METROPOLITAN TRANSPORTATION PLANNING: PROCESS REFORM

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Shifting public values, increasing competition for public resources, and improved technical capabilities have rendered obsolete certain aspects of the conventional regional transportation planning process. Several recent regional planning reviews and restudies have surfaced a new approach. This paper suggests how philosophy, organization, staffing, and technical approach can be balanced in a new process to incorporate the concern for long-range regional issues with short-range localized issues. The implications of such a restructuring of the planning process will be most dramatically felt in the redefinition of a plan as an open-ended document in response to the current status and future options for a continuing improvement program.

•IN many cities, the transportation plans and programs developed in the 1960s and early 1970s have been questioned or curtailed because of their narrow focus and their inflexibility. They

1. Failed to incorporate environmental, economic, and social concerns;
2. Overconcentrated on long-range capital-intensive solutions at the expense of immediate action, low-cost improvement;
3. Were exclusively devoted to improving supply rather than to dealing with demand modifications as well;
4. Tended to be concerned with a single mode or facility type;
5. Lacked mechanisms for the equitable implementation of plans and excluded meaningful community participation; and
6. Failed to provide easily observable evidence that transportation service was getting better rather than worse.

These shortcomings were extensively discussed in the early 1970s and have led to a variety of reforms: environmental law, joint planning regulations, shifts in capital improvement focus to transit, increasing attention to low-cost operations improvements for both highway and transit, and new concern for system and demand management. The speed at which these changes have taken place has left the conventional planning process behind with its long-range regional focus, its closed-shop style, and its inflexible use of complex planning methodologies (1). However, only recently have the full outlines of a viable new process begun to emerge through actual planning experience as distinct from academic speculation or governmental fiat (2, 3, 4, 5). This new process is derived from recent experience with several regional and urban transportation planning studies, restudies, and reviews whose common elements were large size, complexity, and controversy (6, 7, 8, 9). The process builds on an understanding of the necessary relationships among the philosophy, the organization, and the technical approach required for responsive planning in a changing environment.

A major feature of this new process is its flexibility to respond to unanticipated issues and problems—salvaging valuable techniques from the past but recasting them

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with innovative techniques in a new institutional mold. Although transportation planning will continue to change and respond to specific situations, the basic elements of the approach presented, if exploited, will radically alter the nature and function of regional transportation plans.

PRINCIPLES OF A NEW PLANNING PROCESS

Urban transportation planning is, first, a political decision-making process concerned with trade-offs among the conflicting values of different groups in society and, second, a technical processed concerned with the generation of information on the consequences of alternative courses of action. To ensure that the decision process is fully informed of both the technical facts associated with the choices and the response to these facts by societal groups with differing values, the new planning process must

1. Actively involve the informed participation of all affected groups having conflicting values;
2. Institute a technical analysis directed toward the development of equally detailed levels of information on all potential courses of action rather than toward the recommendation of a preferred solution;
3. Ensure that all technical analyses and findings are provided to all interested groups in an unbiased and easily obtainable manner on a timely basis, i.e., all technical information should be as available to any participant as it is to the decision maker; and
4. Clearly identify how, by whom, and where decisions are to be made and provide an uncomplicated and direct process whereby all interested groups have the opportunity to influence those decisions.

Both one-time studies and continuing technical strategy processes must be made of three interrelated components: organization, staffing, and technical approach. Effectiveness is more related to the balance achieved between these components than to the strength and weakness of any one of them.

ORGANIZATION

All decisions concerning the desirability of a particular transportation facility or service must be understood as policy choices, trading increases in transportation service for community and environmental disruption and dollar costs.

A fully informed decision maker must know not only the technical facts surrounding a particular decision but also the response to these facts by the various interest groups in society for which the planning is being done. This requirement implies more citizen participation than that offered by previous transportation planning and has important implications for the institutional structure of the political and technical organizations involved, the participation of public and local interests, and the nature of the technical assistance for such a process.

Institutional Structure

There is no single formula for organization, but at a minimum, a structure for the new process must

1. Avoid spurious distinctions between technical and community representation since many key issues in the new approach combine technical, qualitative, and value issues;
2. Strike an appropriate balance between political representation of the affected subregions and the regional interest;

3. Establish direct communication between the technical process and the ultimate decision maker;
4. Maintain continuity in an institutional structure established for planning, ongoing implementation, and operation;
5. Permit the representation or direct participation of interest groups representing the complete range of values in the planning process; and
6. Include within the decision-making structure institutions responsible for both regional and local land use planning.

The present hierarchical decision-making structure associated with the transportation planning does not respond well to these needs. Such a structure, consisting of technical and policy committees made up from members of transportation and land use agencies, has a tendency to isolate the decision maker from controversial policy choices during the process. Although membership of these committees could be broadened to include selected representatives of other value positions, e.g., environmental or energy issues, a single-level committee structure is always torn between assisting the decision maker in making an informed choice about the course of action and the overall technical and administrative management of technical studies. A possible structure to resolve this problem is shown in Figure 1. As indicated, two separate committees, not sequential but simultaneous, would be established. The steering committee's function would be to advise the decision maker about the issues surrounding the alternative courses of action and the policy or value position of various segments of the community on these issues. Its membership would be composed of representatives of a wide range of interests, such as business, ecology, and transportation, and of ex officio members from the transportation agencies and local governments. The planning coordinating committee would be involved in the daily administration of the study to ensure that the objectives set forth by the decision maker, advised by the steering committee, are achieved as efficiently as possible and in a technically responsible manner. Its membership would be made up of representatives of organizations that would be involved in either the administering or the financing of the study, i.e., for the most part, state and local transportation and land use agencies in the metropolitan area.

The planning (or study) director would be directly responsible to the decision maker. The chief requirements of this position are the ability to handle, in an unbiased manner, the controversies that emanate from the steering committee and to ensure that each position is given appropriate weight in terms of the allocation of staff resources and the presentation of results. In this type of structure, the decision maker receives input from (a) the director and staff, who provide the technical findings of the various studies conducted; (b) the steering committee, which presents information on the various value positions held by parts of the community and on the community satisfaction or dissatisfaction with the type and nature of technical information supplied by the study staff; and (c) the planning coordinating committee, which evaluates the technical adequacy of the information supplied and the study process itself. This organization can be duplicated in subregional studies that are the focus of the new planning process.

Establishment of Process for Effective Citizen Participation

Citizen participation must become an equal partner with the technical staff in the planning process and cannot be relegated to a passive position in expressing approval or disapproval of technical study results. It must become an integral component of the planning process, sharing responsibility with the technical staff for identifying issues and problems, devising alternative solutions, evaluating solutions, and expressing an informed choice about the course of action desired. So that community participation can assume these responsibilities, near-revolutionary changes are required in the transportation planning process. The decision maker, the planner, and the community must recognize that each has mutually supporting and equally important responsibilities in the study.

The decision maker must be decisive and must clearly specify the issues to be de-

Figure 1. Study organization.

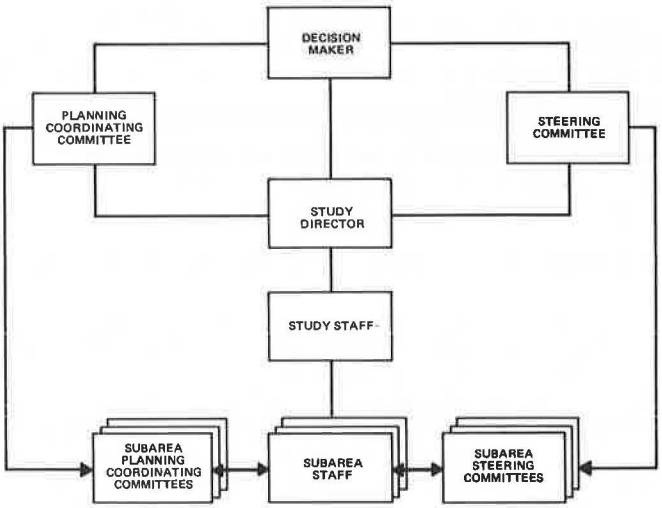
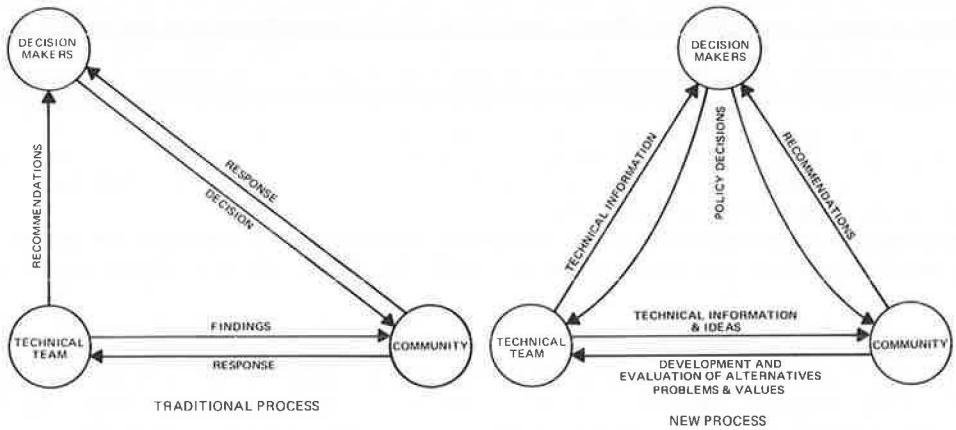


Figure 2. Process comparison.



cided, the time when those decisions will be made, and the manner in which they will be made. Without clear specification by the decision maker, the technical and community participants will not clearly understand what they are to accomplish. The community participants and the technical team jointly participate in the specification of problems, alternative plans, and relevant evaluation issues. The responsibility of the technical team is to provide information on the costs, feasibility, and impacts of these alternatives to both the community participants and the decision maker. The role of the community participants is to develop informative and reasonable arguments for the decision maker regarding the pros and cons of the various alternatives and recommendations for decisions.

Figure 2 shows that the types of information flowing among the various components of the new planning process are dramatically changed from those of traditional planning. The technical team does not make recommendations that involve choosing a value position, and the community participants do not respond to a recommended course of action by the decision maker but propose recommendations for decisions. The achievement of this process requires significant changes in the administration of transportation studies. These changes primarily revolve around the manner and timeliness with which information is provided to other than public agencies and the technical study staff. For

the community participants to fulfill their role, they must have access to the same information as the other participants, including direct access to the study's technical staff and files. Administrative processes that require clearance of documents or other information prior to public release are inappropriate and will effectively negate attempts to implement a community participation process.

Techniques that have proved useful in community participation have been the focus of considerable speculation and documentation. The major lesson learned in practice is that a wide range of techniques are appropriate in different contexts. In all cases, however, considerable effort and forethought are necessary on the part of the technical staff to administer and play its role in community-technical interaction (10, 11).

An open and participatory two-way communication process requires considerable nurturing to ensure its maintenance and balance. Community participation may develop previously unforeseen issues; therefore, the total work plan cannot be completely detailed at the beginning. Building responsiveness into the planning process requires a certain degree of creative study management.

Technical Staff

The role of the technical staff is to assist the community in clarifying the issues to determine a course of action that is physically practical and economical and that represents an acceptable distribution of positive and negative impacts. The staff will have several roles: technical advisor to decision makers, agents of the responsible authority, speaker for interests not represented, conflict manager and negotiator, and producer of facts and alternatives. Although several of these roles may be in conflict, experience has shown that a staff can perform all of them under two conditions:

1. It must not be the focus of making recommendations. If it becomes an advocate, the neutrality required to clarify and understand competing interests would be considerably suspect by all participants. It can perform the issue clarification, alternative generation, impact prediction, evaluation, and community interaction functions only if it is free of advocacy.
2. It should be sufficiently free of the client institutions to retain the independence required for even-handed treatment of issues and public credibility. This independence requires that the staff or study director and staff report directly to the decision maker.

TECHNICAL APPROACH

Integration and responsiveness inevitably require a planning process that can incorporate a broad range of interrelated solution approaches to a given set of transportation and transport-related problems. Such a process must be able to incorporate

1. Long- and short-range solutions to both immediate and anticipated problems;
2. An incremental approach to multimodal improvements;
3. A comprehensive regional focus and a facility-specific view;
4. Reliance on operations and controls to allocate existing facilities and services and additions to supply through intensive improvements;
5. Use of demand management and supply management approaches;
6. Close relationships with land use policy as growth management becomes more feasible;
7. Careful evaluation of alternative courses of action;
8. Equal concern for transportation cost, benefits, and external impacts and their distribution; and
9. Recognition of technical, policy, and value uncertainties in planning through sensitivity analysis.

These simultaneous and conflicting demands doom a planning process that focuses ex-

clusively in any one time frame, at any single geographic scale, or on any single solution. The major technical reorientation of planning must, therefore, be on developing a framework where long- and short-range planning are concurrent and interactive for both regional system and subregional facility or service, and these temporal and geographic scales can be bridged by an incremental approach.

Regional and Subregional Planning

Except for air pollution, the major negative impacts associated with transportation improvements are readily visible only at the subregional scale, and experience has shown that only corridor-scale design will produce sufficiently detailed information to respond to the demands of a participatory process. Conversely, ad hoc subregional facility or service studies done without reference to their regional land use and transportation implications are likely to shift transport problems from one area to another, fail to take full advantage of complementary actions in other subregions, or fail to achieve long-term benefits and regional objectives. System and corridor-level planning must be an on-line, interactive process, and each scale of activity should provide a part of the information required to make an informed decision relative to the work and potential implementation of a particular action. Figure 3 shows the planning process implied by these requirements. The implications of such a process are that the regional plan will no longer provide a single basis or justification for a specific facility implementation or an action program but will become one element or component of an evaluation process.

The new approach consists of a series of semi-independent subregional studies responsive to both regional and corridor-scale cost and impact issues. Several of these studies, whether sequential or simultaneous, are related through a continuous and concurrent regional planning activity that functions as an accounting system for system relationships, policy consistency, and issues that overlap subregional boundaries. In such a framework, the regional system activity can be broken into two elements:

1. Formulation of alternative regional approaches in terms of a series of possible functionally consistent systems. Regional systems could simply be based on the results of separate subregional studies, but a regional initiative could shortcut this process with a sufficiently broad range of alternatives.
2. Formulation of alternative land use systems as possible futures. These futures are constructed for testing transportation needs of future activity distributions responding to any set of probable future policy combinations affecting density, type, and locations of activity in space.

Several subregional studies, if concurrent, can be tested against each other for functional interaction within the regional system framework. Often subregions will be highly independent of each other such that subregional improvements of quite different natures can coexist within the same region. In other circumstances, close relationships between subregions revealed that through-system testing will require joint resolution. In this process, regional system testing becomes a continuous on-line evaluation device, i.e., a service element to subregional planning. The subregional transport planning activity consists of the formulation of alternative action plans in type, location, scale, and mix of capital or operational improvements in response to local issues and becomes the focus of plan development and decision making.

Incrementalism

Within a regional or subregional framework, the imperative to deal with both long- and short-range actions can be resolved through incrementalism (12). Incremental development builds into the planning process the concept that transport improvements be implemented in successive stages over time and that each stage be responsive to the highest priority needs at that given point in time. An increment is that component of

an overall regional or subregional improvement program that can be expected to be operating within 5 to 10 years and that

1. Defines a stage in a continuing program of improvements within the framework of a generalized long-range plan or plan alternatives;
2. Includes components for the complete range of needs of all market segments in the area consistent with short-term needs and objectives; and
3. Contains short-range improvement projects that are for immediate action and that are oriented to low-cost transportation system management and components of any proposed long-range capital-intensive program.

Incremental development establishes a bridge between long-range plans and the project-level implementation program and alters the role of the long-range plan. In contrast to the traditional master-planning approach, the individual elements of the incremental transportation plan would not be justified by a hypothetical future contingent on completion of a single target regional system in the future. The incremental approach suggests that a single detailed and definitive end state for the transit system is inappropriate. It would encourage the maintenance of flexibility through development of a generalized long-range framework capable of refinement and reinterpretation over time as successive short-range increments are implemented and as uncertainties are reduced. Such flexibility can be achieved by defining the long-range plan at a level of generality consistent with more than one increment for meeting specific short-term need while options are preserved among future increments until they are examined in detail at a project level during the development of each increment.

Within a continuing process, evaluation for specific alternatives for each successive short-term time period should be made based on recent developments and the changes in forecasts for the next period rather than on impact projections and inherent assumptions of the long-range system plan. Incremental plans are less subject to the uncertainties of long-range plans resulting from the shortcomings of forecasting technique, the vagaries of public value shifts, or the introduction of new technologies or institutions. Detailed evaluation can therefore take advantage of the more reliable cost and impact predictions possible for short-term projections. Highly specified service improvements, including a wide range of variations of technologies, locations, and operating policies, can be analyzed.

Evaluation of long-term regional systems should be in general terms, recognizing uncertainties and the fact that most impacts are at the project scale. Focus should be on using the systems level analysis to avoid system incompatibility, to test transport impacts on alternative land development futures (regional-scale diversion), and to develop capital programs. Although detailed facility plans would not be appropriately part of long-range plans under the incremental approach, the long-term implications of an increment would be considered when alternative short-term improvements appear otherwise comparable in the short range.

Incremental transportation program development focuses planning on high-priority problems, such as on shorter range actions related to specific time, place, and group objectives. Concentration on the predictable near-term impacts of immediate and short-run transportation alternatives should stimulate public involvement since implementation actions are chosen based on a short-run cost and impact analysis within the general system framework (or long-range options), and this permits immediate decisions to be consistent with immediate problems.

Finally, incrementalism affords an additional flexibility in relation to long-range planning that permits a locality to avoid the prospect of extremely costly long-term investments (that may later prove to be inappropriate) in exchange for the short-run cost of conducting additional planning and investing in facilities to accommodate the evolution of service levels. Moreover, the flexibility is a safeguard against changing goals and priorities.

Cyclical Approach to Problem Solving

The traditional technical approach to transportation planning does not respond well to the objectives of the new planning process. This approach, characterized by a rational series of sequential steps, is not in itself inappropriate; however, what has led to the ineffectiveness of the approach is that each step is done only once in a study and usually at great expense of time and resources.

In an attempt to respond to the weaknesses emerging from traditional studies, the technical approach used by newer continuing transportation planning has adapted a cyclical approach to problem solving that emphasizes near-term subregional implementation programs rather than long-range plan preparation. This approach attempts to explicitly recognize the following:

1. The issues only fully arise after an evaluation of potential courses of action is exposed, and the process should provide a number of such opportunities before a final decision is required.
2. The purpose of the technical process is to provide information for resolution of policy issues, and the type and accuracy of information vary widely, depending on the complexity of the issues and the range of alternative actions available. Therefore, the preparation of an extensive data base and methodology is likely to be inefficient since either a great deal of effort will be expended to respond to issues never raised or unexpected specific issues will be raised for which information was not prepared.
3. A decision on a particular transport facility or program need only be made in conjunction with other transport programs that it will significantly affect. Not all transport improvement programs are inextricably interrelated. The technical process must be able to define the magnitude of such interrelationships to provide the opportunity for staged, incremental decision making.

Based on the experience of more recent studies, three cycles of technical analysis, each followed by a period of intense policy review, appear to provide the necessary interaction of technology, community, and decision making to accomplish the development of programs to be implemented. Each cycle is composed of periods of problem definition, preparation of alternatives, and evaluation of alternatives and concludes with the rejection of an alternative or its selection for additional analysis and a statement of unresolved issues.

First Cycle

The first cycle of activity focuses on suggesting various alternative improvement programs in response to problems as initially perceived by the community and the decision makers. Technical evaluation material in this cycle is based primarily on the judgment of the professional staff. Reviews by the community and the decision maker focus on the political realities of the proposals, the types of issues, and the information required before a course of action is chosen. The reviews also provide a focus for making the immediate decisions over which no controversy exists.

Second Cycle

The second cycle focuses on the evaluation of the shorter term consequences, such as costs, benefits, impacts of the alternative course of action, and the determination of the interdependence or mutual exclusiveness of one subregional program from another. The evaluation during this cycle is accomplished through the use of more detailed and systematic techniques that can be applied in an unbiased way for all alternatives. Community and policy review is aimed at refining or redefining the issues and alternatives and reducing them to a minimum number for final evaluation.

Third Cycle

The third cycle focuses on more precisely defining the alternatives, particularly staging programs, and on developing information on the potential longer term consequence of the alternatives in relation to foreclosed and unforeclosed options for future action. The general work process is iterative, and there are repeated cycles of a sequence of basic activities, such as issues and objective analysis, alternative formulation, impact determination, and evaluation in greater detail on successively fewer alternatives.

METHODOLOGY

Three methodological areas support the new process: travel forecasting, alternative land use futures, and plan evaluation. These are critical because the roles of the first and second areas in the new process are significantly different from those in the traditional process, and evaluation is the key component of the new process.

Travel Forecasting

One of the greatest needs for improvement in methodology, in the travel demand models, flow simulation models, network analysis, and evaluation techniques, lies in the general area of system equilibrium. Urban transport systems operate at states of equilibrium where travel demand is appropriately related to the supply at a particular point in time. A better analytical understanding is needed of the performance of transport networks under conditions where limitations in the system capacity, both deliberate and natural, are left to restrain growth in travel demand. Under such conditions, the cost of using the system (in terms of money costs, delays, and inconvenience) rises rapidly as demand approaches capacity so that demand is always limited to a point just below capacity. Neither the impacts on traffic flow patterns, the feedback to demand, nor the secondary effects on land use, environment, and regional economics of this condition are sufficiently well understood.

Alternative Land Use Futures

There are significant uncertainties associated with socioeconomic and behavioral forecasting, particularly at a 20-year time horizon. To overcome these shortcomings, planners are increasingly using a concept of alternative futures designed to either reduce or expose the uncertainties in forecasting and, more importantly, to permit the relationship between transport and land use to be more understood as a subject for public policy related to individual transportation decisions. These alternative futures can be interpreted in terms of magnitude, distribution, and density of population and employment anticipated in the metropolitan area, assumed transport level of service, and other characteristics to which the issues under consideration are sensitive. They can be characterized by the way in which they relate to general social and urban issues, such as balanced employment growth, access to jobs, access to recreation, preservation of open space, and minimum disruption of communities.

Plan Evaluation

The emerging philosophy focuses on evaluation, not forecasting, as the key element in a cyclical, not sequential, process. The technical analyses associated with urban transportation planning must be capable of responding with information to the full range of issues associated with the provision of urban transport. This means that they must be equally concerned with the portrayal of the following:

1. The distribution of costs and benefits among groups as well as aggregate measures of costs and benefits;
2. The short-term effects as well as the achievement of long-term goals;
3. The positive and negative nontransport impacts as well as transportation-related benefits; and
4. The range of uncertainty associated with the information provided as well as the methodology used to generate the information.

Evaluation criteria under the new process must be numerous and complex and of sufficient breadth to permit individuals with widely varying points of view to evaluate alternatives in accordance with their own values. They also should be selected to reveal the real differences in impacts among alternatives to various geographic areas, communities, and groups.

PROTOTYPICAL WORK PROGRAM

The general principles discussed above can be better understood within the context of an example work program. This program can be adapted to a continuing planning process or a specific study focusing on a particular issue agenda. Figure 4 shows the major components and their interrelationship in the prototypical work program. As shown in Figure 4, the new process is composed of a series of intermittent and relatively independent subarea planning studies supported by four continuous streams of regional activity: improvement of planning techniques, monitoring the transportation system, regional system planning, and regional evaluation of subarea alternatives. Figure 4 also indicates that the regional plan and program can be updated or modified based on activities from either the subarea studies or the regional analyses and that these modifications take place intermittently rather than regularly because decisions are made at either of the two levels of activity.

REDEFINITION OF A TRANSPORTATION PLAN

One must recognize at the onset that a process designed in accordance with the concept proposed will dramatically change the nature and function of regional transportation-land development plans. The simultaneous and interactive flow of regional and subregional studies in an incremental context central to this new process alters the concept of the final product and the manner in which it is achieved since it recognizes that subregional studies and incremental planning may require modification in any range of regional plans.

The necessity for subregional planning activity to take place continuously over time in response to local issues indicates that there can be no single, fixed, long-range transportation-land development plan. Such fixed plans are not only unreasonable in relation to uncertainties and policy variation but are also irresponsible, given the technical limitations of forecasting in the rapidly changing technical and social environment.

If transportation planning is defined as a process of guiding (a) staged improvements of the metropolitan transport function, responsive to cost, system, and impact constraints and (b) improvement objectives, subject to variations among the different parts of the region and the different socioeconomic groups in the region, then the product of such a process is open-ended and encompasses the concept that there are equally probable alternative long-range, transportation-land development patterns toward which the region could move. What the region will look like in 20 years will depend on the cumulative effect of future policy choices and the uncertainty about the socioeconomic behavior of future populations. This definition sharply contrasts with the traditional process whose product was expected to be a single comprehensive regional transportation system for one possible long-range future. This does not imply that there can be no long-range direction to the future of the metropolitan area, but rather that such

Figure 3. System and corridor-level planning.

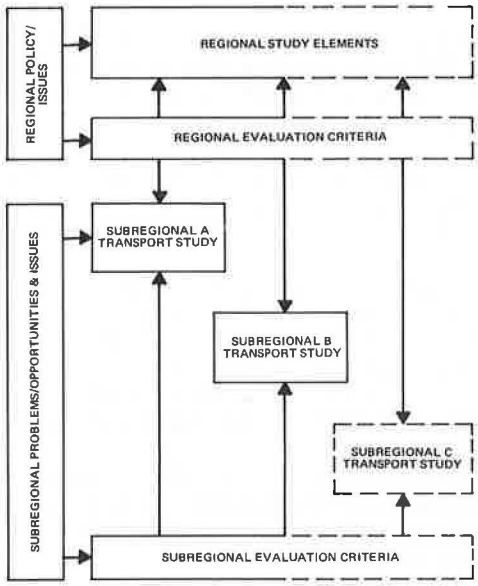
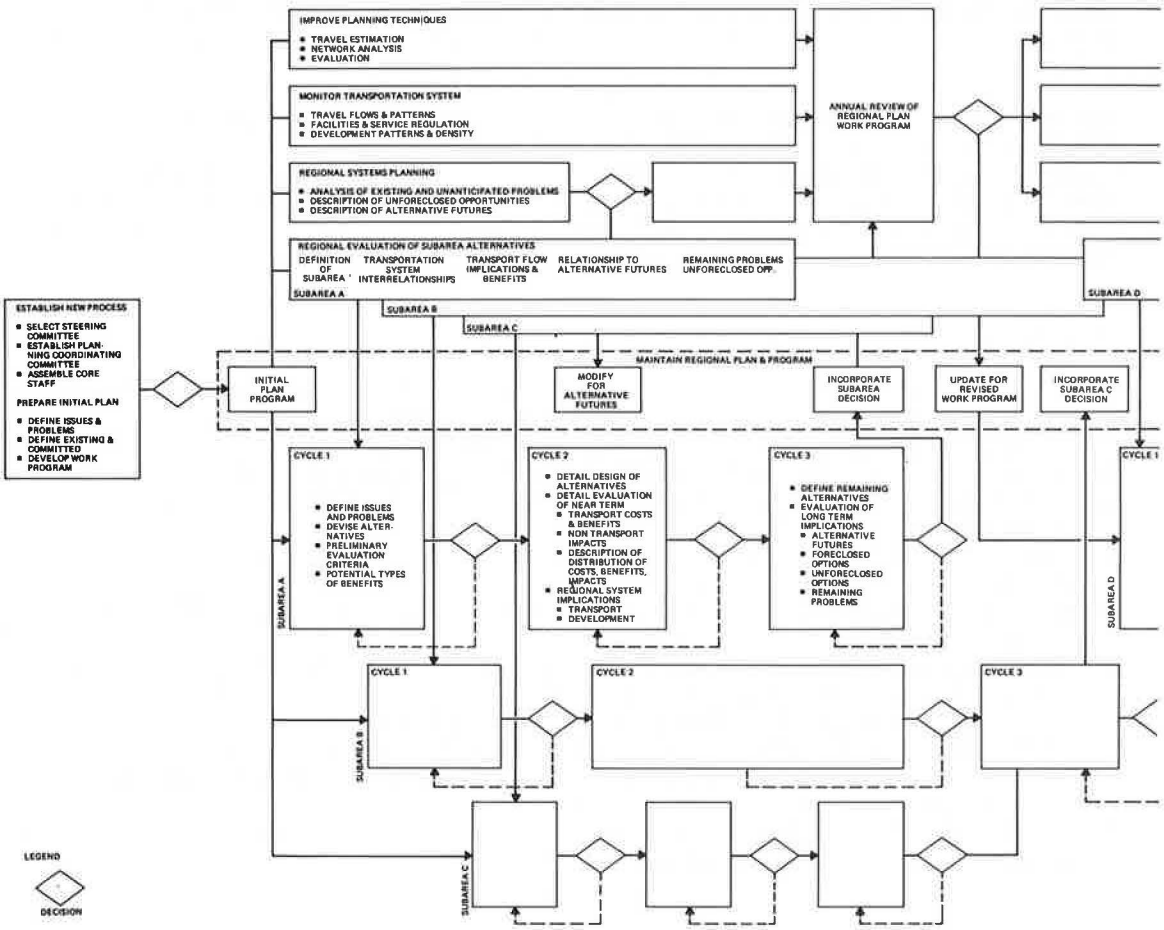


Figure 4. Prototypical work program.



direction is the result of a sequence of decisions and the response to those decisions over time, not the existence of a long-range plan.

Given that the plan is no longer a picture of an end state, the components of the new on-going process are as follows:

1. The existing transport system not only portrays the physical facilities that constitute the transport network but also describes the types and levels of service currently available and current transport policies relating to the operation and regulation of the system.
2. The committed transportation improvement program describes those actions for which there is a firm implementing program, i.e., an allocation of resources, and should display not only the allocation of funds for capital and service improvements but also any policy actions to be implemented. Further, this portion of the plan should fully describe the allocation of technical study resources; e.g., preparation of final designs for a particular facility, undertaking of a subarea study, or preparation of a new regional land use forecast.
3. Unresolved transportation problems include the existing and anticipated transport and transportation-related problems that will not be resolved by the committed transportation improvement program and both near and anticipated long-term problems by type, geographic area, and time.
4. Unforeclosed transportation opportunities are those alternative possible transportation actions that have been suggested to resolve the unresolved problems or to exploit an opportunity for social or economic improvement about which no decisions have yet been made. In addition, this part of the process would describe alternative long-range future metropolitan development patterns toward which the region could be directed, depending on the nature and timing of future decisions relative to transportation policy.

Although a document with the above components will be less than satisfying to those looking for a clear and stable objective for urban areas, it should provide a more realistic basis for decisions about transportation in metropolitan areas. It would provide basic information to everyone concerning where metropolitan transportation planning is today, where it might be in the future, and what is currently being done to direct the development of our metropolitan areas.

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