning process will have to be established. That will take greater effort and resources that are not easily made available.

But these changes will occur. The limits on public funds for transportation system maintenance and improvement require that we do a better job of allocating scarce resources. Continuing concerns about the environmental effects of transportation systems challenge us to develop them in less damaging ways. Growing awareness of the interrelations among transportation and other aspects of our culture require that our planning be more comprehensive, more technically sophisticated, and more effective.

Financial Constraint of the Transportation Improvement Program

by David Murray

The need to balance expected income with anticipated expenditures is part of running a household. It's part of running a business or a government. In the area of transportation planning, the Transportation Improvement Program is the set of transportation investments (the anticipated expenditures) and the Financial Constraint is the budget limit (the expected income).

With a Financial Constraint, the Transportation Improvement Program (TIP) becomes truly meaningful. With a Financial Constraint, the TIP becomes an expectable program of projects. Planners, project sponsors, and public citizens have a foundation of, and a forum for, public policy debates.

The TIP needs a Financial Constraint to be valid. A spending plan like the TIP is reasonable only to the degree that it is based on reasonable projections of available resources. A Financial Constraint means that a region can't count on more money than can reasonably be expected. It means that the TIP can't be a wish list, but must instead be a practical -- and perhaps austere -- set of projects designed to achieve regional mobility, access, economic, environmental, and community goals.

Before ISTEA: Few things disappoint more than a gift anticipated, but not delivered. Before ISTEA, no outside discipline existed to moderate projections of available resources. Projections were sometimes more political than prudent. Then, as now, pressures existed to include as many projects as possible in the TIP, regardless of cost. Without the discipline of a Financial Constraint regulation it was difficult to resist including any project that had some chance, however slight, of being funded. In the end, including every project but the kitchen sink in the TIP -- whether or not the funds exist to build or operate it -- compromises the integrity of the entire program.

With unrealistic financial assumptions, the overall community vision used to develop the TIP is breached. The integration of the various component elements of the transportation system is disrupted. The environmental conformity determination -- the process used to ensure that transportation projects are in sync with clean air laws -- is invalid. For example, if a metropolitan area says it is going to build a new light rail system to reduce auto emissions, the region had better be able to pay for it.

Without a Financial Constraint, the public process used to develop the TIP is a cheat. Rather than a program of projects, the TIP is a pool of projects from which to choose; not a self-contained investment program sufficient to implement certain regional goals.

After ISTEA: Live within your means. Expect less, but get more. The ISTEA and the new Planning Regulations now require TIPs to be financially constrained to reasonably expected resources.

In developing a TIP now, the first step is deciding how much money can reasonably be expected. The second step is determining transportation priorities within the overall budget constraint.

The Financial Constraint regulation -- the foundation for the TIP -- really comes down to two things:

- 1) A cooperative institutional context for agreeing to what is reasonable.
- 2) An appropriate method to project available funds.

The Financial Constraint gives a basis upon which to build a reliable, integrated, transportation investment program. Planning becomes more rational, goals more achievable. Planners and citizens involved in the development of the TIP can have a sense of proportion and purpose. With the Financial Constraint, the TIP becomes truly useful.

The TIP: What is it, anyway: the TIP, or Transportation Improvement Program, is the region's spending plan for transportation improvements. It is the region's transportation investment program, consisting of capital and operating improvements to the Metropolitan

Transportation System. The TIP is multimodal. It includes investments in various modes such as transit, highway, and bicycle facilities. The TIP is the means of implementing the goals and objectives identified in long-range Regional Transportation Plans.

The scope of the TIP has expanded over the last few years. It used to include only those projects which had an element of federal funding, and those projects which required a federal action (like an Army Corps of Engineers permit). Now, TIPs are more comprehensive transportation investment programs. With the Clean Air Act Amendments of 1990 (CAAA), regions were required to include in the TIP all significant projects that could affect air quality. The Metropolitan Planning Organization (MPO), the regional transportation agency responsible for preparing the TIP in urban areas, must determine whether the package of proposed transportation investments in the area -- regardless of how they are funded -- results in better air quality. In doing this conformity determination, the Financial Constraint becomes all the more crucial. If the proposed project list is unrealistic, if some projects that improve air quality must be dropped when less funds are available than were anticipated, then the conformity determination of the entire package of investments becomes invalid. To avoid false promises, the TIP needs a Financial Constraint.

Developing the Financial Constraint: the U.S. Department of Transportation issued new Planning Regulations in the October 28, 1993, Federal Register. These regulations, or guidelines, establish a discipline, rationality, and openness in the development of the TIP. One such element of the Planning Regulations is the requirement that all TIPs be financially constrained. The Planning Regulations describe the nature of the Financial Constraint, and how it governs the TIP.

What does the TIP need to contain?

The TIP is the region's comprehensive spending plan for transportation improvements. The TIP must be, at least, a three-year program of projects. The projects must be listed in priority order. (Footnote: At a minimum, year 1 can be lumped as priority 1.) More than just a list of federally funded projects, or projects requiring federal permit approval, the TIP must be a financially constrained, year-by-year program of all regionally significant¹ projects. The TIP must include all transportation projects in the region that need an assessment for conformity with air quality requirements.

The individual project entries in the TIP must contain the following information:

A) Project description, including sufficient detail to identify the project phase; and, in non-attainment or maintenance areas, sufficient description to permit air quality analysis according to EPA conformity regulations;

B) Specific project budget:

- o Total project cost

- o Federal share and source, by year

- o Other funding shares and sources, by year;

C) Identification of the project sponsor and the designated recipient of the funds;

¹ Regionally Significant (Federal Register 10/28/93, p 58065) means " a project...that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including, at a minimum, all principal arterial highway and

fixed guideway transit facilities that offer a significant alternative to regional highway travel."

The TIP must be financially constrained by year. This means:

A) The Financial Constraint must be expressed in terms of the dollars available from each fund source, for each year of the TIP;

B) Only projects fundable within the Financial Constraint can be included in the TIP.

The TIP must clearly identify which projects are funded from existing and committed sources, i.e., continuations of currently available revenue sources, and commitments dedicated in local resolutions or state commitments under the control of the Governor.

In all but years 1 and 2 of the TIPs within non-attainment and maintenance areas (areas with air quality problems), projects can also be proposed for funding from new funding sources -- but only if the MPO includes within the TIP a strategy for ensuring the availability of the new funds.

This means that in years beyond year 3 of TIPs in non-attainment and maintenance areas, and in all years of TIPs in attainment areas, projects may also be proposed for funding using new revenue sources. However, in the case of new funding sources, strategies (i.e., action plan with a schedule) for ensuring their availability must also be identified in the TIP. Any pie-in-the-sky must also be accompanied by a recipe, and a strategy for on-time delivery.

This is the content of the Financial Constraint. As described in the Planning Regulations, the Financial Constraint requirement can be characterized as having two parts:

A) the Process, the institutional framework for agreeing to what is reasonable; and

B) the Technical Projection Method, the method used to project available funds .

The Cooperative Process for Developing the Financial Constraint: the Planning Regulations require an open, cooperative process for developing the Financial Constraint among the MPO, the state, and the transit operators in the region. More than a simple review and comment, the requirement of a cooperative process for developing the Financial Constraint means direct involvement by all parties in the development of the fund estimate, and in the testing of the reasonableness of the projections.

According to the Planning Regulations, the state transportation departments are expected to provide MPOs with estimates of federal and state funds available. To be part of a cooperative process, this estimate cannot be done in a vacuum. The state transportation department must approach MPOs and transit operators early in the process to develop the best technical method for projecting state and federal funds, and to develop a process for reviewing the reasonableness of the projections.

These early meetings can establish a consensus agreement on the assumptions to be used in the Financial Constraint. In turn, MPOs and transit operators would discuss with the state, and with each other, methods for estimating local funds, and regional shares of state and federal funds.

To follow the spirit of the ISTEA, involvement in the development of the Financial Constraint, and the testing of the reasonableness of the projections should include a wider range of participants and an even more open process. Since the Financial Constraint is a key element of the TIP, involvement should include not only the state, MPO, and transit operators, but

also federal and state agencies that review the TIP, project sponsors, interested agencies, and the public.

The best institutional forum for these discussions may differ between regions, but it must always include the ability for give-and-take between all participants. This give-and-take applies to the original development of the Financial Constraint and also to the subsequent check that all of the elements of the Financial Constraint are reasonable.

The MPOs are responsible for developing the Financial Constraint, and the MPOs are responsible for developing the cooperative process. Indeed, this cooperative context for the Financial Constraint is, in many ways, a great opportunity -- the first step towards jointly developing a TIP, which also must be established in an open, cooperative forum.

The Financial Constraint: The Technical Projection Method: once the ground rules for a collaborative process have been established, the group must choose between several methods available to project available funds. In projecting economic variables, such as available funds, there are nine commonly used Technical Projection Methods. These are described in Table 1.

Table 1

Method Number 1

Regression: Ordinary Least Squares (OLS): OLS regressions characterize the relationship of one variable to other variables. A cause-effect link is established, and that relationship is used to project future values of one variable based on the other variables.

Advantages: simplicity, flexibility, availability, familiarity, OLS regression options exist on most spreadsheet programs. OLS can be used to characterize a variety of circumstances. Explanations are often contained in the spreadsheet software manuals. Causal variables are often projected by economists in publicly available sources, and by state and federal agencies.

Disadvantages: requires a tight cause-effect relationship. Requires data for trend analysis. Requires assumptions for causal variables. To be used properly, requires a working knowledge of statistical methods and properties.

Appropriateness: this method is best for funds that have a direct relationship to economic trends, for example, household income to purchases of goods and services (and the link to sales tax receipts). Regressions are frequently used to predict gas tax receipts and sales tax receipts. OLS regressions are also used to project total fare revenues from proposed new fare structures.

Method Number 2

Regression: Time Series: a time series regression is a way of projecting a variable based on the past values of that variable alone. Time Series statistical packages have been used for business cycle analyses and are available on many business application software programs.

Advantages: Simplicity.

Disadvantages. Requires special software. Current packages are a bit of a black box method, both in terms of the statistical analysis done by the computer (the packages often just spit out the answer without any statistical justification or support) and in terms of being

able to justify why this projection method is better than other regression or algebraic methods.

Appropriateness: a time series method is best for variables that have a constant pattern over time, and no discernible relationship to any other economic variables or political decisions. Some use time series for business cycle variables.

Method Number 3

Input-Output Model: an input-output model is a characterization of an economic system, and the direct and indirect linkages within it, in a matrix form. Some input-output models can calculate fund revenues, or the variables that drive projections of funding resources. For example, if a region is experiencing defense industry cutbacks, an input-output model could also quantify the decline in tax base due to the decline in the industry sectors that provided inputs to the defense factories, or provided service to former defense industry employees.

Advantages. Accuracy, in some cases.

Disadvantages: Complicated for projecting fund sources. Requires an updated, input-output model. Away from academic circles, this is rare. To be used properly, requires a working knowledge of some advanced statistical/mathematical methods and properties.

Appropriateness: Good for analyzing direct and indirect impacts of a toll or tax structure. Not appropriate where updated input-output models are not readily available.

Method Number 4

Geometric, or Exponential Growth Rates: this method uses a trend curve to characterize the behavior of a fund source and to project future values. This can be done on a calculator.

Advantages: simplicity.

Disadvantages: no sensitivity to political or economic forces.

Appropriateness: a geometric formula can be used to characterize funds that have been increasing at a decreasing rate. An exponential formula is sometimes appropriate to project funds that increase at an increasing rate. This is sometimes appropriate for sources driven by population growth. A bridge that is reaching its technical capacity may generate toll revenues that can be characterized by a geometric formula.

Method Number 5

Constant Growth Rates: this method uses a linear trend line to project future values. For example, if vehicle registration fee receipts have increased 3% per year over the past 10 years, it might be reasonable to project an increase of 3% next year.

Advantages: simplicity. This can be done on a calculator, or by hand.

Disadvantages: no sensitivity to independent political or economic forces.

Appropriateness: appropriate to characterize the behavior of some fund sources over time, especially if those fund sources are linked to targets, or have experienced little variation of growth or changes of behavior over time.

Method Number 6

Institutional Formula: some fund sources are easy to predict because they are based on a legislatively determined formula. Sometimes they are set at a certain dollar level, sometimes the values are geared to other (simple or complex) considerations.

Advantages: accuracy. This can be done on a calculator, or by hand.

Disadvantages: only true for some fund sources. Even the ones that are directed by legislative formula are occasionally changed by the legislative body that devised them.

Appropriateness: appropriate only to funds that are determined by legislative formulae.

Method Number 7

Algebraic: some fund sources have strict algebraic relationships to other variables. For instance, the average General Fund contribution to transportation may always be 10% of the budget.

Advantages: simplicity. This can be done on a calculator or by hand.

Disadvantages: only true for some fund sources. Algebraic relationship may change. Other variables, assumptions, political or economic factors are often difficult to predict.

Appropriateness: appropriate only to those certain funds that have this direct algebraic relationship.

Method Number 8

Constant Value: some fund sources haven't changed much over time. The question here is, "Well, what did we get last year?" and use that value to predict future values.

Advantages: simplicity. About as simple as you can get.

Disadvantages: no consideration of political or economic forces.

Appropriateness: appropriate only to certain funds; those that don't change much from year to year.

Method Number 9

Political Judgment: some fund sources are subject to annual budget battles, or are private dedications that are subject to negotiations. These vary widely depending on the circumstances of the decision.

Advantages: some funds just work like this, and the judgment of experience may be more appropriate than other more technical projection methods for these fund types.

Disadvantages: difficult to justify. Difficult to reach consensus, everyone has their opinion. Relies heavily on open forum for reasonableness check.

Appropriateness: certainly not all fund types are subject to a wide amount of political discretion in the short term. Many fund types projected by the other methods should have the wisdom of a good political judgment as a reasonableness check.

The selection of the most appropriate Technical Projection Method depends on:

1. the past behavior of the funding source, how it has increased and decreased over time, and how it is related to other events or trends;
2. expectations about the continuation of those past relationships into the future;
3. data that is available, including assumptions where needed, and
4. experience in using statistical methods, if necessary.

Choosing a Technical Projection Method is really choosing how to systematize, or rationalize, a judgment about the future. Each of the methods above has its advantages and disadvantages. Sometimes, using methods to project past actual values is useful in seeing which comes the closest to that value.

The advantage of choosing one of these methods within an ISTEA- directed process is this: it provides a set of checks and balances. Though occasionally laborious, a democratic process is a good way of getting the truth, or at getting to the best way to proceed. Having an open, cooperative process virtually ensures that all projections will be subject to a reasonableness check.

The Reasonableness Check -- The Open, Cooperative Process Continued: after a Technical Projection Method is chosen -- in the cooperative process -- the projections, the dollars projected to be available each year from each fund source must be reviewed in a reasonableness check. Sometimes, a projection method is chosen by consensus at the start. Other times, one agency is delegated the responsibility for projecting one fund source.

In either case, the set of projections are brought before the broader forum (including the federal reviewing agencies such as Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA)) for endorsement before being used for the TIP. The projections are scrutinized to make sure the estimates are the most defensible and the most justifiable. The limits that the Financial Constraint dictates on the TIP ensure that each projection will be scrutinized carefully.

In testing projections for reasonableness, three checks are made:

1. Was the correct Technical Projection Method chosen? Was a method used that results in the most statistically probable projection? Is there another method that results in a better projection, or one that fits past experience and future circumstances better?
2. Where assumptions were made, are the assumptions themselves accurate? The OLS regression method, for example, requires assumptions about the causal variables in order to project the effect into the future. These assumptions should be called out specifically in the course of developing the Financial Constraint. If, in the end, the assumptions are suspect, then so are the projections. In that case, either the assumptions or the projection method should change.
3. Where political judgments were made, or where politics were left entirely out of the projection methodology, is this supportable? Political judgments are debatable. The omission of politics in the projection is debatable. It is here that the democracy of the open, cooperative process is especially key. Each member brings an element of experience, and a unique insight, that contributes to reaching a consensus on the best judgments to make in developing the Financial Constraint.

In testing the Financial Constraint for reasonableness, a question is whether the projection is the best and most logical. In this context, the larger forum would reject any projection that is not consistent with past trends. For example, if FTA Section 9 funds are being projected, one would base the future projections on past values. While the Planning

Regulations allow the use of Federal Authorization values for the Financial Constraint, this would not pass a reasonableness check. Using the higher Authorization levels (which are much higher than the amounts which have traditionally been available) would be unreasonable.

In this context, the larger forum would reject any projection that is at odds with political reality. In another case, if transportation has always been 10% of the state budget, but if the state is going broke and has not shown an ability to balance a budget, it would be unacceptable to continue to assume the same dollar levels from the state far into the future. Once the Financial Constraint is established, the TIP can be firmly built upon it.

Step Two: Setting Priorities for the TIP: The second step in developing a financially constrained TIP is to decide which projects should be included to the limit of the funds projected to be available. This is done by determining overall priorities, and then strategically assigning projects to the fund source that best fits the project, and the overall goals of the program.

The Planning Regulations require the prioritization of projects in the TIP. The minimum level of prioritization is to call every project in year 1 (fund constrained) a priority 1, every project in year 2 (also fund constrained, of course) as priority 2, and so on. Practically, however, all projects must be prioritized. In almost every region, more projects are proposed than can be funded. Project selection requires a priority order, and a criteria for project ranking.

Again, the method of setting priorities must be developed in an open forum, and to be successful, must include all transportation interests. The priority-setting process must be multimodal, and incorporate the various elements and factors described in the ISTEA. It must also incorporate the operations and maintenance priority called out in the Planning Regulations.

In developing evaluation criteria, it is useful to make a distinction between screening, scoring, and programming. Some criteria are screening factors -- threshold eligibility requirements. Some criteria are ranking factors -- the values upon which priorities are decided. And some criteria are programming strategies -- dictating the principles used to best match projects to particular fund sources.

It is also wise to establish certain principles to formulate the ranking criteria. The first is to tie the solution proposed by the project to the local problem it is intended to solve. The second is to use measures (in differentiating project worth) that can apply to all modes fairly. The third is to incorporate data available from the new Management Systems and to incorporate performance-based standards into the criteria. The fourth principle is to rely upon and strengthen existing plans and programs.

The criteria used to evaluate projects are developed in an open, cooperative context, just like the Financial Constraint that binds the selection of projects. These criteria differ from region to region, being more complex for more varied and large metropolitan areas. In each case, nonetheless, the projects selected for the TIP are multimodal, and based on the goals that the community is trying to achieve with their transportation system.

Step 3: Getting the TIP Approved Under the Financial Constraint: each region (through the MPO) prepares a TIP. The states also prepare a statewide TIP, often incorporating the regional TIPs and adding statewide projects in rural areas outside the MPO jurisdictions. The FHWA and FTA approve the statewide TIP. In reviewing the regional TIPs, the federal agencies make two findings: approval of the air quality conformity determination, and approval of the Financial Constraint.

If the federal agencies have been involved in the development of the Financial Constraint, approval of this aspect of the TIP is perfunctory. By the same token, if the federal agencies have been involved in the development of the Financial Constraint, and have endorsed it in the open, cooperative forum, they cannot reject that Financial Constraint when the TIP is submitted.

While it is true that the Planning Regulations allow all of year 1 to be called priority 1, and also allow federal funds to be programmed at the Authorization level, neither of these tacks is wise for the MPOs to adopt. The priority-setting process must be project-specific in developing the TIP, and the use of the Authorization level could result in false promises and that would not pass a Financial Constraint reasonableness check.

For those who contend that the Financial Constraint inhibits project delivery by prohibiting over-programming, remember that the Planning Regulations allow the movement -- without a TIP amendment -- of a project from year 2 or year 3 into the slot of the project in year 1 which is incurring unexpected project delays. (Planning Regulations, s450.332 (c), Federal Register, 10/28/93, p. 58078.) Thus the TIP can be both financially constrained and efficiently managed.

Another spurious criticism of the Financial Constraint is that by prohibiting over programming, it limits the ability to strong-arm funding agents. Obviously, a rational plan is desirable in its own right, and instead of limiting the ability to get more funding, the Financial Constraint actually delineates the funding issue more clearly, and sets the stage to make the argument for increased funding more persuasively. For instance, the region could say, "If we received \$X, we would be able to do Y projects (specifically), resulting in Z benefits." Following the Financial Constraint cleanly maintains the integrity of the planning and programming activities, and results in the opportunity to make a responsible and compelling case to the funding agency, or the public.

Summary: the Financial Constraint enables the TIP to be a meaningful document for implementing the region's transportation goals. The TIP becomes useful for community planning purposes, for meeting environmental protection laws, and for projecting economic, transportation access and mobility performance. The TIP as the regional transportation spending plan is reasonable only to the degree that it is based on reasonable projections of available resources.

The Financial Constraint has two parts: 1) the Process -- the open, cooperative context for agreeing to what is reasonable, and 2) the Technical Projection Method -- the mathematical/statistical technique, or systematized judgment, used to most accurately project future levels of a funding source.

Proper use of the Financial Constraint rationalizes and democratizes the planning process and the program which implements the region's visionary goals. The region can have a proper sense of purpose and proportion through the Financial Constraint. By forcing us to live within our means, the TIP with a Financial Constraint becomes a truly meaningful transportation priority-setting investment plan.

After all, you can't have everything. Where would you put it? (Attributed to Steven Wright.)

Conformity

by Sarah Siwek

During the deliberations on the Clean Air Act Amendments of 1990 (CAAA), Senator Baucus of Montana spoke of the need for transportation plans and programs to be linked to pollution control strategies in our metropolitan areas. His statements capture the sense of the Congress at that time and help to explain the context in which the transportation conformity requirements were adopted into the CAAA and followed by a strictly constructed rule encompassing their implementation. Senator Baucus said,

"Traditionally, regional transportation plans have been developed to handle expected vehicle volumes without regard to the limit on how many vehicle emission sources can be accommodated in an urban airshed and still meet air quality standards. This legislation makes clear that it is time to develop transportation plans and programs that also serve as part of the pollution control strategy for the metropolitan area (Baucus, 10/27/90, §16969-76)."

Health Effects of Air Pollution: while considerable debate exists over the precise relationships between human health and vehicular emissions, research indicates that health impacts can be significant and that large portions of the population may be, in certain circumstances, at risk due to high pollution levels. Due to research results in some of the nation's worst air pollution areas and elsewhere, the changes in the transportation provisions of the CAAA of 1990 over earlier Clean Air Acts were prompted in part by the fact that increasing numbers of people in the United States were living in areas designated as non-attainment for one or more pollutants for which National Ambient Air Quality Standards (NAAQS) had been previously set (criteria pollutants) and the continuing concern about the health effects of air pollutants on people.

While earlier efforts to improve air quality in non-attainment areas throughout the country resulted in significant improvements, a combination of factors was still preventing these areas from early attainment of the NAAQS. EPA estimates that 140 million Americans lived in over 100 designated ozone non-attainment areas based on 1987-89 data. By 1991 this situation had significantly improved. However, in 1991 EPA estimated that 86.4 million people still resided in non-attainment areas for any NAAQS. (EPA National Air Quality and Emissions Trends Report). [Attachment A](#) is a listing of non-attainment areas and their classifications of non-attainment as of August, 1994.

Six criteria pollutants addressed in the CAAA of 1990 are related to transportation sources: ground level ozone (SMOG precursors such as volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), carbon monoxide, particulate matter less than 10 microns (PM-10) , nitrogen dioxide, sulfur dioxide, and lead. Air pollution is a very complex phenomenon and each pollutant plays a different role in the overall air quality problems in non-attainment areas. In addition, weather, geography, types of industry, age of vehicle fleet, actual travel behaviors and other factors all come into play in creating air pollution. Further, strategies to reduce emissions of one pollutant type can result in increased levels of another pollutant. [Attachment B](#) contains a brief summary of the potential health effects of each of the six criteria pollutants.

Transportation Conformity as a Pollution Control Strategy: the transportation conformity requirements are based on the statutory language included in the CAAA 1990. Section 176 of the CAAA entitled: LIMITATIONS ON FEDERAL ASSISTANCE states that:

"no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to a(n) (state) implementation plan after it has been approved or promulgated under Section 110. The assurance of conformity to such an implementation plan shall be an affirmative responsibility of the head of such department, agency, or instrumentality."

Simply put, conformity to the State Implementation Plan (SIP) for air quality attainment means that the transportation plans and programs for the non-attainment region will not:

- cause any new violations of National Ambient Air Quality Standards (NAAQS),
- cause any worsening of existing violations, and
- delay the region's effort to attain NAAQS in a timely manner.

In addition, in order to meet the conformity criteria, transportation plans and programs must provide funding for transportation control measures which are included in the SIP, must demonstrate that the "build" scenario (implementation of the Plan and TIP) provides more emissions reduction than the "no-build" scenario (do not implement the Plan and TIP) until emissions budgets are approved, and must demonstrate adherence to the emissions budget in the 15% VOC reduction period from 1990 to 1996 and to attainment demonstration budgets thereafter.

Where Does the Conformity Regulation Apply: transportation conformity provisions apply to all designated non-attainment areas. There are different classifications of non-attainment areas, by pollutant type. See the attached list for a complete listing as of July, 1994. In addition, conformity regulations apply to maintenance areas which are areas redesignated to attainment based on progress made to achieve the NAAQS. EPA is considering the implementation of modified conformity provisions to cover some at-risk attainment areas, however, that will be the subject of a new rulemaking which has not yet been initiated.

What do Conformity Requirements Mean to the Transportation Community: conformity is clearly a check on transportation investments by forcing air quality analysis of impacts of investments on urban areas. It has been said that the conformity provisions of the CAAA act as the "enforcer" to keep state and local transportation planning consistent with state and local air quality planning. The final transportation conformity regulation was promulgated in November, 1993 after nearly two years of negotiation and collaboration between U.S. EPA, DOT, State and local air agencies, State DOTs, MPOs, transit agencies and other interested parties. This is the first year and the first round of conformity determinations under the new rule, and the complexity of the rule as well as the relationships between transportation investments and air quality are just beginning to be broadly understood.

What are Emissions Budgets: emissions budgets are the total of all emissions from all sources (stationary, area, and mobile including reformulated gasoline, enhanced inspection and maintenance programs and transportation plans and programs) which the non-attainment area cannot exceed in order to demonstrate attainment of the NAAQS in accordance with federally prescribed time frames which must be incorporated into their SIP. In effect, budgets are a quantification of the "carrying capacity" of the region for each pollutant type and is reduced gradually over time as the area nears attainment. After an area attains the NAAQS, it cannot exceed this cap on emissions and thus must identify ways to offset emissions increases due to new population growth and jobs.

Therefore, it is very important for both air quality and transportation professionals to be involved in how the State proposes to divide up the budget between all types of pollutant sources and to take part in the process of budget development. It is essential that the

portions of the budget assigned to each type of source represent a level of emission reductions that a major industry source, a small business, or the transportation community, as examples, can deliver through the implementation of reduction strategies. The budget, as it relates to transportation, is a ceiling on emissions from transportation plan and TIP activities.

What Actions of Transportation Agencies are Subject to the Conformity Provisions:

- Approvals of Transportation Plans, required under ISTEA provisions, now must include assumptions for growth, employment, land use and VMT growth for a 20-Year timeframe and are subject to the conformity criteria to ensure consistency with the SIP. See [Attachment C](#) for detailed criteria.
- Transportation Improvement Plans (TIPs) which cover a three to five year timeframe are also subject to the conformity requirements.
- All Federal projects, defined as those which receive ISTEA funding or those which require U. S. Department of Transportation approvals in order to proceed, are all subject to the full range of conformity requirements. This includes projects without any federal funding which require U. S. Department of Transportation approvals to proceed.
- Transportation plans and TIPs must be fiscally constrained consistent with U.S. DOTs metropolitan planning regulations at 23 CFR part 450 in order to be found in conformity.
- Regionally significant projects, regardless of funding source, are partially affected by the conformity requirements as well.

"Regionally significant projects means a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel." (40 CFR Parts 51 and 93, 11/24/93)

Who is Responsible for Conformity Determinations: the MPO is responsible for making the conformity determination in each non-attainment area. Ultimately, The U.S. Department of Transportation is responsible for making an affirmative finding on each MPO's finding and has delegated this to the Federal Highway Administration and the Federal Transit Administration . These agencies collaborate on reviewing the conformity findings and make the final determination to accept or reject the MPO's determination. This is done in consultation with the Environmental Protection Agency.

State Departments of Transportation must also play a role in the conformity process, specifically for projects which are outside the MPO boundaries. State air agencies have a key role too, as they, in consultation with MPOs, state DOTs, and where they exist, local air agencies, must agree upon the SIP budgets under which the transportation sources must operate.

How do We Know the Plans Will Work? Model, Model, Who's Got the Model: the conformity requirements are very specific with respect to analytical requirements which must be addressed to demonstrate attainment. While a great deal of work to improve transportation and air quality models is underway, prior to the adoption of the CAAA and ISTEA, many years had passed since significant improvements to models had been accomplished. Further, the evolution of expectations and requirements tied to modeling

capabilities has simply not been matched by the availability of modeling tools and techniques to practitioners. Nevertheless, the requirements exist and MPOs, transit agencies, air agencies, and State DOTs need to be cognizant of their existing capabilities while advocating the funding of necessary modeling improvements to their policy boards. Demonstrating to public officials why modeling improvements are a good investment may, in and of itself, be a challenge in times of constrained resources.

- **Examples of modeling shortcomings include:**
 - Crude, and in some cases, extremely limited air quality modeling tools, specifically for PM10 and NOx.
 - Limited ability to identify and/or isolate the interrelationships of various pollutant types under real time conditions to one another and to travel behavior.
 - Inability to model impacts of certain transportation control measures through regional air quality monitors.
 - Outdated or non-existent origin and destination information on travel characteristics of the region's population and travel related to commerce.
 - Lack of integration of transportation demand forecasting models with current and projected land uses.
 - Limitations on the ability to model the impacts of pedestrian-related travel, ridesharing behavior, transportation systems improvements, and most demand management strategies in regional models.
 - Limited information on discretionary travel and detailed travel trends over extended time periods.
 - Inadequate information on how travelers react to different pricing signals.

What are the Fiscal Constrain Requirements: under the provisions of ISTEA, transportation plans and programs must be fiscally constrained and include only those projects for which funding is secured or for which funding can reasonably be expected to be available in the amounts and at the times that the plan indicates they are needed. In addition, it must be demonstrated that the existing transportation system can be maintained without detriment. In non-attainment areas for carbon monoxide and ozone, TIPs must be fully funded for the first two years and dollars committed to projects.

This provision is incorporated into the conformity process in part to insure conformity findings are based on realistic plans and programs and that Transportation Control Measures and other projects which may be beneficial for air quality are not continually postponed due to lack of funding or funding commitment. This is potentially a powerful tool in reinforcing the linkages between air quality attainment plans and transportation plans and will require a high degree of discipline and willingness to make investment trade-offs on the part of local, regional, and state transportation professionals and policy-makers. Further, this requirement is incorporated into criteria for making conformity findings because the MPO must demonstrate in detail all TCMs which are contained in their SIPs, their funding sources, their eligibility under ISTEA and that they are on schedule for implementation.

What are Transportation Control Measures and How Do They Fit In: the CAAA of 1990 include a list of TCMs (Section 108(f)(1)(a) which must be considered for inclusion in the State Implementation Plan (SIP) for air quality in ozone non-attainment areas classified as moderate, serious, severe, or extreme. These sixteen measures also form the basis for funding eligibility in the Congestion Mitigation and Air Quality Program which was enacted as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The measures include the traditional list of TCMs that have been discussed for years as emission control strategies but not embraced as mainstream transportation improvements in our investment priority setting. Listed in [Attachment D](#) are the types of TCMs listed in the CAAA and specific examples of types of projects which may fall into the general categories provided.

Interagency Consultation: an interagency consultation process is required in each non-attainment area and it should establish procedures for consultation between MPOs, state and local air agencies, state and local transportation agencies, U.S.EPA, FHWA and FTA. These procedures should apply to the development of the SIP, the transportation plan, the TIP and conformity determinations. This conformity SIP revision is due in November, 1994 in all non-attainment areas and is federally enforceable as a state law. It should establish specific interagency consultation procedures for all coordinating agencies with specific schedules for implementation. A provision in the final conformity rule allows for disputes to ultimately be resolved by the Governor if the state air and transportation agencies cannot agree on a conformity determination.

The MPO must make the conformity determination according to the consultation procedures in the conformity rule and SIP revision required by the rule, and according to the public involvement procedures established by the MPO in compliance with ISTEA's metropolitan planning regulations. Once the SIP revision has been approved by EPA, the conformity determination is made consistent with the implementation plan's consultation requirements. Before the SIP revision is approved by EPA, MPOs and State Departments of Transportation must provide reasonable opportunity for consultation with state air agencies, local air quality and transportation agencies, U.S.DOT, and EPA on issues including:

1. Development of a process involving the MPO and State and local air quality planning agencies and transportation agencies to do the following:
Evaluate events which will trigger new conformity determinations in addition to those triggering events established in the rule; and
2. Consult on emissions analysis for transportation activities which cross the borders of MPOs or non-attainment areas or air basins.

1. Interagency consultation procedures must include:

- The roles and responsibilities assigned to each agency at each stage in the SIP development process and the transportation planning process, including technical meetings;
2. The organizational level of regular consultation; and
 3. A process for circulating documents (or draft documents) and supporting materials for comment before formal adoptions or publications.
 4. What about Public Participation in the Conformity Process: public participation is a cornerstone of ISTEA because it requires pro-active efforts for public involvement in the planning and funding process which was formerly, in many areas, a very closed environment with little public attention. The public participation requirements of the ISTEA Metropolitan Planning Regulations apply to the transportation conformity process as well. In short, the public must have an opportunity for early and continuing involvement including individual citizens, affected public agencies, and other interested parties in the development of TIPs, plans, and all other stages of the planning process such as major investment studies, environmental analyses conducted under the National Environmental Policy Act, and opportunities for input in the consideration of the 15 planning factors that metropolitan areas must consider in their long term planning efforts.

Attachment A

OZONE NON-ATTAINMENT AREAS

The following are areas (identified by central city or county) in non-attainment of the National Ambient Air Quality Standard for ozone.

EXTREME-20 YEARS TO ATTAIN (2010)

Los Angeles-South Coast Air Basin, CA

SEVERE-17 YEARS TO ATTAIN (2007)

Chicago-Gary-Lake County, IL - IN

Milwaukee-Racine, WI

Houston-Galveston-Brazoria, TX

NY-Northern NJ-Long Island, NY, NJ,CT

Southeast Desert Modified Air Quality Management Area, CA

SEVERE-15 YEARS TO ATTAIN (2005)

Baltimore, MD

Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD

Ventura, CA

San Diego, CA

SERIOUS-9 YEARS TO ATTAIN (1999)

Atlanta, GA

Baton Rouge, LA

Beaumont-Port Arthur, TX

Boston, Lawrence-Worcester, MA., NH

El Paso, TX

Greater Connecticut, CT

Muckegon, MI

MODERATE-6 YEARS TO ATTAIN (1996)

Atlantic City, NJ Charleston, WV*

Charlotte-Gastonia, NC* Cincinnati-Hamilton, OH-KY

Cleveland-Akron-Lorain, OH Dallas-Forth Worth, TX

Dayton-Springfield, OH* Detroit-Ann Arbor, MI*

Grand Rapids, MI Huntington-Ashland, WV - KY
Kewaunee County, WI* Knox and Lincoln Counties, ME
Lewiston-Auburn, ME* Louisville, KY-IN
Manitowoc County, WI Miami-Fort Lauderdale-West Palm Beach, FL*
Monterey Bay, CA* Nashville, TN
Parkersburg, WV* Phoenix, AZ
Pittsburgh-Beaver Valley, PA* Portland, ME
Reading, PA* Richmond-Petersburg, VA*
Salt Lake City, UT* San Francisco-Bay Area, CA
Santa Barbara, Santa Maria, CA St. Louis, MO-IL
Toledo, OH*

MARGINAL-(Attainment 1993)

Albany-Schenectady-Troy, NY*
Allentown-Bethlehem-Easton, PA-NJ*
Altoona, PA*
Birmingham, AL
Buffalo-Niagara Falls, NY*
Canton, OH*
Columbus, OH*
Door County, WI
Edmonson County, KY*
Erie, PA*
Essex County,(Whiteface Mountain), NY
Evansville, IN*
Greenbrier County, WV*
Hancock and Waldo Counties, ME
Harrisburg-Lebanon-Carlisle, PA*
Indianapolis, IN*
Jefferson County, NY*

Jersey County, IL*

Johnstown, PA*

Kent and Queen Anne's Counties, MD

ATTAINMENT-(non-attainment in 1990, subsequently redesignated to attainment status)

Kansas City, MO-KS

Greensboro-Winston Salem-High Point, NC

Cherokee County, SC

Raleigh-Durham, NC

Knoxville, TN

CARBON MONOXIDE NON-ATTAINMENT AREAS

SERIOUS-Attainment by 12/31/2000

Los Angeles-South Coast Air Basin, CA

MODERATE-Attainment by 12/31/95

Anchorage, AK Denver-Boulder, CO

Fresno, CA* Las Vegas, NV

NY-Northern NJ-Long Island, NY-NJ-CT Provo, UT

Seattle-Tacoma, WA* Spokane, WA

MODERATE-Attainment by 12/31/95

Albuquerque, NM Baltimore, MD*

Boston, MA* Chico, CA*

Cleveland, OH* Colorado Springs, CO*

El Paso, TX Fairbanks, AK

Fort Collins, CO Grants Pass, OR* Hartford-New Britain-Middletown, CT* Klamath Falls, OR*
Lake Tahoe South Shore, CA* Longmont, CO* Medford, OR Memphis, TN* Minneapolis-St.
Paul, MN Missoula, MT Modesto, CA* Ogden, UT* Philadelphia-Camden County, PA, NJ*
Phoenix, AZ Portland-Vancouver, OR-WA Raleigh-Durham, NC* Reno, NV Sacramento, CA

San Francisco,-Oakland-San Jose, CA San Diego, CA* Stockton, CA Washington, D.C.
Maryland-VA* Winston-Salem, NC*

ATTAINMENT

Syracuse, NY Duluth, MN

*Denotes areas which have complete ozone air quality monitoring data meeting the National Ambient Air Quality Standard during the period 1990-1992, the first step towards attainment.

PM-10 NON-ATTAINMENT AREAS

MODERATE-Attainment by 12/31/94

New Haven, CT Presque Isle, ME

Guaynabo, PR Clairton, PA

Stuebenville-Follansbee, OH-WV Granite City, IL

Lyons Township, IL Oglesby, IL

Southeast Chicago, IL Lake County, IN

Vermillion County, IN Detroit, MI

Rochester, MN St. Paul, MI

Cuyahoga County, OH Anthony, NM

El Paso, TX Aspen, CO

Canon City, CO Denver Metro, CO

Lamar, CO Pagosa Springs, CO

Telluride, CO Butte, MT

Kalispell, MT Lame Deer, MT

Libby, MT Missoula, MT

Polson, MT Ronan, MT

Salt Lake County, UT Sheridan, WY

Ago, AZ Hayden/Miami, AZ

Nogales, AZ Paul Spur/Douglas, AZ

Phoenix, AZ Rillito, AZ

Yuma, AZ Imperial Valley, CA

Manmouth Lake, CA Searles Valley, CA

Reno, NV Eagle River, AR

Mendenhall Valley, AR Boise, ID

Bonner County, ID Pinehurst, ID

Pocatello, ID Grants Pass, OR

Klamath Falls, OR LaGrande, OR
Medford, OR
Springfield/Eugene, OR
Kent, WA Olympia/Tumwater/Lacey, WA
Seattle, WA
Spokane, WA
Tacoma, WA
Walla Walla, WA
Yakima, WA

MODERATE AREAS-Attainment 12/31/99

Whitefish, MT Lakeview, OR
Mono Lake, CA

MODERATE AREAS-Attainment 12/31/2000

New York County (Manhattan), NY Steamboat Springs, CO
Weirton, WV Thompson Falls, MT
Bullhead City, AZ Payson, AZ
Sacramento County, CA San Bernardino County, CA
Shoshone County, ID Oakridge, OR

SERIOUS AREAS-Attainment 12/31/2001

Coachella Valley, CA Owens Valley, CA
San Joaquin Valley, CA South Coast Basin, CA
Las Vegas, NV

Attachment B

Health Effects of Air Pollutants

Carbon Monoxide: Impairs the ability of blood to carry oxygen in the body. Cardiovascular system is primarily affected, causing angina pain in persons suffering from cardiac disease and leg pain in individuals with occlusive arterial disease. Affects other mammals in a similar manner.

Lead: Damages the cardiovascular, renal and nervous systems, resulting in anemia, brain damage, and kidney disease. Pre-school age children are particularly susceptible to brain

damage effects. Similar effects are observed in other mammals. Additional adverse effects on animals, microorganisms and plants.

Nitrogen Dioxide: Impacts the respiratory system, causing a high incidence of acute respiratory diseases. Pre-school children are especially at risk. Damages certain plants and materials. Degrades visibility due to its brownish color and the conversions to nitrate particles. Nitrate particles are also a major component of acid rain.

Ozone: Damages the respiratory system, reducing breathing capacity and causing pain, headache, nasal congestion and sore throat. Individuals with chronic respiratory diseases are especially susceptible to ozone. Injures some plants, trees and materials.

Particulates: Cause irritation and damage to the respiratory system, resulting in difficult breathing, inducement of bronchitis and aggravation of existing respiratory disease. Also, certain polycyclic aromatic hydrocarbons in particulate matter are carcinogenic. Individuals with respiratory and cardiovascular diseases, children and elderly persons are at the greatest risk. Also soils and damages materials and impairs visibility.

Sulfur Dioxide: Aggravates asthma, resulting in sneezing, shortness of breath and coughing. Healthy persons exhibit the same responses at higher concentrations. Asthmatic and atopic individuals are the most sensitive groups, followed by those suffering from bronchitis, emphysema, bronchiectasis, cardiovascular disease, the elderly and children. Damages some plants and materials. Impairs visibility and contributes to acid deposition due to its conversion to sulfate particles.

Attachment C

Conformity Criteria

This chart lists the conformity criteria for Transportation Plans, Transportation Improvement Programs (TIPs), Projects from a Conforming Plan and TIP, and Projects not from a Conforming Plan and TIP.

TRANSPORTATION PLANS: In all time periods enumerated under the final conformity regulations:

1. The conformity determination must be based on the latest planning assumptions.
2. The conformity determination must be based on the latest approved emission estimation model available.
3. The MPO must make the conformity determination according to the consultation procedures of the regulation and the implementation plan revision required.
4. The Plan must provide for the timely completion or implementation of all TCMs in the SIP which are eligible for funding under ISTEA and consistent with schedules included in the SIP, and, nothing in the transportation plan can interfere with the implementation of any TCM in the SIP .

TRANSPORTATION IMPROVEMENT PROGRAMS (TIPs) For TIPs, the following criteria must be met for all time periods:

Criteria 1, 2, and 3 above in addition to:

5. The MPO must examine the specific steps and funding sources needed to fully implement each TCM and determine which are eligible for funding under ISTEA and demonstrate that they are on or ahead of the schedule established in the SIP or, if they are behind schedule the MPO and DOT must determine that past obstacles to implementation have been identified and have been or are being overcome, and that all State and local agencies with influence over approvals or funding for TCMs are giving maximum priority for their funding over other projects within their control .

6. Nothing in the TIP can interfere with the implementation of any TCM in the SIP.

PROJECTS FROM A CONFORMING TIP:

The criteria in numbers 1, 2, and 3 above must be satisfied in addition to:

7. Localized impacts of carbon monoxide pollution must be analyzed in carbon monoxide and PM-10 non-attainment areas. In addition, the proposed projects must come from a transportation plan and TIP which has undergone a regional emissions analysis.

8. There must be a currently conforming transportation plan and currently conformity TIP at the time of project approval.

9. The project must come from, a conforming transportation plan and program.

10. The FHWA/FTA project must not cause or contribute to any new localized CO or PM-10 violations or increase the frequency or severity of any existing CO or PM-10 violations in CO and MP non-attainment and maintenance areas.

11. The FHWA/FTA project must comply with PM-10 control measures in the SIP.

PROJECTS NOT FROM A CONFORMING PLAN AND TIP:

The criteria listed in numbers 1 ,2, 3, 4, 6, 7, 8, 10, and 11 above must be satisfied in addition to:

12. Non-federally funded or approved projects do not need to undergo hot-spot analysis but must undergo regional emissions analysis along with the rest of the transportation program if they are regionally significant or sponsored by a recipient of federal highway or transit funds.

For FHWA/FTA projects which are not from a conforming transportation plan and TIP, the timely implementation criteria for TCMs is satisfied if the project does not interfere with the implementation of any TCM in the SIP.

Pre-construction requirements for non-federally funded projects include: they should be included in the Plan and TIP, and they must be included in the regional emissions analysis of the plan and TIP or a new emissions analysis of the plan and TIP must be performed. Therefore, if the region did not have a conforming plan and TIP these projects would be halted.

Attachment D

Transportation Control Measures Listed in Section 108(f)(1)(A) of CAAA

The TCMs in Section 108(f)(1)(A) of the CAAA are listed in bold type. They are followed by examples of projects and programs which fit into these general categories of TCMs. Please note that there is considerable overlap between some of the measures and the examples shown are intended to illustrate types of projects non-attainment areas might consider implementing to reduce vehicle miles travelled (VMT) and increase overall vehicle occupancy. In addition to this list, much work is underway in non-attainment areas to explore options for market-based TCMs including road pricing, congestion pricing, VMT tax, and parking pricing as cost effective ways to reduce VMT and congestion.

(i) programs for improved public transit;

Feeder services to or from fixed route or rail transit

New or expanded transit services

Subscription vanpool, buspool, or shuttles

Reduced transit fares

Private charter services for regular commute trips

Marketing programs targeted to non-transit users

Accommodation of bicycles on transit vehicles

(ii) restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;

High occupancy vehicle lane programs

Construction of exclusive lanes for buses and transit vehicles

(iii) employer-based transportation management plans, including incentives;

Transit, vanpool, carpool subsidies

Alternative work schedules for non-SOV users

Bicycling subsidies

Walking subsidies

Transportation allowance with increased parking cost

(iv) trip reduction ordinances;

Localized or regional programs to reduce travel, usually oriented around commute trips

Employer Commute Options Programs

(v) traffic flow improvement programs that achieve emission reductions;

Synchronized signalization programs

Arterial high occupancy vehicle lanes

Selected IVHS applications

Reversible lanes during peak periods

(vi) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit service;

Preferential parking or free or discounted parking for rideshare vehicles

Use of private parking areas for Park-n-Ride lots

Special Event center parking strategies to induce mode shift or

travel to remote drop-off/pick-up points

Reduced parking requirements or limits at developments

Surcharge on parking, gas or other pricing mechanisms

Increased parking cost in concentrated areas for SOV users

Fringe parking facilities with effective feeder service to destination points

(vii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use;

Downtown pedestrian zones

Center city zones only accessible to the public by transit

(viii) programs for the provision of all forms of high-occupancy, shared-ride services;

Ridesharing passenger loading areas

Accommodation of vanpools in parking facility

Information displays at major trip generators

Accommodations for bicyclists and walkers

Childcare centers at multi-modal transit facilities or park and ride locations

Trip reduction programs for multi-tenant work sites

Transportation Management Associations/organizations

Videoconferencing at commercial development

Aggressive marketing for SOV users to encourage alternative modes

(ix) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;

(x) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;

Bicycle parking facilities

Showers and lockers for bicyclists

Bicycling education and marketing programs

Creation of bicycle paths, rights-of-way, to enable and encourage cycling

Provision of security for bicycle paths, rights-of-way

Accommodation of bicyclists on transit

(xi) programs to control extended idling of vehicles;

Off-street loading facilities for trucks and delivery services

Queuing programs at truck and port facilities

Legislation limiting idling time at major terminals and ports

(xii) programs to reduce motor vehicle emissions, consistent with title II, which are caused by extreme cold start conditions;

(xiii) employer-sponsored programs to permit flexible work schedules;

Employer-based alternative work schedules

Employer-based telecommuting programs

Employer-based flexible work hours

(xiv) programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;

Government or non-profit telework center or facilities sharing

Residential neighborhood development center

Video conferencing center in commercial district/development

Government investment in remote access to information/transactions

(xv) programs for new construction and major reconstructions of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and

Programs to preserve abandon rail rights-of-way and convert it for pedestrian and bicycle use

Programs to ensure continuous rights-of-way are protected for public use

(xvi) program to encourage the voluntary removal from use in the marketplace of Pre-1980 model year light duty vehicles and Pre-1980 model year light duty vehicles and light duty trucks.

Vehicle scrappage programs

Cash for clunker programs

Outline for a Model Transportation Improvement Program

by Hank Dittmar

The Surface Transportation Policy Project receives many requests from professionals and activists alike for a sample Transportation Improvement Program (TIP) that meets the requirements of ISTEA. The TIP is one of the most important products of the transportation planning process as it has been recast under federal law. Prior to ISTEA, the TIP was a largely meaningless wish list of projects, one source which the state used to choose projects for federal funding. ISTEA changed all that, making the TIP the document from which federal projects were selected. Both the metropolitan TIP and the state TIP thus become an important step in the transportation planning process, and thus they need to be recast as user-friendly documents that can be seen to comply with the substantive requirements of ISTEA. What follows is intended to be an outline for such a Transportation Improvement Program, either at the level of the State or the Metropolitan Planning Organization. Other outlines are clearly possible for the TIP - this is intended merely as one possible way of presenting the information. We hope that this outline can serve as a useful tool for integrating the many requirements of ISTEA into a useful programming document for professionals, decision-makers and the public.

Sample Transportation Improvement Program (TIP) Outline:

I. Executive Summary - a two page outline of the contents of the TIP which explains its purpose, the relationship of the TIP to the overall planning process, the amounts and sources of funds programmed, the major projects included and the time period covered.

II. Introduction and Background - A statement of the purpose of the TIP, the legal requirements for it in ISTEA, and the relationship of the TIP to the planning process (i.e. management systems, long range plan, major investment studies and specific project development and environmental processes). Should include a chart of the entire process, including any relevant air quality processes, so that the reader can be oriented.

III. Sources of Funds - This section should detail and explain the various sources of funds included in the Transportation Improvement Program, both federal and non-federal. It should explain the eligible uses of each category of funding and provide background on limitations and availability.

IV. Financial Plan - This section should show how much money is available for each category of funding for each year in the TIP. If innovative sources of funding or bonding are used, this plan should so indicate and explain the assumptions involved in paying back any debt. All

financial assumptions should be indicated in the financial plan, including any assumptions about revenue, such as tax or rate increases, appropriation levels or obligation authority. Any parts of the TIP which rely on future action by a legislative body to raid the money should be clearly identified. Financial assumptions should be specific to the specific categories of funding. Escalation rates for project costs by program year should be outlined here as well. The TIP must be financially constrained, which means that funding must be available for a project within the time period covered by the TIP if it is to be included within the document.

The financial plan should list the annual costs for maintaining and rehabilitating the existing highway, local street and road and transit system. These estimates can be derived from the management systems, which need to be based on a life cycle cost analysis. The plan should clearly show that the TIP first addresses these costs and demonstrates that the region has financial capacity to maintain the existing physical plant per management system strategies.

V. Project Selection Criteria - This section should outline the process for selecting specific projects from those proposed generally in the plan, so that a financially constrained TIP can be put forward. A project selection process can be loosely organized into three stages: screening criteria, scoring criteria, and programming criteria. Screening criteria are those which weed out clearly ineligible or unripe projects. Scoring criteria are those which rank projects against objectives or goals identified in the planning process or deriving from ISTEAs planning factors. Programming criteria are criteria which organize the TIP into program year, fund source and jurisdiction. Project selection criteria are thus qualitative and quantitative. The TIP needs to let a person know what criteria were used to pick the mix of projects proposed within it.

VI. Project Listings - This section of the TIP lists all projects included in the TIP. It should be subdivided by year, by jurisdiction (county, city), and then by funding category. Each project listing needs to identify the route, program or facility number or name, the geographic location, a brief description of project type, scope and purpose, and an identification of costs by fund source and program year. Special information such as air quality status (exempt, TCM, etc.), whether the project involves a Major Investment Study, or status of environmental process should be flagged as well. The project listings section should include a sample page explaining how one reads this section, as this is the most technical part of the TIP.

VII. Adoption Schedule and Public Involvement Process - The draft TIP should explain the process for review and adoption of the document, including date, time and place for all hearings, and meetings where the TIP will be discussed. The draft TIP should also explain the process for submission of comments or questions on the document as well as the process the agency will use to consider and respond to comments. The draft TIP should also explain where the reader can go to examine or receive copies of background information on the TIP or projects included therein. Relevant staff and their phone numbers could also be listed.

The final TIP needs to include a documentation of public comments received as well as the responses to these comments. Any changes made to the draft in response to public comment should be clearly indicated.

VIII. Major Investment Studies - Per ISTEAs planning regulations, the planning process needs to identify what corridors in the state or region have a need for significant capacity expansion. This section should list the Major Investments Studies proposed in the plan or identified here in the TIP by corridor and briefly outline the status and schedule for each.

IX. Finding of Consistency with Plan - ISTEA requires that TIPs be drawn from conforming long range transportation plans. A brief discussion of the plan, its goals and measures of performance, and the manner in which this TIP advances those goals and meets those measures would demonstrate consistency here. Any differences should be identified as well. The relationship to the ISTEA management systems should also be discussed.

The ISTEA requirement that capacity-expanding projects first be considered through a Congestion Management System should be addressed here. Any such projects in the TIP should be listed and the CMS consideration should be documented. All demand and system management actions taken should be listed.

X. Air Quality Conformity Finding - In air quality non-attainment areas, a finding of conformity with the relevant State Implementation Plan needs to be made. This finding should have two parts: an analysis which demonstrates that all applicable Transportation Control Measures are being implemented in a timely and expeditious manner, and a demonstration that the projects and programs being financed by the TIP lead to the attainment of air quality standards. The TCM analysis should: list all relevant TCMs and the schedule for their implementation; identify funding status and implementation status for each TCM; and provide contingency TCMs for any that are stalled.

The analysis of the TIP programs and projects needs to be a quantitative analysis using the five step modeling process. The TIP should include as much documentation of the process as possible, and at the least should tell the reader where complete documentation can be obtained. The TIP should show Vehicle Miles Traveled (VMT), vehicle speed and emissions for the region as a whole and for specific corridors or subareas within the region. Projects for which detailed CO analyses will be required later should be identified.

XI. Results of TIP Implementation & ISTEA Planning Factors - First, the section could summarize where the funds programmed in the TIP are going by jurisdiction, by mode and by type of project. Simple graphics can usefully tell the story, by depicting what percentage of funding is devoted to rehabilitation vs. new capacity, for example; or by detailing the split between highways, local roads, transit and walking and bicycling.

In addition, this section could summarize the benefits and costs of implementing the proposed TIP. How much time will be saved, in the aggregate or in specific corridors? What will be the impact in vehicle speed, transit use, VMT reduction or use of modes such as telecommuting, walking and cycling? What gaps in transit service or access will be filled? What improvement in access to low income persons will result? What economic benefits will result for the region as a whole or for specific communities or population groups within the region?

This section should also examine ISTEA's planning factors, as well as those added by regulation, and provide a discussion as to how the TIP considers each of these factors. For example, a consideration of Title VI of the Civil Rights Act might look at transit system coverage and auto ownership and use by ethnicity and census tract.

XII. Glossary of Terms - The TIP should include a glossary of technical or transportation terms used in it. An acronym dictionary would also be helpful.

Major Investment Studies: An ISTEA Legacy with Promise

by Julie Hoover

Major investment projects merit priority attention from transportation professionals and citizen groups because they involve the expenditure of large sums of money, typically tens of millions of dollars, and can significantly affect mobility and quality-of-life in metropolitan areas.

ISTEA and the Clean Air Act Amendments triggered the need for new major transportation investment planning procedures, which were defined in a preliminary way in the FHWA/FTA Final Rule on Statewide and Metropolitan Planning (Final Rule) issued in the Federal Register on October 28, 1993. Further guidance has been offered in FHWA/FTA seminars held across the country and in a subsequent summary of key questions and answers.

This new corridor planning process, which was conceived to improve transportation investment decisions, came to be called a "Major Investment Study," or MIS. (It was originally characterized as a "Major Investment Analysis" but the corresponding acronym-MIA-was perceived to have a pejorative connotation so the name was changed.)

Major investment studies are required when an agency identifies the potential need for both a major investment and federal funds. Their primary purposes are to provide information about the likely impacts and consequences of alternative transportation investment strategies, and to assist the MPO in adopting the strategy to be implemented as part of its long range plan. A strategy refers to the design concept and scope of a project, and may also include operational and policy (land use, parking availability and pricing, transportation demand management, etc.) components as well as a financial component.

A major investment is officially described as a "high type highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-scale area." Examples include but are not limited to: a new, partially controlled principal arterial; extension of a partially controlled principal arterial (one or more miles); capacity expansion equivalent to one or more lanes on a partially controlled principal arterial; construction or extension of an HOV facility or fixed guideway transit facility; addition of lanes or tracks to a fixed guideway; and substantial increase of transit service on a guideway.

HOW CITIZENS SHOULD BE INVOLVED

Citizens concerned about transportation risk burn out as they are faced with an increasing array of involvement opportunities at state, MPO, and project levels. Not all are equal, of course, for there is broad variation in the intent and responsiveness of the various planning sponsors, the intensity of participation solicited, and the relevant importance of the issues addressed. All things being equal, citizens should take special notice of MISs because the stakes in this arena are so high. To be most effective, make your views known at both federal and local levels.

FHWA Meets FTA to Craft a Common Planning Process: for the past two decades, planning for highway and transit major capital investments has evolved differently.

In general, planning requirements for transit investments have been much more rigorous. Project sponsors had to prepare an Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) before preliminary engineering, which involved close scrutiny of

alternative modes and alignments, a 15-year planning horizon, a financial planning assessment, and cost-effectiveness analyses. Additionally, project sponsors had to obtain federal approval before even embarking on an AA/DEIS. Finally, there was a "one corridor at a time" restriction and a policy of "overmatch," whereby localities which pledged more than minimum local funding were given federal priority.

In contrast, highway investments proceeded in a relatively laissez-faire environment, enjoying an absence of federal approvals to initiate planning studies and limited federal overview of planning products, no corridor restrictions, and a 20-year planning horizon. Financial considerations and cost-effectiveness requirements were non-existent and formal EISs were postponed until preliminary engineering.

In ISTEA, Congress instructed FHWA and FTA to conform their environmental procedures. This provided some of the impetus for developing an integrated planning process. Other ISTEA and Clean Air provisions came into play as the full implications of the reauthorization bill were realized including flexible funding, CAAA requirements for detailed plans, and ISTEA's emphasis on intermodalism.

Who Can Officially Sponsor an MIS: only government agencies. These include state DOTs, MPOs, transit properties, commuter rail and railroad agencies, transportation authorities, and city and county governments.

MISs Feature Interagency Agreements, Public Involvement, and Comprehensiveness: an MIS is a thorough assessment of alternatives in a corridor or subarea. In some respects, it is similar to FTA's former Alternatives Analysis process, although sponsors have the option of deferring the Draft Environmental Impact Statement to the next phase of project development (see following section), a 20-year time horizon prevails, the level of federal oversight is reduced, and there are other minor differences. The MIS must conform to federal regulations and guidance. Key elements include:

- An initial interagency meeting (or meetings) to determine the extent of the MIS. Participants must include: the state DOT; the MPO; relevant transit agencies; environmental resource and permit agencies; affected local officials; the FHWA; FTA; operators of other major modes of transportation; and, where appropriate, community development agencies, major governmental housing bodies, and other related agencies that may be affected by the proposed scope of the analysis. Participation of citizen groups is not mandatory in this formal negotiating process, but is not prohibited either. Some type of public involvement must be conducted during the period.
- It is critical for the sponsoring agency to have a clear statement of purpose and need at these meetings so participants can adequately assess whether the alternatives adequately respond to the corridor's transportation problems. Indeed, the statement itself should be subject to review, especially from the perspective of its comprehensiveness. Another key issue is the level of detail to be addressed in the MIS.
- Any agreements reached should be set down in writing. Denver, which has already gone through the process, has fallen back on their written agreements several times.
- A proactive public involvement program initiated early in the process.
- Consideration of all reasonable alternatives. While sponsors do not have to waste time studying unrealistic options, all rational solutions to the corridor's transportation problems must be addressed. This represents a fairly significant change for highway project sponsors.

- Demand forecasting that includes the level of usage, the basis for the estimation of benefits and costs, freight movement as well as person trips, impact on other facilities, and input to other impact assessments.

Assessments of alternatives to the extent needed to answer community concerns and arrive at a defensible Locally Preferred Alternative. Impact assessments should cover:

- mobility, including needs of the transit-dependent population;
- social, economic, air quality, other environmental, energy concerns;
- operating efficiency and safety;
- land use and economic development;
- goods movement/safety; and
- a financial assessment.

Both direct and indirect impacts must be considered. Assessments should be conducted to the extent needed to identify and evaluate all of the significant differences among the alternatives under consideration, to find fatal flaws, to identify the views of interested parties, and to get some handle on mitigation costs. At present, there is a fair amount of confusion regarding appropriate levels of detail in each area and a manual on MIS preparation is being developed.

The assessments are ultimately incorporated into an evaluation procedure that includes a systematic analysis of expected benefits and costs using both quantitative and qualitative measures consistent with Executive Order 12893 on Principles of Federal Infrastructure Investments.

- Cost estimating that includes capital, operating, and maintenance costs.
- Optional DEIS. (See below.)
- Quality control procedures and processes, including methods to ensure data and analytical quality such as independent peer reviews and fully open public involvement processes.

In addition, sponsors of transit proposals seeking Section 3 money must respond to FTA's project justification and financial criteria; both transit and highway sponsors seeking discretionary money must also comply with the evaluation criteria of relevant Congressional committees.

Dealing with NEPA: the Final Rule offers two options for responding to NEPA's EIS requirements:

Option 1 permits the sponsoring agency to defer the EIS document until the later, preliminary engineering phase. The MIS narrows the range of investment alternatives to one design concept and scope (although more detailed design options may still exist). It provides information for subsequent NEPA documents, including sufficient material to support elimination of alternative investment strategies. This is modeled after FHWA's former planning process.

Option 2, replicating FTA's pre-ISTEA project planning, incorporates a DEIS or Environmental Assessment (EA) into the Alternatives Analysis (now called MIS).

Some federal officials privately predicted that projects which were either very simple or very complex would adopt Option 2, and the remainder would choose Option 1. Their rationale was that sponsors of easily-implementable projects would want to get the environmental requirements over early so they could quickly move into implementation. Sponsors of controversial projects, on the other hand, would have to do a great deal of environmental

analysis in the MIS anyway, and might as well go the few extra steps and comply with EIS documentation requirements.

Option 2 involves some additional up-front time and cost because the full environmental and engineering impacts of all alternatives have to be officially documented on an equal basis. Also, supplemental EISs may be required if the project changes as it moves through preliminary design. On the other hand, some argue that this approach develops a more defensible basis for the elimination of alternatives and the selection of one, and dispenses of the need to repeat environmental and community reviews.

To date, most transit MIS sponsors seem to be choosing Option 1 while sponsors oriented more to highway facilities appear to favor Option 2.

Linkages to Other ISTEA Activities: MISs must be closely integrated with other elements of the ISTEA planning process as well as related requirements such as conformity analysis. The flow chart shown in Figure 2 illustrates how MISs will fit into the rather complicated web of new planning activities.

The focal point of major investment planning is the MPO because all MISs must be included in both their long range transportation plan and their TIP.

A major source of input to plan and TIP development will be the measures and strategies produced from the management systems, especially the Congestion Management System (CMS). If an area does not yet have a CMS in place, is a Transportation Management Area, and is contemplating additional single occupancy vehicle (SOV) capacity, a special congestion analysis called an "SOV Project Analysis" must accompany any new MIS. Other key inputs include the results of policy studies where available; environmental, land use studies, and other technical studies; and, of course, contributions from stakeholders and the public.

MISs may be conducted as part of the plan preparation or update process. Projects which emerge from this process are then evaluated and prioritized. Those adopted move forward if they pass the stringent test of EPA conformity analysis in non-attainment areas. They are placed in the MPO's plan and TIP and the state TIP, all of which must be financially-constrained. The NEPA process is then completed and if all environmental requirements are met, the project advances into implementation.

Ideally, the results of MISs will be available in time for inclusion in the MPO's plan. Until the dust settles and all MPOs have effective planning processes in place, this will not always be the case. Being out of synch is not a fatal flaw, however, because a "place holder" may be assumed and included in the plan. This may be either a "No Build" or a "most promising" alternative. Inclusion of this assumed project allows a conformity determination and financial constraint test to be applied to the project. Once the MIS is completed, the plan will have to be amended to include the selected strategy.

Grandfather Provisions: the MIS requirements do not apply to projects where the environmental process has been completed and a Record of Decision (ROD) or Finding of No Significant Impact (FONSI) has been signed.

For studies underway but not completed, sponsoring agencies need, at a minimum, to consult with FTA, FHWA, the state DOT, transit operators, and the MPO to determine the need to revise the study scope. Consideration will be given to:

- Nearness of the study to completion;
- Whether a reasonable range of alternatives was considered and analyzed

- in the original study scope;
- Whether the study will produce sufficient information to fully evaluate
- investment strategies; and
- The need for enhanced public involvement.

Major Investment Projects Can be Funded in Numerous Ways: a wide variety of funding programs are available to support both the planning and implementation of major capital transportation investments as a result of ISTEA.

Planning, if it is included in the Unified Work Program and the TIP and STIP for programming purposes, can be funded by CMAQ, STP, NHS, or other capital funds administered by FHWA. Some planning funds are also earmarked. It is generally recognized that planning funds are insufficient to support MISs, and that project money needs to be used and is eligible.

For implementation, transit and commuter rail projects can draw upon their Section 9 and 18 allocations as well as compete for discretionary Section 3 funds. Additional programs containing flexible funds which may be transferred to transit include the Surface Transportation Program (STP), the National Highway System (NHS), the Congestion Mitigation and Air Quality program (CMAQ) in non-attainment areas, and several others.

Major highway projects will normally be funded from apportionments for the NHS, STP, Interstate Transfer Program, Minimum Allocation, Donor Bonus, 90% Adjustment, or Hold Harmless categories. Transit Section 9 funds in Transportation Management Areas may also be transferred to highways.

New Federal Roles: Less Ongoing Oversight but New Certification Power: FHWA/FTA see their role in MISs as "partners" rather than "police." For transit projects, this is a significant change from the past, which was characterized by intensive federal oversight and review at each major milestone.

A large portion of future quality control will be provided by peer reviews, which FHWA/FTA are urging in several technical areas. Other quality checks are expected to come from the dynamic of transit agency/state/MPO partnerships, because it is alleged that each agency will keep tabs on the others, a premise which elicits skepticism from some observers. FTA or FHWA will do selective reviews, although there are staff constraints, especially within FTA. Both agencies do need to be consulted, however, as part of the initial MIS consultation process. Projects advancing under NEPA Option 2 will have more federal oversight because FHWA or FTA must be a sponsor of the document.

Additionally, ISTEA breaks precedent with the past 12 years by mandating federal- (rather than self-) certifications of all planning processes in a region. The first cycle will begin this year.

FHWA/FTA must certify MPOs every three years and these reviews will include MISs. Guidelines on certification are currently under development and pilot programs are being conducted over the summer, with citizen participation, MISs, and MPO planning constituting three of five areas investigated. FTA Deputy Administrator (and former STPP Director) Grace Crunican is advocating the use of citizens as part of certification, not just of the citizen participation programs, but of the entire planning processes. In any event, federal officials assure they will definitely seek consultation of major actors beyond the process and project sponsors.

Blueprint for Better Planning or a Burdensome Federal Requirement: for the vast majority of STPP readers, the evolving MIS requirements are a significant change for the better.

A primary benefit of the new planning approach is a level playing field for highways and transit. It also establishes the framework for evaluating highway and transit alternatives against each other. Moreover, it creates the opportunity to develop multimodal strategies encompassing highway and transit solutions.

Another advantage is the significant impetus it creates to bring major investment projects into the fold of comprehensive regional planning, thereby strengthening the role of the MPO. It is also hoped the procedures will spark greater cooperation among state, MPO, and transit agencies.

Other benefits include assessment of a broader range of alternatives; earlier consideration (before a decision is made) in FHWA-sponsored projects of social, economic, and environmental effects; a 20-year target for FTA-sponsored projects, allowing more time to realize transit's long-term benefits; elimination of FTA's onerous "one corridor" requirement and project initiation threshold tests; and the potential for more uniform, meaningful public involvement.

There are some, of course, anxious to get on with building their projects in the face of mounting congestion, who deplore the delays (real and perceived) that will be caused by the new expanded studies. Others are hostile to the notion of any additional federal planning requirements and/or fearful, especially since so many procedures are still undefined.

It is unfortunate that it has taken FHWA and FTA so long to agree on even the skeleton procedures we currently have, and while their travelling seminars were immensely useful, everyone-including those unable to attend the introductory sessions-believe written guidance is sorely needed.

An additional shortcoming is the absence of practitioner and public input to the development of the guidance to date, except for comments received on the Notice of Proposed Rulemaking on Metropolitan Planning issued in March 1993, which only addressed the basic concept of MISs and a few key issues. While there is no formal requirement for public participation in the development of federal guidance, the voluntary provision of opportunities to comment would be in keeping with the spirit of ISTEA.

Further, there are many questions about how NEPA Option 1 will play out. Will public officials and citizens be put through two extensive involvement processes for the same project? If there is extensive citizen participation during the MIS, will public interest fall off when NEPA begins, thus reducing outside scrutiny of project development during a critical phase? Although federal officials in Washington assure that MISs will produce environmental and community impact information to the degree necessary to respond to all public concerns, will this really be the case? The budgets of some forthcoming MISs suggest otherwise. What happens if new alternatives are discovered during NEPA, or if analyses used to dismiss alternatives previously considered are found to be inadequate? Might project development then take more, rather than less, time? Answers will be evolve over the next year or two as MISs advance through the new regulations.

Finally, many have concern about the numerous outstanding MIS-related issues, and hope they will be resolved in the very near future.

In spite of these concerns, overall MIS requirements are headed generally in the right direction. Who can really argue against spending a bit more time and effort to do good comprehensive, participatory planning before spending tens or hundreds of millions of dollars on a new transportation facility?

Forthcoming Federal Guidance and Assistance

There will be significant changes to MIS procedures over the coming year as federal officials issue additional regulations and guidance that fine-tune and expand upon existing requirements. Interested professionals and citizens should make their views known at every opportunity. Future modifications include:

- A new FTA Major Capital Investment Policy to formally address the wide range of Section 3 New Start project investment criteria called for in ISTEA, expected during the 1994 Fiscal Year. These include, in addition to cost-effectiveness, mobility improvements, environmental benefits, operating efficiencies, and other factors such as land use and economic development.
- A Notice of Proposed Rulemaking (NPRM) on joint FHWA/FTA environmental procedures is scheduled for release in late 1994. This NPRM will reflect the new MIS requirements as well as corridor preservation guidelines. When finalized, this rule will replace the 1987 joint regulations.
- A senior FHWA official has indicated there will be more future guidance on public involvement, building on actual practice and comments obtained.
- Some type of document describing how certification will be conducted and what specific evaluation criteria will be used has been promised by various Administration officials, although no availability date has been set.
- Case studies of "best practices" for major investment planning sponsored by FHWA/FTA will be out before the end of the year. Other case studies and additional multimodal planning research projects are being sponsored by the National Cooperative Highway Research Program, although they will not be available for some time.
- An MIS manual and a three-day training course will be available by the end of the year. Two pilot courses will be conducted in 1994 and at least 12 taught over the next two years. Both are sponsored by the National Transit Institute with participation by FTA and FHWA.

Suggested Federal Actions:

Support current federal efforts to obtain citizen involvement in certification by suggesting ways this could rationally be accomplished, participating in certification reviews in your area, etc.

- Comment on Notices of Proposed Rulemaking such as the forthcoming one on joint environmental procedures.
- Comment on open nonregulatory federal dockets soliciting observations and suggestions on public involvement and MIS procedures.
- Assess existing procedures and lobby for improvement where necessary.

- Ask to attend one of the National Transit Institute's MIS training programs if you or your group have the time and resources to make such a commitment. The knowledge you will acquire in this course will help put you on an equal footing with the professionals.

Specific Local MIS Actions:

- Be actively involved in the initial meetings for all MISs in your areas. Make sure the study scopes include a full range of alternatives and address all relevant issues. Review carefully the project's purpose and need statement and project evaluation criteria; call on regional federal officials if you sense a problem. If the MPO is proceeding under grandfather provisions, add your views to the assessment of the adequacy of prior citizen participation efforts, as well as the other key issue areas. Urge your MPO to include citizens in the official meetings. If this is not possible, remind them that federal regulations call for some sort of public input in this initial stage. Think about the pros and cons of the NEPA options, and make your views known.
- Participate actively in whatever program is developed. Work to get other potentially concerned individuals and groups involved, and try to establish constructive working relationships with the project sponsors. If necessary, remind local officials that ISTEA regulations call for "complete information, timely public notice, and full public access to key decisions," as well as early and continuing involvement of the public. Special efforts must be made to obtain participation of those traditionally underserved by existing transportation systems, including low income and minority households. A Response-to-Comments record should be maintained and MPOs must periodically monitor effectiveness.
- Take advantage of opportunities to participate in the selection of a preferred alternative.
- Testify at meetings and hearings and lobby the elected officials of your MPO.
- If the Locally Preferred Alternative is a project you favor, you can often be very effective in assisting the project sponsor in its implementation.
- Work within the MPO planning process to promote future MISs you feel will advance your vision for your region.
- Become familiar with ISTEA and its flexible funding programs, as well as the Clean Air Act Amendments and current conformity regulations.

ISTEA Congestion Management Systems: Expanding the notion of System Performance

Expanding the notion of System Performance

by Robert Stanley

Overview of Management Systems Under ISTEA: the enactment of the Intermodal Surface Transportation Efficiency Act of 1991, or ISTEA, has introduced fundamental change in the procedures and processes we have traditionally used to plan, build and operate the network of transportation facilities and services that move people and goods. In both the letter of the law and in its broad intent, ISTEA emphasizes a number of key themes. Among them is the need for:

- Improved performance on the surface transportation system;
- Better connections and interrelationships between and systems and services to create a "seamless network;"
- Increased travel and transportation options and better balance among the options available;
- Greater efficiency in utilization of scarce funds;
- Broader involvement and participation in transportation decision-making; and,
- Greater attention to fundamental community and national goals in evaluating and selecting transportation investments, improvements and actions.

In a word, what ISTEA requires is far more effective MANAGEMENT of our current and future transportation network and transportation resources.

The theme of better managing our transportation network has been reinforced in ISTEA by a specific requirement that each state design and institute a series of six new, interrelated "management and monitoring systems."¹

Each of the six new management systems listed in Figure 1 are intended to enhance our ability to diagnose existing and potential problems throughout the entire surface transportation network, and to evaluate and prioritize alternative strategies, actions and solutions. The use of the management systems is intended to improve, not replace, the overall planning process, as well as improve the performance of the transportation network.

The nature, scope and use of these management systems is still being debated at the state and local level. They must, however, be fully operational by October 1, 1996, in most cases.

The sections below outline in more detail the nature of the ISTEA management system requirements generally and the unique features and characteristics of the Congestion Management System (CMS) in particular.

(1) The required management systems are described in Section 1034 of the Intermodal Surface Transportation Efficiency Act. On December 1, 1993, the U.S. DOT issued guidance to implement Section 1034 entitled, "Managing and Monitoring Systems, Interim Final Rule," which describes the scope and nature of each of the systems. In simplest terms, the management systems can be thought of as computerized databases that contain shared information on both the physical facilities and the operations of the entire surface transportation system. In addition to housing information that can be applied in a wide

range of analyses and decision-making, the management systems are expected to contain built-in analysis routines that assist in evaluating current conditions as well as alternative plans and strategies. It is assumed that each of the management systems themselves will be linked with one of another, and that they will be accessible to a variety of outside users, including local agencies, MPOs, transit agencies, research organizations and others.

Figure 1

ISTEA Management Systems*

Pavement Management System (PMS)

Bridge Management System (BMS)

Highway Safety Management System (SMS)

Traffic Congestion Management System (CMS)

Public Transit Facilities and Equipment Management System (PTMS)

Intermodal Management System (IMS)

* In addition to the six management systems noted above, a seventh system is required in ISTEA, the "Traffic Monitoring System for Highways," or TMS/H. Because states and localities already conduct extensive traffic monitoring, the purpose of the TMS/H requirements in ISTEA is to enhance current traffic monitoring practices to support the other six management systems.

Purpose of the ISTEA Management Systems: the management systems are intended to provide additional information and improved analysis to support development of metropolitan and statewide transportation plans, programs and projects. In particular, management systems are expected to improve the establishment of project funding priorities across modes and the analysis of trade-offs among the full range of potential transportation investments being considered.

The ISTEA Interim Final Rule also defines management systems as, "a systematic process (emphasis added), designed to assist decision-makers in selecting cost-effective strategies/actions to improve the efficiency and safety of and protect the investment in, the nation's transportation infrastructure." 2

2"Managing and Monitoring Systems: Interim Final Rule," Federal Register. December 1, 1993. p. 63476.

Each of the management systems are expected to involve or include:

- Data collection and analysis;
- Identification of performance measures;

- Determination of needs;
- Evaluation and selection of strategies/actions to address needs; and
- Evaluation of the effectiveness of the implemented strategies/actions.

In other words, management systems are expected to enhance the traditional transportation planning process at both the project planning and system levels by providing more systematic and comprehensive data and analyses across the network as a whole.

Management System Development Schedule: development of the ISTEA management systems is to take place over the 1994 to 1998 period, with various milestones to be achieved for each system in that timeframe. Figure 2 highlights the management system development schedule that generally includes:

- Submission of "work plans" by October 1994;
- Limited implementation and application of each system by October 1995; and
- Full implementation of each by October 1996, 1997 or 1998.
- **Who is Responsible for Management System Development:** the primary responsibility for management system development lies with the state, although it is anticipated that each state will tailor its management systems to meet state, regional and local goals, policies, resources and conditions.

The states, in turn, are directed to coordinate development, establishment and implementation of the management systems with designated Metropolitan Planning Organizations (MPOs), local officials, federal transit grant recipients and other agencies that operate affected transportation systems or facilities. In addition, the states are allowed to enter into agreements with these agencies to develop or implement any part of or all of the management systems subject to state coordination.

Generally, states have designated specific staff from state DOTs to lead development of each management system, and have convened management system users and participants to help guide the initial development effort.

The Focus of Various Management Systems: Assets vs. Performance: the ISTEA management systems are different in their basic character and scope. Three of the systems -- pavement (PMS), bridge (BMS) and transit (PTMS) -- are asset-oriented systems. Their major purpose is to inventory and track the condition of various elements or components of the network and assist in establishing cost-effective capital investment strategies to get the maximum use from facilities and services.

Three other management systems -- safety (SMS), congestion (CMS), and traffic monitoring (TMS/H) -- are focused more directly on the performance and operation of the transportation network. The intermodal management (IMS) system combines both asset and performance management features.

To be used most effectively, the various management systems must draw on common or shared databases and information covering all elements of the network and their performance. Ideally they are intended to inform and support planning and decision-making at all levels, from project-specific planning, to multi-year budgetary planning, to long-range strategic planning.

The Congestion Management System -- Multimodal System Performance: the Congestion Management System, or CMS, is one of the more innovative and challenging of the six management systems. Congestion management not only implies a direct customer orientation to planning and investment, it can potentially provide a mechanism to measure

directly the economic and environmental consequences of current system performance and future proposed improvements.

The specific requirements of the Congestion Management System are to formulate measures of performance applicable to all modes, monitor conditions on the entire transportation system network, identify where congestion problems are most severe, and to evaluate the impact of various congestion mitigation strategies to relieve current or projected levels of congestion. In particular, the CMS is intended to provide the basis for analyzing all reasonable alternatives to expanding single-occupant vehicle highway capacity in Transportation Management Areas, or TMAs (areas of over 200,000 population) that are in non-attainment status for carbon monoxide or ozone.

These objectives make the CMS unique in at least three respects:

1. It focuses directly on system performance and efficiency and calls for broader, multimodal performance monitoring;
2. It is intended for use in examining strategies for reducing single occupant vehicle (SOV) use; and,
3. It provides a direct, formal link to planning required under the 1990 Clean Air Act Amendments.

Measuring System Performance and Efficiency: critical to the concept of congestion management as outlined in ISTEA is the notion that the "acceptable" threshold levels of congestion will vary from locale to locale, and across different transportation modes and systems, and that the CMS should reflect local determinations of what constitutes an agreed-upon norm or threshold level.

Traditionally, congestion has been measured independently for different modes. A variety of statistical measures have been used to relate the capacity of a particular facility to the volume of use on the facility. A concept called "level of service," or LOS was intended to capture a variety of qualitative as well as quantitative aspects of travel. As a practical matter, however, levels of service are typically determined by one or two statistical measures of effectiveness relating volume and capacity.

In the context of ISTEA, however, many traditional measures, taken individually, are considered too narrowly focused because they tend to emphasize vehicle movement rather than person movement, they are oriented toward expanding rather than managing the supply and capacity of existing facilities, and they tend to emphasize problems and deficiencies rather than options and alternatives. The CMS requirements of ISTEA call for a broader and more multimodal assessment of system performance that is geared more to issues of mobility, access and the quality of the entire travel experience.

Fundamental to the development of a CMS, therefore, is the identification of a broader array of performance measures that eliminate the shortcomings of a traditional traffic engineering approach to congestion measurement and can be used to evaluate all modes and improvement strategies. In simplest terms:

Congestion management requires measures that identify the degree to which travel time and/or delays are within locally agreed upon ranges or norms;

- Mobility measures must include the extent to which options are available as well as their relative travel time and costs; and,
- Access measures must incorporate the characteristics of the land use and development patterns as well as transportation system operating characteristics.

A wide variety of measures covering these aspects of congestion management are available or currently in use. In addition, a wide range of data is typically available that will be critical in CMS development. Recognizing the need to monitor person movement more effectively (rather than just the movement of vehicles), the Interim Final Rule provides examples of measures that directly address person travel, including the number of persons using HOV (or preferential facilities), the proportion of persons congested or delayed, person hours of delay and vehicle occupancy counts. Clearly, however, no single measure (or small combination of measures) will adequately capture the conditions in all areas, or allow adequate analysis of alternative strategies or congestion mitigation measures.

One of the most useful resources in examining and selecting appropriate CMS performance measures is a document prepared in part by Cambridge Systematics, Inc. and others for the Federal Highway Administration entitled, "Congestion Management Systems: Metropolitan Planning Technical Report," Report No. 2, July 1994. The report summarizes current CMS development efforts in selected states and presents an overview of analytical procedures to support a CMS, including a literature review and a comprehensive review of performance measures in the broad framework highlighted above.

The selection and application of performance measures for a CMS (locally or at the state level), however, requires consideration of several factors. Figure 2, taken from the July FHWA Technical Report, identifies the evaluation criteria that should be considered in selecting CMS performance measures of any type.

Figure 2

Evaluation Criteria for CMS Performance Measures

- Area Type, Facility Type and Scale of Use
- Applicable to large urbanized areas, small-to-medium areas, or rural (or non-urban) areas
- Can discriminate between freeways and other surface facilities
- Usable at the regional, subarea, or corridor level
- Usable for individual transportation projects
- Capable of being reported at the state level

Multimodal and ISTEA Relationships

- Applicable to the movement of persons and goods
- Relatable to other ISTEA management systems, especially IMS, PTMS, and SMS
- Interpretable with respect to user cost, air quality, safety, economic, and general quality-of-life measures

Temporal Issues

- Capable of discriminating between peak period, off-peak, and daily congestion levels
- Can address seasonal congestion associated with tourism, agricultural harvests, etc.
- Capable of expressing the magnitude, spatial, and temporal extent of congestion

Technical Analysis and Data Requirements

- Constitutes a direct measure of congestion
- Capable of diagnosing transportation system deficiencies; a "triggering" device that will cause further study to occur
- Relatable to existing data collection and analysis methods

- Understandable to the transportation profession and the public
- Relatable to thresholds; how well the system is performing
- Capable of being forecasted
- Capable of supporting evaluation of congestion management and mobility enhancement strategies

Source: *Congestion Management Systems: Metropolitan Planning*

Technical Report, FHWA Report No. 2, Cambridge Systematics, Inc. et al, July 1994.

Congestion Management Strategies for Improving Performance: considerable effort is underway in many areas of the country to evaluate actions and strategies that may prove to be useful in controlling or reducing congestion. Much of the analytical work has been triggered by interest in identifying actions that are most effective in reducing mobile source emissions as part of Clean Air Act compliance efforts. The results to date show, not surprisingly, that: (1) no single strategy can be expected to address the majority of the problem; and, (2) strategies easiest to implement tend to be least effective and those that may be most effective are the most politically difficult to enact. The same observation is generally true for congestion management and mitigation. A range of strategies and actions are needed and the menu must be tailored to the particular area and circumstances under consideration.

The Interim Final Rule on CMSs explicitly identifies a series of strategies that should be considered, taking care to indicate that the list provides examples only and is not intended to be all-inclusive. The strategies noted in the rule are contained in Figure 3.

Figure 3

Interim Rule Congestion Management Strategies

1. Transportation demand management measures
2. Traffic operational improvements
3. Measures to encourage HOV use
4. Public transit capital improvements
5. Public transit operational improvements
6. Measures to encourage the use of bicycle, pedestrian and ferry systems
7. Congestion pricing
8. Growth management and activity center strategies
9. Access management techniques
10. Incident management
11. Intelligent transportation systems (formerly referred to as IVHS)
12. Addition of general purpose lanes

Relationship of a CMS to Other ISTEA Management Systems: the Interim Final Rule of ISTEA monitoring and management systems states that, "because of their interrelationship, the development, establishment and implementation of the CMS shall be coordinated with the development, establishment and implementation" of the PTMS and IMS. In addition, there are linkages that must be considered in data and performance measurement between a CMS and the traffic monitoring system (TMS/H), as well as the safety management system (SMS).

Common to the development of all the management systems is the need to use the systems to identify and evaluate alternative actions and strategies, and to evaluate the effectiveness of those projects and plans that are carried forward. As a result, the coordination of the CMS with other management systems is likely to initially involve: (1) shared or common data; and (2) shared or common performance measures.

Ultimately, the relationship between individual management systems will include mechanisms that are used to apply management system results to state and metropolitan decision-making. At this level, it may be expected over time that existing agencies and organizations may "reengineer" their decision-making processes and perhaps even their organizational structure as part of the implementation of new management systems. Review of organizational structures, missions and decision-making processes is, in fact, taking place in several states in parallel with -- and triggered by -- the need to develop the ISTEA management systems and new multimodal planning efforts.

Congestion Management Systems, SOV Use and Clean Air: pursuit of clean air objectives and enhanced management of the transportation network through the use of a CMS obviously go hand-in-hand. The Interim Final Rule on management systems, other planning provisions of ISTEA, and provisions of the Clean Air Act Amendments all note or reflect the close linkage between a CMS and air quality planning. Among the most important of these linkages are:

Interim Final Rule requirements to consider strategies that reduce SOV use, as discussed above;

- ISTEA language that requires highway projects that increase SOV capacity in non-attainment Transportation Management Areas (TMAs) to be part of an approved CMS; and,
- Interim Final Rule requirements that strategies resulting from the CMS be coordinated with the development of transportation control measures as part of State Implementation Plans.

As suggested earlier, however, the role of the CMS extends beyond the achievement of air quality objectives to include monitoring mobility, goods movement, multimodal system utilization and overall transportation system performance. As a result, it is important to recognize that congestion reduction strategies examined in a broadly configured CMS may not always have comparable air quality benefits. As a result, state and local officials have to determine the extent to which the CMS will or can support required air quality analysis. Approaches could range from simply monitoring VMT, speed and congestion within the CMS, to use of the CMS to develop emission inventories and trigger determinations of conformity.

The relationship of a CMS to air quality planning and evaluation can be assessed in several dimensions. The first is common data requirements. Traffic volumes, vehicle speeds, the mix of vehicle types, vehicle occupancy, mode splits, time factors and many other data elements are fundamentally important in monitoring the achievement of both air quality and congestion objectives. In addition, factors and data that are of greater importance for air quality purposes could also be incorporated into a CMS database, with the effect of enhancing both the CMS and its use in air quality planning. Examples include vehicle acceleration data, speed changes and related information.

A second area in which the CMS/clean air linkage can be established is in development of performance measures for use in the CMS. Typical measures of congestion like level of service and travel time delay may be of limited use in air quality analysis. Similarly some measures that are discussed in CMS development are more directly applicable in air quality

planning than in congestion measurement, including average vehicle occupancy or mode share.

A final area in which the relationship of a CMS and air quality planning and analysis might be strengthened is in evaluation of mitigation strategies and related actions. Because the CMS is to be used to evaluate various strategies for congestion reduction, and because many of the strategies, as suggested by Figure 4, are also considered Transportation Control Measures (TCMs) within the context of air quality planning, a CMS could eventually provide a means of calculating emissions reductions or otherwise evaluating the impacts of TCMs required in non-attainment areas under the Clean Air Act. TCMs under consideration in a region should, therefore, regularly be analyzed as part of the battery of actions proposed in or emerging from the application of a CMS.

The potential relationships between a CMS and the process of monitoring and evaluating clean air compliance are so broad that neither activity should be pursued without a thorough understanding of scope, status and progress on the other, including the sustained involvement of the agencies and actors responsible for each.

An Example:

CMS Principles for Albany, New York

Metropolitan areas throughout the country as well as states are not only developing the required work plans to be followed in establishing a CMS, in many cases they are beginning CMS implementation. Among the efforts documented in the July 1994 FHWA report is activity in Albany, New York. Summarized below are seven principals that were adopted by the Capitol District Transportation Commission to guide selection of performance measures and development of strategies:

1. Management of demand is preferable to accommodation of single-occupant vehicle demand growth.
2. Cost effective operational actions are preferable to physical highway capacity expansion.
3. Land use management is critical to the protection of transportation system investment.
4. Capital projects designed to provide significant physical highway capacity expansion are appropriate congestion management actions only under certain conditions.
5. Significant physical highway capacity additions carried out in the context of major infrastructure renewal are appropriate only under certain conditions.
6. Incident management is essential to effective congestion management.
7. Corridor protection and official street mapping are necessary to preserve options.

Collaborating on Congestion Management: much of the activity in response to ISTEA has been focused on realignment and expansion of the participatory and public involvement processes that have long been a relatively pro forma feature of transportation planning. Several themes and new directions are worthy of added emphasis with respect to the new cooperative / collaborative / consultative nature of transportation planning and decision-making in the ISTEA era.

The general nature of collaborative action under ISTEA has changed in several broad ways. First, traditional participatory processes in the past were applied almost exclusively in consideration of capacity expansion projects and programs. The decisions involving maintenance and management of existing systems -- both physically and functionally --

were routinely made by planning and engineering professionals using relatively narrow technical bases that addressed the conditions or performance of individual modes.

Today, maintenance of existing systems both physically and functionally is synonymous with the overarching goal of ISTEA --increasing the efficiency of the transportation network. Expansion of the participatory process into this area requires additional progress on two broad fronts: (1) new technical knowledge and understanding on the part of non-professional participants; and (2) a much broader perspective by transportation professionals who have traditionally focused on traffic operations between the right-of-way lines of street and highway facilities.

A second change in the collaborative nature of system planning and management under ISTEA is expansion in the numbers and types of participants that have an assumed or professed interest and stake in the decisions that result from both traditional planning activity and from new initiatives like management system development. New players need to be brought productively into new processes as those processes are designed, whether they are management systems or the "reengineered" business processes that management systems are intended to support. Development of a CMS provides a major challenge and opportunity in expanding the participatory nature of ISTEA planning activity.

Key Areas for Collaboration and Coordination: development of ISTEA management systems is well underway in every state. Initial activity has generally involved assembling teams of professional staff members, designing procedures for use in preparing required management system work programs, and beginning initial management system development tasks. Typically the initial tasks involve review of agency planning and decision-making processes, review of current databases, review of existing computer systems and their capabilities, and discussion of the performance measures that might be incorporated into the management systems.

Cooperation between various public agencies in development of the ISTEA management systems is required. In every state, the activities noted above include to varying degrees the involvement of Metropolitan Planning Organization (MPO) officials, local officials, and affected agencies receiving assistance from the Federal Transit Administration (FTA), including private owners and operators. There is significant variation, however, in how this consultation is taking place and the scope of activity involved. Not all participants are likely to feel their involvement is adequate or productive.

In carrying out the required coordination activities, many states have designed participatory processes that involve both "in-reach" activities with the staff of affected government agencies, and "out-reach" activities that involve contacts and coordination with agencies outside those directly responsible for management system development and use. In some instances, states are making contacts with various user groups, like shippers, to gain a better understanding of the issues and problems that users experience. This information can help shape the kinds of data, performance measures, analytical procedures and strategies that might be incorporated into the CMS as well as other management systems.

With respect to broader public involvement in general, however, there are no explicit requirements of state or local agencies to provide an independent public participation process in development of the ISTEA management systems. The rationale for this approach, contained in the Interim Final Rule, is that since use of the management systems will result in proposed activities to be considered within the overall transportation planning and decision-making process, and since public involvement requirements of ISTEA are firmly stated for the overall planning and decision-making processes, public interest in the scope and application of the management systems can be addressed within the overall planning process.

Whether this approach is considered adequate or not, there are a number of issues on which interested parties should focus during the ongoing management system development process. Many of the aspects of management systems that may be of greatest importance to the broader community of interests have been touched on above, including:

- Parallel efforts to reformulate agency goals, missions and business practices;
- The specific goals and objectives to be established for the CMS and other management systems;
- Scope and content of the CMS, e.g., data requirements, performance measures being considered, scope and extent of the CMS network in particular, etc.; and
- Emerging proposals for how the output of the CMS is to be used with respect to long range and strategic system planning, policy planning and development, and project planning and funding decisions.

Decisions on all of these matters are likely to be very fluid at this time and will certainly be the subject of continued discussion through the next year across all the states as management system implementation begins in earnest.

While each state is well on the way to meeting the ISTEA management systems requirements, the usefulness of the management systems individually and in combination over the long term will depend, to a considerable degree, on how effectively the systems reflect the concerns and interests of customers in combination with the interests of system owners and operators. Being mindful of this customer orientation should provide an impetus for a wide variety of interests to closely follow if not seek opportunities to directly engage in the continuing process of management system design. Between September 1994 and January 1995, the development and submittal of required management system work plans to the Federal Highway Administration division offices and Federal Transit Administration regional offices provides one potential opportunity to better understand the directions that are being taken in response to the management system requirements of ISTEA.

Appendix 1

Potential Roadway CMS Performance Measures

Time-Related Measures

- Average Travel Speed
- Average Travel Time
- Average Travel Rate
- Travel Time Contours
- Origin-Destination Travel Time
- Percent Travel Time Under Delay Conditions
- Percent of Time Average Speed Below Threshold Value

Volume Measures

- Vehicle-miles per Lane Mile
- Traffic Volume

Congestion Indices

- Congestion Index
- Roadway Congestion Index
- Texas Transportation Institute Suggested Congestion Index
- Excess Delay

Delay Measures

- Delay per Trip
- Delay per Vehicle Mile of Travel
- Minute-Miles of Delay
- Delay due to Construction/incidents

Level-of-Service Measures

- Lane-miles at/of LOS "X"
- VHT/VMT at/of LOS "X"
- Predominant Intersection LOS
- Number of Congested Intersections

Vehicle Occupancy/Ridership Measures

- Average Vehicle Ridership
- Persons/vehicle

Source: *Congestion Management Systems: Metropolitan Planning Technical Report*, FHWA Report No. 2, Cambridge Systematics, Inc. et al, July 1994.

Appendix 2

Potential Transit / Travel Demand Management CMS Performance Measures

Population Served

- Route Spacing
- Frequency of Service
- In-Vehicle Travel Time
- Travel Time (Origin-to-Destination)

Person Miles of Travel

- Person Hours of Travel
- Modal Shares
- Vehicle Occupancy
- TDM Program Coverage

Transit Hours per Capita

- Non-motorized Facilities Coverage
- Riders Per Vehicle Mile
- Riders Per Vehicle Hour
- Peak Load Factors

On-Time performance

- Cost Per Rider
- Vehicle Hours Per Employee
- Vehicle Miles Per Employee

Source: *Congestion Management Systems: Metropolitan Planning Technical Report*, FHWA Report No. 2, Cambridge Systematics, Inc. et al, July 1994.

Defining and Managing the Metropolitan Transportation System

by Hank Dittmar

In December 1991, the United States Congress passed and President George Bush signed into law a landmark piece of legislation which reshaped the orientation of national transportation policy and expenditures. The new Intermodal Surface Transportation Efficiency Act (ISTEA) has been called many things: a law which frames transportation decisions in the context of larger societal goals, a bill to help implement clean air standards, and the bill which empowers hitherto neglected regional organizations called Metropolitan Planning Organizations. The bill provides dedicated funding to metropolitan areas, imposes new planning requirements at both the state and the metropolitan level, focuses attention on asset management and system performance, and greatly increases the type and number of projects that can be funded with federal dollars. ISTEA seems to promise that America will focus on congestion and environmental problems in the nation's metropolitan areas. The ISTEA requirement for the designation of a metropolitan transportation system (MTS) provides the needed tool for addressing urban and suburban problems, just as the bill's call for a National Highway System is intended to provide that focus for intercity, interstate and international passenger and freight movement.

The lack of a defined metropolitan system in America's cities and the historical use of the Interstate system as its surrogate has distorted transportation priorities in most cities. The requirement to develop a Metropolitan Transportation System (MTS) can guide planning, allow the setting of investment priorities and the management of a multimodal transportation system in an efficient manner. The MTS requirement within metropolitan areas can enable regional bodies like Metropolitan Planning Organizations to develop the objectivity and the focus needed to manage the system in a manner that meets both the economic needs of the region today and the environmental objectives required over the long term.

Background on ISTEA Legislation: the Intermodal Surface Transportation Efficiency Act broke with past practice by looking beyond the old focus on linking the nation's cities through the Interstate highway system to a new realization that the nation also needed to address the mobility, quality of life and environmental problems of the nation's metropolitan areas. To address these problems, Congress recognized that new tools were needed: the flexibility at the state and regional level to fund the type of improvements needed, the ability to enhance existing transportation infrastructure to address its impact on the environment, tools to address the challenges of both maintaining deteriorating physical assets and improving transportation system performance, better planning and programming which was responsive to social and economic factors, and increased involvement of the public and affected parties in the process. Congress also recognized the need for protecting the substantial federal investment in a national transportation system, and thus created a process for designating a National Highway System of approximately 155,000 miles.

The ISTEA legislation clearly provides a focus on the nation's metropolitan areas with its emphasis on heightened planning and programming requirements for Metropolitan Planning Organizations in Transportation Management Areas (metropolitan areas over 200,000 in population) and non attainment areas. The dedication of a portion of Surface Transportation Program (STP) funds to areas over 200,000 in population and Congestion Mitigation and Air Quality dollars to projects in air quality non-attainment areas further demonstrates that air quality and congestion relief in the nation's urban and suburban areas are primary concerns in ISTEA.

Implementing ISTEA - Two Years On: ISTEA truly was a major shift in transportation thinking in the United States - from a focus on connecting cities and building a new system to a focus on managing an existing system and addressing its consequences (congestion, air and water pollution, neighborhood and town disruption, loss of open space). Its focus on metropolitan areas represented another major shift as the federal transportation program had traditionally been seen as a block grant to the fifty states. The dedication of specific funding to substate metropolitan areas and for solving problems with environment was a new idea. The states have been slow to respond and the federal government slow to direct change - ISTEA's important planning regulations were not issued until twenty-two months after ISTEA passed.

Similarly, cities, counties, transit operators and citizens in metropolitan areas did not have the power or responsibility to make investment decisions about transportation before the passage of the new law. When this new regional authority and funding is coupled with new planning, programming and public participation deadlines and requirements, it's no wonder that many MPOs along with their constituents feel overwhelmed by the challenge. A real danger exists that the enormity of the challenge can lead to real dissatisfaction with ISTEA as a whole both among those who embrace the change but decry the lack of instant progress and those who fear it.

MTS - An Organizing Concept That Makes ISTEA Workable: some focus of the new ISTEA effort in the metropolitan areas must be defined, around which the new plans, programs and constituencies may organize. The Metropolitan Transportation System can provide this central organizing focus for Metropolitan Planning Organizations, states, local officials, transit operators and interest groups seeking to implement ISTEA. The MTS can be the focus of federal investment in the metropolitan areas through the Transportation Improvement Program and can be an organizing system around which asset management systems such as pavement, bridge, transit and safety systems are designed. Congestion management and intermodal management systems can focus upon the performance of the MTS; and the long range plan can be the twenty year blueprint for developing, operating and managing the MTS. Finally, the Metropolitan Transportation System can be the tool for rationalizing and maintaining the performance of the National Highway System inside the nation's metropolitan areas.

At this point, the ISTEA requirement for designating an MTS as a key part of the metropolitan planning process is barely mentioned in the ISTEA planning regulations promulgated by FHWA and FTA. Several MPOs, in both large and small areas, are taking this Congressional directive seriously, however, with positive results. New legislation introduced in the Congress by Representative Robert Borski of Philadelphia calls for the development of a National Transportation System, with the Metropolitan Transportation System as its key building block.

What is the MTS and how can it be defined: the Metropolitan Transportation System as defined in ISTEA has a multimodal focus, an integration focus and a functional focus. As such, it reaches beyond the old road categories to look at principal arterials in the metropolitan areas, transit corridors, intermodal facilities such as trucking distribution centers, passenger terminals, ports, airports and railheads, as well as rail rights of way. The focus is on the integration of all the modes in the way that the user integrates modes in a trip into a functioning metropolitan system.

The Metropolitan Transportation System accommodates as well the concepts of real time management of the system, user information systems and a focus on the whole trip, not just individual facilities. The concept of managing a metropolitan transportation system also implies coordination of day-to-day activities between the varied parties who own and

operate the Metropolitan Transportation System. The purpose of the system is to accommodate, per ISTEA, important national and regional functions (elsewhere defined as ISTEA's planning factors).

Albany, New York: the Capital District Transportation Commission: in Albany, New York, the Capital District Transportation Committee defined their Metropolitan Transportation System to include "regionally significant highways, arterials, transit systems, ports, airports and appropriate non-motorized facilities within metropolitan area boundaries. The National Highway System (NHS), as it is defined within the metropolitan area boundaries, is an explicit subset of the greater MTS." [Capital District Transportation Committee, Definition of the Metropolitan Transportation System, July 1993]

In Albany, designation of a facility for the MTS is based upon the function of the facility, as the objective of the exercise is to designate the regional system so that it can be managed and operated as a system. Accordingly, the Albany MPO suggested five functional criteria for consideration in determining whether a facility should be part of the designated Metropolitan Transportation System. A facility should provide access to major activity centers, facilitate modal and intermodal connections, provide modal options to relieve congested parts of the system, accommodate high volume demand, and/or provide essential service for which limited opportunities exist.

The Albany effort has revolved around the development of their long range transportation plan and has included the development of congestion management strategies for the Metropolitan Transportation System, a freight planning effort for this upstate New York region, and the development of measures of accessibility and performance for the transportation system. The selected measures include such factors as pedestrian, residential and commercial access in addition to the usual measurements of speed and volume for through traffic. The Albany MTS recognizes that users of a Metropolitan Transportation System are also non-users of that system and are hence affected by that system. As such, the planning effort reflects a desire to optimize among community, environmental and mobility objectives and an explicit subordination of transportation system objectives to broader system goals.

San Francisco Bay Area - Metropolitan Transportation Commission and Bay Area Partnership: in the San Francisco Bay Area, the Metropolitan Transportation System was similarly developed along functional lines. Designation of the MTS was a joint responsibility of the Metropolitan Transportation Commission (the metropolitan planning organization), Caltrans (the state DOT), the transit operators, cities and counties, congestion management agencies and the local air quality agency. This cooperative effort as part of the metropolitan planning process was critical, as MTS designation also represented a commitment to operate and manage the system so as to improve air quality and provide better access and mobility. This commitment to operate and manage the MTS as a system is embodied in the Bay Area Partnership, a compact between the above agencies to plan, program, finance, operate and manage the MTS in a coordinated, systematic manner. Not only does the Bay Area's approach to designating a Metropolitan Transportation System serve to tie the region together, the commitment to the Partnership provides a way of operationalizing the region's commitment to joint management in a sustainable manner. The Partnership group represents some 36 agencies in the Bay Area, a region with over four million residents, all of whom have some leadership role in managing, building or operating transportation. Its committees include Finance and Legislation, Planning and Programming, and Management and Operations and they are advised by a Blue-Ribbon Committee composed of representatives of the business, minority, social justice and environmental communities.

Such a partnership can have many benefits in improving air quality and reducing congestion. One of the key activities of the Bay Area Partnership is the definition of high impact projects on the MTS which cannot be accomplished unless various of the transportation partners unite. The projects are defined as "Jump Start" projects and have been highly successful. For example, the Bay Area's Freeway Service Patrol project involves the MPO as the contracting entity in a partnership with the California Highway Patrol as tow truck dispatcher and Caltrans as system manager to coordinate a fleet of privately owned tow trucks to speedily remove damaged vehicles from the roadside. The Bay Area Congestion Pricing Demonstration is a partner effort of MTC, Caltrans, the Bay Area Air Quality Management District and environmental and business groups to introduce the concept of peak period pricing in the Bay Area. As a third example, MTC, Caltrans and the congestion management agencies in two Bay Area counties are partnering to explore the concept of using the Benicia Bridge - a key entry point into the region - as a gateway to define the limits of system capacity and manage the corridor as an integrated part of the MTS.

Why an MTS and What Can It Do for Regional Political Processes:

1) Provide Needed Focus. A metropolitan transportation system is needed to focus attention and support on congestion and air quality problems in the nation's metropolitan areas. ISTEA has provided the tools - flexibility of funding, improved linkages in the planning and programming process, targeted funds - but a clear focus is needed around which the industry can organize. Just as the nation's Interstate system was successful in garnering the public and the Congress's attention for over thirty years, so the Metropolitan Transportation System can be the vehicle for amassing public and institutional support behind a concerted effort to improve the environment, provide access to all and reduce congestion. Absent an organizing system, political support will be lacking. This is not a suggestion that the MTS replace a national system, but a recognition that the problems of economic vitality, social justice and environmental health in the metropolitan areas are of national concern. To resolve these problems, a central metropolitan focus is needed to complement the intercity, interstate focus of the national system.

2) Rationalize the National System in Metropolitan Areas. The lack of a defined metropolitan system and the dedication of funding to specific categories has resulted in the reliance on the interstate system as the principal carrier of intraurban travel in many of our urban areas - urban roads have been continuations of interstate or secondary roads and have not been designed to serve urban centers or nodes. This fact has had undesirable consequences on the ability of the Interstate system to serve interurban travel, as so much of its capacity has been consumed by local trips. Similarly, the ad hoc use of Interstate routes to accommodate urban travel may have undesirable and distorting impacts on urban form, as Senator Daniel Patrick Moynihan argued as long ago as the early Sixties. What is needed to prevent the exacerbation of this trend in the future with the new National Highway System is the encouragement of a systematic approach to developing, managing and operating the metropolitan system to accommodate all types of travel. Hence, an MTS can help to rationalize the National Highway System within metropolitan areas.

3) Relate the Management Systems to the Planning Process. MTS can provide a focus for activities related to both asset management and efficiency of the existing system - two activities highlighted as top priorities in ISTEA. The new law requires the development of six management systems and one traffic monitoring system. These new systems are intended to promote activities to wisely manage and maintain the existing transportation infrastructure. The currently proposed regulations for implementing the various asset management systems for pavement, bridges, transit and safety all posit slightly different physical systems. The MTS can define the system in which the federal government has an

interest and because the MTS is a basis of the metropolitan planning process, the linkage between the plan and the management systems can be assured.

Similarly, the MTS can define the network for the systems to manage both the asset base and the performance of the metropolitan systems. ISTEA requires the development of 'management systems' covering pavement, safety, bridges and transit on the physical asset side and intermodal facilities and traffic congestion on the performance side of the ledger. These systems are intended to provide data and develop strategies as an aid to system planning and investment. The use of the defined MTS for all the management systems in the metropolitan area would eliminate the confusion and duplication. The use of the MTS for the Congestion Management System would be particularly helpful in reconciling the many ISTEA planning and monitoring requirements into one coordinated process. The Congestion Management System could then become the process for defining the recommended mix of strategies to improve performance on the multimodal metropolitan transportation system. These strategies could include the full range from demand and supply measures to management activities and urban design solutions. Such an approach is being employed in both Albany and in the San Francisco Bay Area.

4) Provide a Focus for Investment. The definition of the Metropolitan Transportation System in the long range plan can also provide an investment focus for the plan and the program. In the San Francisco Bay Area, for example, all projects proposed for federal funding must either be on the defined Metropolitan Transportation System or be on facilities which can be demonstrated to improve the performance, relieve congestion or enhance the MTS. This funding priority leads eventually to a focus by project sponsors on developing projects with a well defined benefit to the regional system and to a growing awareness of the need to manage the system as a system.

5) Enable the Convening of a Transportation Partnership. The Metropolitan Transportation System provides the impetus for the metropolitan planning organization to undertake a regional transportation planning process. In urban areas, the MTS will be a system with many owners and operators. The State Department of Transportation will own the state highway system, while local government is the owner/ operator of local streets and roads. There may be several transit operators within the metropolitan area, along with port, airport and rail terminals. All are key parts of the MTS and all bring an ownership bias to the table with them. Within the metropolitan area, only the metropolitan planning organization is not an owner/ operator of a system component, and thus the MPO is the logical convener of the partnership to develop, manage and operate the entire MTS.

Conclusion - Making ISTEA Workable in Metropolitan Areas: the development and designation of a Metropolitan Transportation System as an integral part of the transportation planning process can be a vital part of making regional cooperation a reality. It can help to make ISTEA's requirements manageable, help to rally support for transportation improvements, and provide an antidote to the danger that the new National Highway System will distort metropolitan priorities by integrating the NHS into the metropolitan system. The MTS can be a vehicle to bring disparate interests together in deciding what to do with the public capital that is dedicated to transportation. In an era when city-states are being recognized as key economic forces, the development and management of a Metropolitan Transportation System can reinforce the ties that hold these regional economies together and can help to introduce notions such as bioregionalism and regional sustainability into political decision making in the longer term. As Neal R. Peirce noted in his new book *Citistates*:

What would a visitor from another planet, approaching the dark side of our planet Earth, first discern? Obviously, it would be the clusters of light where humans congregate in great

numbers. And approaching any one of them, the visitor would see, as soon as dawn came, a fully integrated organism: a concentration of human development, of roads and rivers and bridges, people and vehicles, air, water and energy, information and commerce, interacting in seemingly infinite ways. This is, of course, the citistate, the true city of our time, the closely interrelated, geographic, environmental entity that chiefly defines late twentieth century civilization.

Some of the features one can't see from the air are as significant as those one can. . . All those dividing lines between center cities, suburbs, counties, townships and urban villages -- the dividing lines politicians tell us are so utterly significant -- are not to be seen from above. Indeed, between work and home, for errand and entertainment and shopping, the Earth's people cross such municipal lines billions of times each day.

Neal R. Peirce with Curtis Johnson and John Stuart Hall, *Citistates - How Urban America Can Prosper in a Competitive World*, Seven Locks Press, Washington, D.C., 1993, pp.291-2.

Glossary

Access, Accessibility

The opportunity to reach a given end use within a certain time frame, or without being impeded by physical, social or economic barriers. Enhancing mobility is one way of providing improved access.

Allocation

An administrative distribution of funds among the States, done for funds that do not have statutory distribution formulas.

Alternative Fuels

Any motor fuel other than ordinary gasoline, especially those that result in lower levels of air pollutants (i.e. reformulated gasoline, natural gas and liquid propane).

Americans with Disabilities Act of 1990 (ADA)

Federal Law that requires public facilities, including transportation services, to be fully accessible for persons with disabilities. ADA also requires the provision of complementary or supplemental paratransit services in areas where fixed route transit service is operated. Expands definition of eligibility for accessible services to persons with mental disabilities, temporary disabilities, and the conditions related to substance abuse. The Act is an augmentation to, but does not supersede, Section 504 of the Rehabilitation Act of 1973 which prohibits discrimination on the basis of disability against otherwise qualified individuals in programs receiving federal assistance.

Apportionment

A term that refers to a statutorily prescribed division or assignment of funds. An apportionment is based on prescribed formulas in the law and consists of dividing authorized obligation authority for a specific program among the States.

Appropriations Act

Action of a legislative body that makes funds available for expenditure with specific limitations as to amount, purpose, and duration. In most cases, it permits money previously authorized to be obligated and payments made, but for the highway program operating under contract authority, appropriations specify amounts of funds that Congress will make available to liquidate prior obligations.

Arterial

A class of street serving major traffic movement that is not designated as a highway.

Attainment Area

An area considered to have air quality that meets or exceeds the U.S. Environmental Protection Agency (EPA) health standards used in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others. Non-attainment areas are areas considered not to have met these standards for designated pollutants.

Authorization Act

Basic substantive legislation or that which empowers an agency to implement a particular program and also establishes an upper limit on the amount of funds that can be appropriated for that program.

Average Daily Traffic (ADT)

The average number of vehicles passing a fixed point in a 24-hour time frame. A convention for measuring traffic volume.

Base Year

The lead-off year of data used in a study.

Bikeway

A facility designed to accommodate bicycle travel for recreational or commuting purposes. Bikeways are not necessarily separated facilities; they may be designed and operated to be shared with other travel modes.

Budget Authority

Empowerment by Congress that allows Federal agencies to incur obligations to spend or lend money. This empowerment is generally in the form of appropriations. However, for the major highway program categories, it is in the form of "contract authority." Budget authority permits agencies to obligate all or part of the funds that were previously "authorized." Without budget authority, Federal agencies cannot commit the government to make expenditures or loans.

Build/No-Build

Refers to conformity requirement during Interim and Transitional periods whereby Metropolitan Planning Organizations must demonstrate that "building" or implementing a long range plan (LRP) and Transportation Improvement Programs (TIPs) will provide more

emissions reduction than "not building" or not implementing that same long range plan and TIP.

Bus Lane

A lane reserved for bus use only. Sometimes also known as a "diamond lane." See also "HOV."

Carbon Monoxide (CO)

A colorless, odorless, tasteless gas that impedes the oxygenation of blood. CO is formed in large part by incomplete combustion of fuel.

Central Business District (CBD)

The most intensely commercial sector of a city.

Clean Fuels

Fuels that, when burned, generate fewer pollutants than gasoline. Compressed natural gas (CNG), methanol, ethanol, and others are considered clean fuels. Also known under heading, "Alternative Fuels."

Collector-Distributor Street

A road generally parallel to an expressway which collects and distributes traffic at access points to the expressway involving through lanes.

Conformity

Process to assess the compliance of any transportation plan, program, or project with air quality control plans. The conformity process is defined by the Clean Air Act.

Congestion Management and Air Quality Improvement Program (CMAQ)

A new categorical funding program created with the ISTEA. Directs funding to projects that contribute to meeting national air quality standards. CMAQ funds generally may not be used for projects that result in the construction of new capacity available to SOVs (single-occupant vehicles).

Congestion Management System (CMS)

ISTEA requires that each Transportation Management Area (see definition of TMA) develop a CMS that provides for effective management of new and existing transportation facilities through the use of travel demand reduction and operational management strategies. Unless a part of a CMS, future highway projects that significantly increase capacity for single occupant vehicles (SOVs) may be ineligible for federal funding.

Consolidation

Restructuring transportation services to serve the same market with fewer service providers.

Contract Authority

A form of budget authority that permits obligations to be made in advance of appropriations. The Federal-Aid Highway Program operates mostly under contract authority rules.

Coordination

When agencies share responsibilities related to transporting clients: carrying others' clients, arranging with other agencies to carry clients, or sharing vehicles or vehicle support services including maintenance, etc. Example: a provider whose major activity is transporting elderly clients may make midday schedule space to serve clients of an AFDC, WIC, or substance abuse prevention program.

Corporate Average Fuel Economy Standards (CAFE)

Refers to the federal fuel efficiency standards for automobiles.

Demand-Responsive

Descriptive term for a service type, usually considered paratransit, in which a user can access transportation service that can be variably routed and timed to meet changing needs on an as-needed basis. Compare with Fixed-Route.

Dial-a-Ride

Term for demand-responsive systems usually delivering door-to-door service to clients who make requests by telephone on an as-needed reservation or subscription basis.

Elderly and Handicapped (E&H)

Anachronistic designation for special transportation planning and services.

Emissions Budget

The part of the State Implementation Plan (SIP) that identifies allowable emissions levels, mandated by the National Ambient Air Quality Standards, for certain pollutants emitted from mobile, stationary, and area sources. The emissions levels are used for meeting emission reduction milestones, attainment, or maintenance demonstrations.

Enhancement Activities

Refers to activities related to a particular transportation project that "enhance" or contribute to the existing or proposed project. Examples of such activities include provision of facilities for pedestrians or cyclists, landscaping or other scenic beautification projects, historic preservation, control and removal of outdoor advertising, archeological planning and research, and mitigation of water pollution due to highway runoff.

Environmental Impact Statement (EIS)

Report which details any adverse economic, social, and environmental effects of a proposed transportation project for which federal funding is being sought. Adverse effects could include air, water, or noise pollution; destruction or disruption of natural resources; adverse employment effects; injurious displacement of people or businesses; or disruption of desirable community or regional growth.

Environmental Protection Agency (EPA)

EPA is the federal source agency of air quality control regulations affecting transportation.

Expenditures (Outlays)

A term signifying disbursement of funds for repayment of obligations incurred. An electronic transfer of funds, or a check sent to a State highway or transportation agency for voucher payment, is an expenditure or outlay.

Expressway

A controlled access, divided arterial highway for through traffic, the intersections of which are usually separated from other roadways by differing grades.

Federal Highway Administration (FHWA)

Division of the U.S. Department of Transportation that funds highway planning and programs.

Financial Capacity, Capability

Refers to U.S. Department of Transportation requirement that an adequate financial plan for funding and sustaining transportation improvements be in place prior to programming federally-funded projects. Generally refers to the stability and reliability of revenue in meeting proposed costs.

Fiscal Year (FY)

Since FY 1977, the yearly accounting period beginning October 1 and ending September 30 of the subsequent calendar year. Prior to FY 1977, the Federal fiscal year started on July 1 and ended the following June 30. Fiscal years are denoted by the calendar year in which they end; e.g., FY 1991 began October 1, 1990, and ended September 30, 1991.

Fixed-Route

Term applied to transit service that is regularly scheduled and operates over a set route. Usually refers to bus service.

Fragmentation

A situation stemming from the lack of effective and efficient integration of programs, facilities and services.

Freeway

A divided arterial highway designed for the unimpeded flow of large traffic volumes. Access to a freeway is rigorously controlled and intersection grade separations are required.

Federal Transit Administration (FTA)

Division of the U.S. Department of Transportation that funds transit planning and programs.

Gasohol

An alternative motor fuel that is a blend of 90% ordinary gasoline and 10% ethanol which fermented from biomass (e.g., corn). It can be used interchangeably with gasoline in conventional cars.

Guaranteed Ride Home

Refers to employer-sponsored program that encourages employees to carpool, use transit, bike or walk to work by guaranteeing them a ride home in case they cannot take the same mode home (e.g., if they need to work late or if an emergency occurs).

High Occupancy Vehicles (HOVs)

Generally applied to vehicles carrying three or more people. Freeways, expressways and other large volume roads may have lanes designated for HOV use. HOV lanes may be designated for use by carpoolers, vanpools, and buses. The term HOV is also sometimes used to refer to high occupancy vehicle lanes themselves.

High-Speed Ground Transportation (HSGT)

Includes HSR (High Speed Rail) and magnetic levitation, or "Maglev" systems. Examples of HSR include the Japanese Shinkansen, or "bullet trains," and the French TGV, or Train a la Grande Vitesse. HSR systems use continuously-welded track, and range in travel speed from 120 m.p.h to a maximum tested by TGV of 320 m.p.h. Maglev systems are lifted, guided, and propelled by electrically powered magnets along elevated guideways and can travel securely at 300 m.p.h.

Highway

Term applies to roads, streets, and parkways, and also includes rights-of-way, bridges, railroad crossings, tunnels, drainage structures, signs, guard rails, and protective structures in connection with highways.

Home-Based Work Trip

A trip to or from home for the purpose of one's employment.

Hot-Spot Analysis

Analysis of particulate matter and/or carbon monoxide emissions at particularly polluted or high-emission areas or intersections.

Infrastructure

A term connoting the physical underpinnings of society at large, including, but not limited to, roads, bridges, transit, waste system, public housing, sidewalks, utility installations, parks, public buildings, and communications networks.

Intelligent Transportation Systems (ITS)

Use of computer and communications technology to facilitate the flow of information between travelers and system operators. Includes concepts such as "freeway management systems," "automated fare collection," and "transit information kiosks." IVHS technologies are a subset of ITS technologies.

Intelligent-Vehicle Highway Systems (IVHS)

Narrow grouping of ITS technologies that focus on monitoring, guiding or operating motorized vehicles. See Intelligent Transportation Systems.

Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

Legislative initiative by the U.S. Congress that restructured funding for transportation programs. ISTEA authorized increased levels of highway and transportation funding and an enlarged role for regional planning commissions/MPOs in funding decisions. The Act also requires comprehensive regional long-range transportation plans extending to the year 2015 and places an increased emphasis on public participation and transportation alternatives.

Interstate System

The system of highways that connects the principal metropolitan areas, cities, and industrial centers of the United States. The Interstate System also connects the U.S. to internationally significant routes in Mexico and Canada. The routes of the Interstate System are selected jointly by the state department of transportation for each state and the adjoining states, subject to the approval of the U.S. Secretary of Transportation.

Land Use

Refers to the manner in which portions of land or the structures on them are used, i.e., commercial, residential, retail, industrial, etc.

Limitation on Obligations

Any action or inaction by an officer or employee of the United States that limits the amount of Federal assistance that may be obligated during a specified time period. A limitation on obligations does not affect the scheduled apportionment or allocation of funds, it just controls the rate at that these funds may be used.

Local Street

A street intended solely for access to adjacent properties.

Long Range

In transportation planning, refers to a time span of more than five years. The Transportation Improvement Program (TIP) is typically regarded as a short-range program, since ISTEA has changed the TIP from a five-year to a three-year document. See "Transportation Improvement Program."

Management Systems

Six systems required under ISTEA to improve identification of problems and opportunities throughout the entire surface transportation network, and to evaluate and prioritize alternative strategies, actions and solutions. The six management systems include: Pavement Management System (PMS), Bridge Management System (BMS), Highway Safety Management System (HSMS), Congestion Management System (CMS), Public Transit Facilities and Equipment Management System (PTMS) and Intermodal Management System (IMS).

Metropolitan Planning Organization (MPO)

The organizational entity designated by law with lead responsibility for developing transportation plans and programs for urbanized areas of 50,000 or more in population. MPOs are established by agreement of the Governor and units of general purpose local government which together represents 75 percent of the affected population or an urbanized area.

Mobility

The ability to move or be moved from place to place.

Mode, Intermodal, Multimodal

Form of transportation, such as automobile, transit, bicycle and walking. Intermodal refers to the connections between modes and multimodal refers to the availability of transportation options within a system or corridor.

Model

A mathematical and geometric projection of activity and the interactions in the transportation system in an area. This projection must be able to be evaluated according to a given set of criteria which typically include criteria pertaining to land use, economics, social values, and travel patterns.

Network

A graphic and/or mathematical representation of multimodal paths in a transportation system.

National Ambient Air Quality Standards (NAAQS)

Federal standards that set allowable concentrations and exposure limits for various pollutants.

National Highway Systems (NHS)

A federal transportation program authorized by ISTEA that designates nationally significant Interstate Highways and roads for interstate travel, national defense, intermodal connections, and international commerce. Other eligible activities include bikeways and park-and-ride lots. The NHS is currently being developed as the first component of a larger, intermodal National Transportation System. See "National Transportation System."

National Transportation System (NTS)

ISTEA called for the development of a "National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner." The NTS is intended to allow for the development of transportation planning, program management and investment strategies that will bring about a transportation system that will move people and goods more effectively and efficiently, and thereby advance our economic, environmental and social goals. Secretary Pena has launched an outreach initiative to identify the NTS.

Obligation Authority

See "Limitation on Obligations."

Obligations

Commitments made by Federal agencies to pay out money as distinct from the actual payments, which are "outlays." Generally, obligations are incurred after the enactment of budget authority. However, since budget authority in many highway programs is in the form of contract authority, obligations in these cases are permitted to be incurred immediately after apportionment or allocation. The obligations are for the Federal share of the estimated full cost of each project at the time it is approved regardless of when the actual payments are made or the expected time of project completion.

Oxygenated Fuels

Gasoline blended with alcohol or ether containing oxygen. Use of such fuels reduces carbon monoxide production and other emissions.

Ozone

Ozone is a colorless gas with a sweet odor. Ozone is not a direct emission from transportation sources. It is a secondary pollutant formed when hydrocarbons (HC) and nitrogen oxides (NOx) combine in the presence of sunlight. The ozone is associated with smog or haze conditions. Although the ozone in the upper atmosphere protects us from harmful ultraviolet rays, ground level ozone produces an unhealthy environment in which to live.

Paratransit

Alternatively known as special transportation when applied to social services systems. Applies to a variety of smaller, often flexibly-scheduled and routed nonprofit-oriented transportation services using low-capacity vehicles, such as vans, to operate within normal urban transit corridors or rural areas. These services usually serve the needs of persons that standard mass transit services would serve with difficulty, or not at all. Common patrons are the elderly and persons with disabilities.

Particulate Matter (PM), (PM-10)

Any material that exists as solid or liquid in the atmosphere. Particulate matter may be in the form of fly ash, soot, dust, fog, fumes, etc. Small particulate matter, or PM-10, is less than 10 microns in size and is too small to be filtered by the nose and lungs.

Peak Hour

The 60-minute period in the a.m. or p.m. in which the largest volume of travel is experienced.

Pedestrian Walkway

A secured path for walking.

Penalty

An action that does not allow a State to use the full amount of its apportioned funds. The action may be a withholding of project approvals or withholding of a percentage of the

State's apportionment. The action may be taken when the State does not comply with a required provision of law.

Person-Trip

A trip made by one person from one origin to one destination.

Privatization

The supplying traditionally government-supplied goods and services through for-profit business entities to enhance public cost efficiency.

Provider

An agency that causes clients to be transported, as opposed to an agency whose role is limited to funding programs.

Public Authority

A Federal, State, county, town, or township, Indian tribe, municipal or other local government or instrumentality with authority to finance, build, operate, or maintain toll or toll-free transportation facilities.

Public Participation

The active and meaningful involvement of the public in the development of transportation plans and improvement programs. The Intermodal Surface Transportation Efficiency Act (ISTEA) and subsequent regulations require that state departments of transportation and MPOs proactively seek the involvement of all interested parties, including those traditionally underserved by the current transportation system.

Public Road

Any road or street under the jurisdiction of and maintained by a public authority and open to public traffic.

Rescission

A legislative action to cancel the obligation of unused budget authority previously provided by Congress before the time when the authority would have otherwise lapsed. Rescission may be proposed by the Executive Branch but requires legislative action to become effective.

Region

An entire metropolitan area including designated urban and rural subregions.

Regionally Significant

A term which has been defined in federal transportation planning regulations as "a project...that is on a facility which serves regional transportation needs...and would normally be included in the modeling of a metropolitan area's transportation network, including, at a minimum, all principal arterial highway and fixed guideway transit facilities that offer a significant alternative to regional highway travel."

Reverse Commute

Commuting against the main directions of traffic. Often refers to the central city to suburb commute.

Right of Way (R-O-W)

Priority paths for the construction and operation of highways, light and heavy rail, railroads, etc.

Scenic Byway Program

Program to establish scenic byways which are typically secondary roads having significant cultural, historic, scenic, geological, or natural features. They often include vistas, rest areas, and interpretive sites in harmony with the scenic characteristics of the road.

Shuttle

Usually a service provided with an up-to-20 passenger vehicle connecting major trip destinations and origins on a fixed- or route-deviation basis. Shuttles can provide feeder service to main transit routes, or operate in a point-to-point or circular fashion.

Single-Occupant Vehicles (SOVs)

A SOV is a vehicle used to get just one person to a destination.

Social Equity, Justice

The provision of affordable, efficient and accessible transportation services to all people regardless of race, ethnicity, income, gender, or disability. A socially equitable transportation system provides all people with convenient access to meaningful jobs, services and recreational opportunities.

Stage II Controls

Mechanisms on gasoline pumps designed to control and capture vapors during vehicle fueling.

Standard Metropolitan Statistical Area (SMSA)

A Census Bureau delineation for major metro areas in the U.S.

State Highway Department

The department, commission, board, or official of any State responsible for highway construction, maintenance and management.

State Implementation Plan (SIP)

Required documents prepared by states and submitted to EPA for approval. SIPs identify state actions and programs to implement designated responsibilities under the Clean Air Act.

Surface Transportation Program

A new categorical funding program created with the ISTEA. Funds may be used for a wide variety of purposes, including: roadway construction, reconstruction, resurfacing, restoration and rehabilitation; roadway operational improvements; capital costs for transit projects; highway and transit safety improvements; bicycle and pedestrian facilities; scenic and historical transportation facilities; and, preservation of abandoned transportation corridors.

Telecommuting

The substitution, either partially or completely, of transportation to a conventional office through the use of computer and telecommunications technologies (e.g., telephones, personal computers, modems, facsimile machines, electronic mail). Implies either work at home or at a satellite work center that is closer to an employee's home than the conventional office.

Title III

Title of the Older Americans Act enabling expenditures for nutrition and transportation programs that service elderly persons.

Title IV

Title of the Civil Rights Act of 1964 that ensures that no person in the United States will be discriminated against on the basis of race, color or national origin. The transportation planning regulations, issued in October 1993, require that metropolitan transportation planning processes be consistent with Title IV.

Transit

Generally refers to passenger service provided to the general public along established routes with fixed or variable schedules at published fares. Related terms include: public transit, mass transit, public transportation, urban transit and paratransit.

Transit Dependent

Persons who must rely on public transit or paratransit services for most of their transportation. Typically refers to individuals without access to personal vehicle.

Transportation Control Measures (TCMs)

Local actions to adjust traffic patterns or reduce vehicle use to reduce air pollutant emissions. These may include HOV lanes, provision of bicycle facilities, ridesharing, telecommuting, etc.

Transportation Disadvantaged

Those persons who have little or no access to meaningful jobs, services and recreation because of a transportation system that does not meet their needs. Often refers to those individuals who cannot drive a private automobile because of age, disability or lack of resources. See also "Social Equity, Justice."

Transportation Improvement Program (TIP)

This is a document prepared by states and planning commissions citing projects to be funded under federal transportation programs for a full-year period. Without TIP inclusion, a project is ineligible for federal funding.

Transportation Management Area (TMA)

Defined by ISTEA as all urbanized areas over 200,000 in population. Within a TMA, all transportation plans and programs must be based on a continuing and comprehensive planning process carried out by the Metropolitan Planning Organization (MPO) in cooperation with states and transit operators. The TMA boundary affects the responsibility for the selection of transportation projects that receive federal funds.

Transportation Management Association (TMA)

A voluntary association of public and private agencies and firms joined to cooperatively develop transportation-enhancing programs in a given area. TMAs are appropriate organizations to better manage transportation demand in congested suburban communities.

Transportation System Management (TSM)

The element of a TIP (Transportation Improvement Program) that proposes non-capital-intensive steps toward the improvement of a transportation system, such as refinement of system and traffic management, the use of bus priority or reserved lanes, and parking strategies. It includes actions to reduce vehicle use, facilitate traffic flow, and improve internal transit management.

Travel Time

Customarily calculated as the time it takes to travel from "door-to-door." In transportation planning, particularly in forecasting the demand for transit service, measures of travel time include time spent accessing, waiting, and transferring between vehicles, as well as that time spent on board.

Trust Funds

Accounts established by law to hold receipts that are collected by the Federal Government and earmarked for specific purposes and programs. These receipts are not available for the general purposes of the Federal Government. The Highway Trust Fund is comprised of receipts from certain highway user taxes (e.g., excise taxes on motor fuel, rubber, and heavy vehicles) and reserved for use for highway construction, mass transportation, and related purposes.

U.S. Department of Transportation (DOT)

The principal direct federal funding and regulating agency for transportation facilities and programs. Contains FHWA and FTA.

Urbanized Area

Area which contains a city of 50,000 or more population plus incorporated surrounding areas meeting set size or density criteria.

Vehicle Miles of Travel (VMT)

A standard areawide measure of travel activity. Most conventional VMT calculation is to multiply average length of trip by the total number of trips.

Zone

The smallest geographically designated area for analysis of transportation activity. A zone can be from one to 10 square miles in area. Average zone size depends on total size of study area.

Sources:

Federal Register, "Statewide and Metropolitan Planning Regulations," Federal Highway Administration and Federal Transit Administration, United States Department of Transportation.

Financing Federal-Aid Highways, Federal Highway Administration, United States Department of Transportation.

"A Summary of Transportation Programs and Provisions of the Clean Air Act Amendments of 1990," Federal Highway Administration, United States Department of Transportation.

"Talking the Talk," East-West Gateway Coordinating Council.