

TRANSPORTATION AND LAND DEVELOPMENT  
RESEARCH NEEDS AND RECOMMENDATIONS FOR ACTION

by

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The debates over traffic, growth, and development raise a number of questions with important implications for the transportation research community. For example:

- o How does physical design affect the transportation characteristics of a community? How can transportation projects contribute to good design?
- o Does travel behavior differ in different physical settings, other things being equal? How stable are traveller responses to traffic conditions and transportation alternatives? What socio-economic factors are important in predicting location and travel decisions of people and businesses?
- o What are the implications for land development patterns and travel of emerging technologies in transportation and telecommunications?
- o Do we need to rethink our institutions and intergovernmental arrangements in order to accommodate emerging transportation, communications, and land use patterns, lifestyles, methods of finance? What kinds of organizations and decision processes would meet emerging needs?

Research in each of these areas could improve our understanding of land use and transportation, and could help guide public policy development.

RESEARCH NEED #1: PHYSICAL PLANNING STRATEGIES

Planners and engineers today recognize that much of the development built after W.W. II not only is oriented to the automobile but is actually hostile to transit and pedestrians. In a number of areas there is active interest in reversing this situation, creating communities in which foot, bike, and bus (or rail) are the travel modes of preference. Land use strategies encouraging "pedestrian pockets," jobs-housing balance", higher densities, mixed use development, and transit-friendly design are now being actively pursued in a number of jurisdictions.

To date, however, there is little concrete information on the feasibility, acceptability, or efficiency of these measures. Some of the more commonly raised questions are:

- o Whether/under what circumstances the mode shift potential created by higher building densities, clustering of buildings, etc. offsets the congestion effects also produced.

- o Whether/how/under what circumstances trip-making associated with mixed use development differs from that associated with more conventional single use development.
- o Whether on-site transportation amenities such as pedestrian paths, bikeways, showers and lockers, etc. make any difference in mode choice.
- o Whether the availability of on-site services in employment complexes and in residential subdivisions reduces total non-commute vehicle trips (or trip lengths) significantly, and/or increases employee willingness to commute by modes other than the single-occupant auto.
- o Whether suburbanization of employment will, over time, help reduce trip lengths, or increase them.
- o Whether/how much policies encouraging additional housing development in parallel with job growth will help reduce commute trip lengths, congestion, and related problems
- o Whether growth management strategies such as urban limit lines, infill incentives, and growth-pacing controls aid in traffic management.
- o How the efficiency of strategies varies with locus in the metro area, city size and function, density and types of uses, and transportation network structure.
- o What other benefits and costs, direct and indirect, are associated with these strategies.

Conflicting views can be found on a number of these matters. For example, some argue for strong policies to encourage housing development in closer proximity to jobs, and vice versa; others assert that proximity is less important than clustering (so that transit and ridesharing is facilitated), and argue that jobs-housing balance absent such clustering might even lead to more auto use and more sprawl (since trips in the 2-10 mile range are in general too short for pooling and too long for walking and cycling.) Both research and monitoring efforts will be needed to establish a body of reliable information, and to address questions of where and under what conditions the land use strategies are likely to be effective.

Research that is more in tune with an understanding of real estate markets, employer behavior, and the space needs of various business also is in order. For example, some recent trip generation studies at suburban locations have been called into question because they failed to account for the weak real estate markets at the study sites. When rents are depressed, businesses can afford more space per employee than when prime rents are being charged (which is more likely when vacancy rates are low.) Thus the number of employees per 1000 square ft. has been found to vary at different times, from as low as two to as high as four in the same, fully occupied, building -- depending on rents, space availability, and whether the building management was willing to make concessions in order to lease up the building. Significant variability in employees per square foot (and

trip rates) also may be due to employment type, building design (especially floor layout), and employer size. Better information on the effects of these factors, and better accounting for them in studies of traffic generation, are needed.

#### RESEARCH NEED #2: UNDERSTANDING TRAVEL BEHAVIOR

Investigations of changing demographic, social, and economic factors may provide new insights into the ways in which individuals and households make travel choices. Among the questions that may be relevant to transportation and land use planning are the following.

- o Effects of changing population characteristics, household composition, and lifestyle choices on location decisions and travel behavior, e.g., child care as a consideration in location and travel choices; travel behavior of active older adults.
- o Impact of two-worker households on residential location decisions and travel choices.
- o Impacts of crime rates, ethnic mix, class mix, etc. on location choice and travel behavior.
- o impacts of time constraints on trip chaining, and hence on mode choice, number of trips generated, destination choice for non-work trips, VMT, and emissions and other environmental impacts.

Some research has been done on each of these matters, but additional work will be needed before the implications will be clear. While research on travel behavior is, at present, mostly a concern of academics, a better understanding of travel behavior ultimately should help transportation practitioners to devise more relevant, effective strategies, and thus broader professional interest seems warranted.

#### RESEARCH NEED #3: UTILITY AND IMPLICATIONS OF NEW TECHNOLOGIES

Congestion relief strategies based on new technologies, including computer-aided traffic control and management, "smart" highways, automatic vehicle detection and monitoring systems, and planned telecommunications substitutions, are under active development. Although in some cases deployment of the new approaches is underway and in several others work has reached the demonstration project stage, most of the emphasis has been on proof-of-concept R & D, and relatively little attention has been given to demand-side issues of markets and competition, to implementation strategies, or to implications for the transportation system and for metropolitan and regional spatial structure. Yet these broader questions may be of critical importance from a public policy perspective, and their study could reveal both opportunities and problems which the new technologies may hold in store.

A wide range of research topics could be identified. A few, to illustrate, include:

- o Development of generalizable findings on the traffic implications and related land use and environmental impacts of "freeway reliever" concepts, in which incidents on mainline facilities would be detected electronically and traffic automatically diverted to alternate routes (primarily parallel arterials).
- o Research on the spatial development implications of highway technologies which could permit order-of-magnitude greater traffic carrying capacity and/or order-of-magnitude greater mainline travel speeds.
- o Analysis of the implications for route choice, traffic levels, and location decisions of road pricing, particularly if it is implemented on only a subset of limited-access facilities.
- o Assessment of the spatial implications of widespread availability of work-at-home/telecommute option, including effects on location decisions and non-work travel.
- o Assessment of the land development/redevelopment implications of just-in-time inventory management (and the transportation impacts of changing land use patterns).

Work on some of these topics would be practical, on many others speculative. Both types of work could yield important insights on transportation-consumer behavior-activity system interrelationships.

RESEARCH NEED #4: ORGANIZATIONS, INSTITUTIONS, AND THE FRAMEWORK FOR DECISION-MAKING

The past two decades have seen an accumulation of changes in federal, state, and local policy, ranging from federal withdrawal from many transport, housing, and industrial development policy arenas to greater acceptance of public-private partnerships and greater (local) willingness to experiment with growth management. These changes already are having major impact on transportation and land use planning, and additional shifts will undoubtedly result from post-Interstate transportation policy deliberations and the debates over directions for such matters as air quality. Organizations and decision processes designed in a different era to address the issues of an earlier time are in some cases showing signs of stress in responding to the new mandates and new rules of today's situation. Partly as a result, there has been a surge of experimentation with new governmental and public-private organizational formats, new decision approaches, and new planning processes. Research on the effectiveness of these innovations is needed, along with additional thinking on how land use and transportation actors might better coordinate their efforts.

Among the topics worth examining are the following:

- o Assessment of the efficiency of multi-jurisdictional planning efforts of the sort gaining popularity in areas where locally-based attempts to

reduce traffic and manage other growth impacts have proven inadequate to the problem.

- o Development of strategies for coordinating local planning with regional and state planning; exploration of alternative institutional arrangements and assignments of responsibility, reflective of emerging financing and decision-making realities.
- o Assessment of mandates now in effect in some states for state/regional/local land use and transportation plan coordination and consistency.
- o Assessment of the performance of transportation management organizations (TMOs) and other private-sector or public-private organizations for transportation planning and service provision.

Approaches such as these seem likely to be the focus of considerable activity in the next few years, as urban areas struggle to cope with congestion and to manage development (whether promoting it in areas in need of growth, or controlling it in high-growth areas.) Better information on the options would be helpful, as would creative thinking on other approaches that might be taken.

#### CONCLUDING COMMENTS

Transportation and land development have long been topics of interest to researchers as well as practitioners. Today, changes in technology, finance, and public policy are converging to change practice and challenge theory. The field thus is ripe for renewed efforts in research, experimentation, monitoring, and evaluation. For these activities to be fully productive, communication of findings among the various actors will be critical.

#### TRAVEL CHARACTERISTICS AT LARGE-SCALE SUBURBAN ACTIVITY CENTERS: STATUS OF CURRENT RESEARCH

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#### RESEARCH PROBLEM STATEMENT

Suburban Activity Centers (SAC) are one of the fastest growing segments of our urban areas. However, there is very little up-to-date information on travel characteristics of these activity centers, particularly the large-scale, multi-use suburban centers that have been developed recently. For that reason, NCHRP Project 3-38(2) was initiated to collect and analyze travel characteristics data appropriate for use in evaluating the site impact of individual buildings, the regional traffic impact of individual buildings, the regional traffic impact of SAC's, and the internal trip characteristics of SACs. The following is a brief summary of the research approach and of the key findings. The complete document